

Questions raised and answers given during GDA consultation events

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Staff event – 2 February

Q: Is it right to accept that safety included safety, security & environmental protection? I continually fight a battle with XXX that safety doesn't cover environmental protection & I think without explicit mention of environmental protection folk do tend to forget it?

A: We have worked very hard to embed environmental culture in that safety, security and environment mind-set. Safety, security and environment together is an expectation in the IAEA guidance on management systems. This approach is consistent with international guidance. To be consistent with international guidance and expectations we need to make sure there is an integrated approach but that environment gets the right profile within that approach, rather than separating it out as a separate consideration. This approach is how we have responded to dealing with MSQA aspects of GDA. ONR also reference an integrated management system within their SAPs and that is because so many factors influence a safety management system.

Q: Does GDA cover decommissioning waste management?

A: Yes, but not every aspect in decommissioning. There are some aspects that are out of scope of GDA, for example, liquid wastes. This is partly because we cannot predict what is going to be used and what secondary waste would be resulting from decommissioning, but, in terms of the structure of the design, the solid waste from the primary circuit is considered in GDA.

Q: When it comes to Higher Activity Waste, please can you explain how we are advising requesting parties on our expectations for management/treatment/storage of HAW prior to final disposal (in a GDF)? How involved are RWM in conversations regarding future disposability of HAW (including spent fuel)?

A: For GDA we do expect the requesting party to have significant engagement with RWM and we do expect a conceptual disposal assessment to be completed. At the moment we are advising that there will be an interim fuel store for both spent fuel and higher activity waste. Although, the actual management process falls within ONR's vires the EA look at it to ensure it doesn't prejudice waste disposal and that waste is not put into a form that can't be undone and disposed of safely. We look at expectations of being able to monitor all the requirements of a geological disposal facility and also a low level waste facility, so the requesting party has to show that they understand what needs to be measured, what environment could cause corrosion and how that could impact on disposability. We require the requesting party to submit all this information to RWM, and then it is for RWM to do a conceptual disposal assessment. Our expectation would then be for the requesting party to have a plan in place to act on the advice from RWM.

Q: How do site specific issues come into these "proposed appropriate limits"? In particular I'm thinking of cooling water discharges for direct vs indirect cooling.

A: The cooling is chosen mainly for ONR's assessment work in GDA relating to safety. We (EA), do not do any assessment on the cooling system at GDA as the impact of the proposed cooling system is so site specific.

Q: Are any considerations made in GDA for neighbouring sites, such as operating or decommissioning stations and potential combined impacts, or is that left entirely to the permit application stage?

A: No, we cannot consider adjacent sites until we have a real site. Combined impact of adjacent sites will be considered at permitting.

Q: General question, does any other country have a GDA type assessment approach which supports licensing / permitting?

A: Yes, Canada's does.

Q: RWM will be assessing disposal of this spent fuel in a copper disposal canister – so it is considered in RWM's work for GDA?

A: This is for RWM to advise on as a consultant to the requesting party on the disposability of spent fuel. The requesting party takes this advice and then liaises with the EA and this is the information that the EA assesses to ensure consistency. At present, the EA are awaiting further information on how the requesting party will act upon RWM's advice. This is set out as a potential GDA issue.

Q: Do we know to what extent other countries rely on our GDA process to provide reassurance for implementing these designs in their own countries?

A: CGN and Hitachi GE both saw GDA as a good way to put their designs through what is perceived to be one of the most robust regulatory systems in the world as we are goal setting regulators. It is up to the requesting parties to demonstrate to us as the regulators that their proposals protect the environment in a proper way and is safe and secure. This is an advantage of GDA.

Unanswered Question: Q: What about food doses – local family source of milk etc.?

Staff event – 4 February

Q: Can we advise on what type of reactor is built (e.g. pressurised or boiling water reactors), or is that for the operator to justify?

A: The vendors put forward their designs for assessment. We don't / can't dictate the technology.

Q: Where does the water in the primary circuit come from?

A: The water in the primary circuit comes from public supply, this is conditioned to be very pure.

Q: Is the reason for keeping the water liquid in a PWR that it effects rate of heat transfer from the reactor and therefore control and safety of reactor?

A: Pressurised water based stations are large water conditioners as it works by keeping the primary coolant hyper clean. There are some chemicals added to condition surfaces and to avoid activity getting into the primary coolant and to protect the fuel so that you don't get leakage through the fuel cladding.

Q: Is there any loss and replenishment from / to the primary circuit?

A: Primary circuit water is very pure, treated water. Losses from the primary circuit are very small as it's expensive to replace. Water is treated and reused where possible.

Q: How radioactive is water within the primary circuit?

A: There is a water conditioning plant that keeps the primary water clean so it can be reused. Some radioactive discharges arise from that clean up. The primary circuit water/coolant would have to be cleaned up before it could be discharged as waste.

Q: Do we know why there isn't a Bradwell B (like there is a SZB, HPB, Heysham)?

A: Bradwell was the only station at the site until proposals for the Bradwell B site came forward and so therefore never had to be designated as 'A' site.

Q: Did the CEGB look into building a Bradwell B?

A: We weren't sure about this but we did note that the CEGB looked into a number of sites at the time.

Q: What contingency is in place in case of further delays in finding a suitable geological disposal facility?

A: The UK Governments base case for nuclear new build is that fuel should be stored at sites or elsewhere in an interim store safely until such a time as a geological disposal facility becomes available and then it would be disposed of. The design life of a spent fuel interim stores for nuclear sites for nuclear new build are a minimum of 100 years. There are active programmes underway to secure a geological disposal facility and there is at present two volunteer communities to host a facility.

Q: Where does the environmental effect of construction - a big building site for several years- fit into the process?

A: These matters would be considered at the planning stage. Primarily, this stage is when considerations of transport, noise, impacts on health services, accommodation for site workers etc. are addressed.

Q: Are we allowed to know which 2 areas have stated that they want to host a GDF?

A: Working Groups have been formed in Copeland and Allerdale, to begin discussions about the potential for hosting a geological disposal facility for the disposal of radioactive waste. [Further information <https://www.gov.uk/guidance/geological-disposal>]

Q: So the Nuclear EA permit will not contain a noise condition?

A: No. The radioactive substances regulation (RSR) permit would be about solid waste and liquid and gaseous discharges.

Q: Does the ecological impact of different designs (e.g. impacts of different cooling systems on fish mortality) come into consideration at the design stage?

A: Yes, but at the site specific stage. It was decided in generic design assessment, similar to the other reactors that we have assessed in generic design assessment, to take that forward as a once through direct cooling system. There are safety matters that have to be addressed as part of that choice because it has to maintain adequate cooling when you shut down a reactor as there is still a lot of heat to dissipate. But really it is the site that decides the nature of the cooling system and the size of the plant that you put onto the site. The quantities of water required to cool a reactor are quite large, for example at Sizewell C, 45 cubic meters are needed to go into the turbine condensers every second and at Hinkley Point C, 135 cubic meters per second are extracted from the Bristol channel. The issue with Bradwell is the length of the cooling tunnels that would be needed to guarantee suitably cooled water to condense therefore the proposal from the company is to use hybrid cooling towers.

National Stakeholders – 10 February

**(No questions were asked at this event)*

ONR:

- People will see that we do work on safety related to waste and spent fuel.
- We look at safety aspects and risks to both public and workers.
- We have 4 regulatory observations covered for safety for intermediate level waste and spent fuel storage, which are published in the public domain.
- We reassure that ONR work closely with EA to make sure that assessments are consistent.
- We learn from and support each other, taking into consideration all impacts of waste matters.

EA:

- We make GDA as open and transparent as we possibly can.
- There are a whole host of assessment reports from ONR and EA.
- We have gone through the process to get us to here.
- There is also a comments process where anybody can ask questions, which go to the requesting party, who will respond or send them to the appropriate organisation to respond.
- We as regulators see both questions and responses and can use them to help form our assessments.

GNSL:

- We work with the EA and ONR in an open and transparent manner.
- The process is suitable to allow us to create a safe design for the UK.
- We are working on the issues that have been identified and are confident that they will be resolved within the GDA.

Maldon District Council – 11 February

Q: Is this design of reactor similar to other CGN reactor designs and if so why can the 6 GDA issues raised not be answered by these reactors and is this type of reactor novel?

A: This design is an evolution of the Westinghouse design and not novel technology. The company noted that they welcomed challenge from the regulators and are confident that the remaining GDA issues will be resolved.

Q: Given that the generic site is defined as an estuarine site, what other experience do the Environment Agency have of regulating nuclear sites in an estuarine environment?

A: Oldbury and Berkley are all estuarine sites. Heysham is also a low natural dispersion site.

Q: Question relating to proposed discharge of water from the cooling system. Will water from the cooling system be discharged into the estuary or further out into the sea? Will the cooling pipes be located on the surface of the estuary bed or sub-surface? And how will this affect the temperature of the surrounding water?

A: One of the key assumptions used in this GDA is that the generic site uses once through sea water cooling. This type of cooling system generally raises discharge water by 12 degrees Celsius. Each site is different for tolerable limits in temperature and would be subject to further assessment at the site specific stage to understand the impact fully. (Additional comments from company to support answer: Bradwell B Co are proposing to use an indirect hybrid cooling system for the proposed Bradwell B development. The cooling pipes would be tunnelled.)

Q: How does the GDA for UK HPR1000 hold for Wales and Scotland?

A: As the Environment Agency are the environmental regulators for England, this GDA is relevant for proposed nuclear sites in England. For the ABWR GDA, Natural Resources Wales (NRW) were involved in the GDA alongside the Environment Agency as this design was proposed for the Wylfa Newydd site in Wales. The decision was made by UK Government for NRW to not be involved in this GDA. At present, current policy in Scotland is for no new nuclear development and therefore the Scottish Protection Agency (SEPA) will not be involved in this GDA.

Q: Do the proposals for an interim storage facility at site for spent fuel take into consideration future impacts of climate change?

A: (ONR provided response) Current proposals for interim storage of spent fuel at site is a dry storage facility. As part of the safety case, ONR assess proposals for spent fuel storage to ensure risks are as low as reasonably practicable (ALARP). As part of this, assessments take into consideration extreme weather events, the latest climate change predictions and cliff edge effects. ONR have both an internal panel of experts and also consult an external panel of experts to review this. Regulatory Observation number 50 looks at selected spent fuel interim storage technology. The company also responded to advise that the interim fuel store on site will store fuel for 100 years as per current BEIS policy and then this will be disposed into a geological disposal facility (GDF). GNSL are working with Radioactive Waste Management (RWM) to ensure that fuel stored on site will be acceptable for any future GDF.

Q: How site specific is GDA?

A: GDA is about a generic site which has been specified in terms of its attributes. ONR and EA did challenge some aspects of the generic site initially put forward by the Requesting Party.

Q: How would the environmental regulators approach the UK HPR1000 design acceptability should a site come forward in Wales and Scotland?

A: Natural Resource Wales and the Scottish Environment Protection Agency would have to decide how to take this forward as the environmental regulators for Wales and Scotland.

Q: How will the spent fuel be transported to a GDF?

A: Transport of spent fuel is regulated by the Office for Nuclear Regulation under the Ionising Radiations Regulations 2017 (IRR17) and transport of radioactive materials, but, this is not assessed as part of GDA.

Q: Should we expect that the cooling water discharge will have some sort of radiological discharge?

A: A radiological impact assessment is conducted on the generic site as part of the GDA. For other chemical impacts, assessments are done slightly differently and require more site specific data.

Q: Is a social impact study carried out for GDA?

A: A social impact study is not carried out during GDA. This would be done through the planning Development Consent Order process at a site specific stage.

Other comments:

- It is very difficult to think about a generic site when the design is proposed for one site.

BANNG & Colchester Borough Council – 17 February

Q: Is GDA ongoing, given that BRB have said they have a pause for at least a year in the development of Bradwell B, because of the Covid restrictions they have difficulties getting the engineers to and from China? Will this affect their operating Experience?

A: GDA is a separate process and will count for any site in England. ONR is Great Britain in terms of New Build so from that angle of safety and security will be covered already. Therefore, no impact on GDA because we will carry on as a process and we are targeting completing about this time next year.

Q: Concerned that the public would probably concentrate on the Bradwell site because they believe that is what the HPR100 is for. At the BRB Community forum it was mentioned that if there were responses that looked at the specific site that they wouldn't be included in this consultation. Worried that people/public will put in a lot of time and effort given it's a very complicated consultation for the public. Why is it a public consultation given it's so complicated and technical? If the public are going to find out that the responses are not going to be included because they've referred to the Bradwell B site, which is inevitable, how will you deal with that?

A: In terms of responses which are site specific is to be only Bradwell, then those response will have to be taken if proposals come forward and permit applications come forward, they would be considered at time. If we can read it into GDA at the generic level then we would. It was promoted primarily by Alan McGoff to give people opportunity to talk and comment on the work and would be wrong to take it away. The new updated GDA process, there is a route to take you to step 3 which shows that a developer can choose to do a more limited GDA which doesn't include consultation, but includes a detailed assessment and will be more restricted. It therefore wouldn't get a DAC (Design Acceptance Confirmation) or SoDA (Statement of Design Acceptability). The only way to get a SoDA is to go through the consultation phase. The requirements in the new GDA process to get a SoDA are not the same as what they are in the existing process.

At the end of the consultation if there are responses that are relevant to site specifics then they will be passed to Bradwell B, the same with those that are relevant to safety will be passed to ONR for consideration. We will not be able to address the responses as part of GDA but will pass them onto the company. They will be reported back in our summary of consultation responses.

Q: Although it's a technical report it is brilliantly written.

How far the various issues that you are raising aren't causing concern with the company and how far might this be a potential reason for the slowing up because they are saying that there are a lot of things to sort out. Media are suggesting that is partly the EA's intervention with these various issues that maybe causing the concern. How difficult this is for them? How far you think they will be successful resolution within the original timescale which is the scheduled for beginning of next year? Has the CGN come in too early and now beginning to falter because there are some fundamental issues that they are not getting to grips with and my find it difficult to get to grips with? I would like your considered view on how this process is going and whether there is a genuine slowing up because of the GDA or is it just that they are gradually stepping away from the project?

A: We don't see any slowing up in GDA as they are continuing at pace. Work is continuing on site suitability specifically for Bradwell. Proposals are best informed by more information about a site. I haven't come across a project were getting more information and trying to get it right at the beginning wouldn't help. As we understand they are doing more work at the site and certainly no let-up in GDA.

I don't believe the press association with that is right. GNSL would have been able to provide and an authoritative view if they were present.

When Coronavirus hit us we had to change the ways of working and we moved to do the meetings virtually and they are working well. We are communicating on a daily basis with the Chinese engineers to clarify our questions. We continue issuing our regulatory queries and the regulatory observations as you can see on our website and receiving answers. At the moment we are completing our assessment and will start writing our report soon.

I haven't seen any impact in the GDA on the factors mentioned in the press.

On linking the press with the 6 issues, we are confident that they are all resolvable at the end of GDA and confident that the requesting party know exactly what they have to do to resolve them.

Q: Relating to page 17, Input of Government actions to facilitate Nuclear New Build under Strategic Setting Assessment and it says 'This work identifies sites that are strategically suitable' but no mention that they are potentially suitable?

A: They are potentially suitable subject to all site specific considerations

Q: Should that be in the document?

A: That's effectively what it means by potentially suitable, however there's been interchange of words. EN6 applies to deployment by 2025 so it's a document of interest now as opposed to in the planning process. At the BEIS NGO Forum there was a discussion on what BEIS are intending to do because it is in the white paper to develop a new updated National Policy Statement.

Q: Page 21 under 'Detailed Assessment' it says 'To ensure people and the environment will be properly protected'. Is that during operations or the construction period?

A: That specifically thinking about the environment being protected during operations and decommissioning and not construction. This is outside GDA.

Q: Page 80 'Future Operator will have to do this that and the other' – are you talking about BRB as the future operator? Concerned that members of the public will be thrown off by reading about a future operator and thinking it was BRB.

A: This will be any future operator if we are talking about any assessment findings. Those are what the future operator or potential licensee (for ONR) would be required to do. It's not for GNSL to do and it's the same process that was used for Hinkley. UK EPR GDA had hundreds of assessment findings recorded and they are being gradually addressed by EDF or NNB Genco Hinkley, who are the operator.

In the Environment side we include them primarily what we call information requirements and conditions in the permit that we issue so that they are tracked through from GDA to the site specific period. The caveat is if you have the same operator or even a different operator, if you build a second site like Sizewell, they would probably go from the design that they have now developed further into the design at Hinkley rather than go back and do assessment findings all over again because that be inefficient.

Q: Page 86 Preliminary conclusions - doesn't see how we are going to get away with people talking about Bradwell site. Blackwater Estuary does have peculiarities and has a long refreshment period of 10 days and people will be saying something about that. Does the preliminary conclusions take that into consideration?

A: This has been discussed at past meetings when we were looking at Bradwell A. There is a data set that we use that has been produced by Cefas for our purposes, which indicates how in the sense of logical assessment, the water exchange will impact on people's exposure. It looks at the context because we are looking at annual dose, looks at the context in an annual situation. There may be differences on shorter timeframes than that but the situation that we are interested in are annual dose. The daily exchange rate is converted into a volumetric conversion factor, which is applied to the modelling and then gives us the outcome that way. It is done conservatively so tends to overestimate the outcomes.

They used Bradwell parameters for the dispersion. There is an EU system which was produced by The National Radiological Protection Board at the time and there is a data set there that they published which they have used. The independent data is revised data which we got from Cefas, so we asked Cefas to look at the numbers again, and they used slightly different numbers which gives slightly lower outcome using a more refined data set. So yes the peculiarities of the refreshment period have been taken into consideration.

Q: Has HR Wallingford been used for consultation again?

A: The factors that were used came from Cefas because they as under contract to us, they generated a data set for Nuclear Coastal including the Bradwell area. Using PC cream software version zero eight which is what is recommended for dose assessments in the UK.

Q: Public Health England website states that it's only fine for very long periods, rather than any short duration releases. Whilst the GDA is not specifically talking about the Bradwell site, it does include coast and estuarine cooling water abstraction potential and that software, according to PHE, does not include estuarine modelling.

Lots of little things that are quite concerning that appear in the text. Page 43 'Height of the discharge stack' – States height will be decided once a site was decided. However, EA must have minimum requirement for this as stated earlier that the sites are pretty much on flat territory. I feel that's missing. Where the consultation is requesting 'how do you feel about what the EA has done about this' things like this are concerning.

No view of Carbon 14, no guarantees for liquid radioactive waste management system to be held within limits, also table on page 47, when you have to the power figures, for most lay people these are relatively meaningless unless you really understand fairly advance arithmetic and maths.

Are you looking for someone to go through and pick up certain points that technically are concerning? The stuff about the waste is deeply concerning and the whole timescale, document states that the spent fuel might have to be moved earliest potentially 2310 (unsure). How can you have a definite view on dates and say the EA doesn't have concerns, when the industry hasn't existed that long?

Spent fuel particularly, the way it morphs unpredictability comes into play. It is not predictable and is forever changing. How can these terms of 100+ be regulated?

A: This something that is part of our communications and we would take away and think about it a bit more as we try to learn for subsequent consultations. We are trying to be helpful and set it out as we see it.

The requesting party have told us what stack height they expect for the design. So we have based our assessment on that stack height, however, we have looked at a shorter stack as well as part of the screening of the site, so built into that is ground level release assessment and a release at a higher level placed on the information that they provide. To understand how that might change with height. If it goes to site specific, we will require a lot more detail about how the stack height plays into the dispersion around the site and the impact on people. It was based on the reference design at the other HPR1000.

Q: Is the actual stack height listed?

A: They have a real stack height of 70 metres, but when they take into account the simplifying assessment they have used the value of 20 metres.

Because it's such a specific thing it may be listed in the assessment report and not the consultation document.

Q: Concerned about the way it was addressed in the consultation document. The way it reads is that it doesn't matter. What EA are asking is 'are you happy with what you are putting forward as a documentation in a consultation'.

A: What we recognise is the actual stack height for a specific plant will be chosen at the time and will be of a number of factors, not least the dispersion characteristics but there can be a playoff with planning as well because often planners don't like high stacks.

The proposal is for long lived plants, 60 years expected life, which works to the Governments based case for management of spent fuel which is storage in an interim store, followed by disposal after operation of the site and once the Geological Disposal Facility is not only available but available for those disposals because it's required for existing waste. This is the basis of the assessment. The capability to dispose of the waste is dictated with that availability at the geological disposal facility but also with the cooling of the fuel because it has to achieve an adequate cooling were it can be transported. This will be taken into account, it's a heat load factor in transport casks. Would be potentially mixing fresh and well cooled fuel over that 60 years of operation in transport. This is the base case that we have used.

This permit is a live permit and is constantly reviewed and the management of the site is constantly reviewed.

Q: In terms of spent fuel, assumptions seem to be made that it will be cooled between 5 and 10 years in the cooling ponds and then moved to the spent fuel store and gives a figure of 100 years. It is impossible to regulate for that length of time and therefore we are in an artificial situation of purporting to regulate on the idea that these spent fuel stores will be ok for the next 200 years, when in practical terms it is simply impossible.

RWM don't know if they are going to get a disposable facility, whether it will be able to take the whole inventory. It should be looked at that to make it a little more plausible.

A: Although timescales are long, the assumption will be that it will be properly regulated for those periods of time. The processes are in place because of periodic safety review which is carried out by ONR and EA, in terms of our purpose. It's not a case of waiting for there to be an issue, it would be a case of a forward look and picking up issues that come ahead. It's based on the fact that society will continue, which is the underpinning assumption.

Q: You're asking people in the future generation to accept, take it on board and if there is a crisis and the site starts to go alright, they're going to be asking what should we do with all this, should we move it and where are we going to move it to? Have we got the resources to do it? Have we got the technology, skills etc.? Why can't the regulators and industries be honest and say this is very difficult and is an area uncertainty. We are going to give you a SoDA anyway, but simply cannot say whether it's going to happen or not?

The institutional continuity, the society changes and climate change all combined, make it impossible.

A: It might be that future generations might decide that they don't want the fuel to be directly disposed of and they want to reprocess it and re-use it. We are working to the base case at the moment.

A: The work we are doing on spent fuel interim storage safety. We have a regulatory observation number 50, which is quite detailed and it asks about all the evaluation that we want to see now to get confidence that the spent fuel storage facility will be safe. We ask for explicit identification of the hazards and risks associated with each of the stages of these operations of this facility.

When we have one of our bi-annual meeting for you to come along and have one of our specialist explain how we do the evaluation of those risks. Our waste team works very closely with the EA and also with our fuel specialist to make sure that we have an understanding and we can accept that the risks associated with this facility and this operation are reduced in this design as low as reasonable practicable. We do a lot of detailed assessment.

Q: Making a rational point that all that effort cannot conceivably can give any ultimate certainty about the management of those wastes into the far distant future. Are we prepared to take that risk, are we prepared to force onto the next generation and if they say yes then so be it It's a question of how you evaluate the future. Do you assume that the future will get on with it and do things and will take care of itself or do you think the present generation really needs to give more protection? Would like to see more honesty about the uncertainties.

A: There will be options for future generations because these proposals don't foreclose them and that's the best thing that you can give to future generations. It will need to be addressed and dealt with and it's really important that there will be funds to do it, and we need a geological disposal facility, whether or not new build goes ahead because of the existing waste. I would hope that new build helps to encourage securing that geological disposal facility, and it's good to see that being taken forward at the moment.

There are assessment findings within the solid waste section that talk about periodic review in waste management cases. It isn't something that is left alone after GDA. It is under constant review at site specific permitting and regularly after that. It isn't something that is assumed and left. So if the assumptions are constantly reviewed and those change, the whole approach is reviewed as well. The assumptions that underpinned are constantly reviewed and reacted to.

It's this long term periodic safety and environment review which is carried out, which is the foresight. The predictions which are made in the near future, there is a lot more certainty about it, although we are still learning and it's clear from what's going on, but they are better than what the long term projections are. By those longer term predictions, as they come closer to us again, will get better again in terms of uncertainty. The UK regulatory system says is 'not to forget it after it's been issued with a permit or a nuclear site licence or the safety case. It's review and look forward and that's what helps to give confidence that it would continue to be safe and environmentally acceptable.

Q: I do not see how the enormity of the prediction variables, whether they be climate, whether they be affordability, ability, inclination, government policy changes. It is your duty to somehow to state clearly, in a sizable paragraph that says, 'we have to assume that the following are guaranteed by the government of all parties into the future up to 2-300 years hence whatever it is to remain safe. The investments that will be made, whether it's by the operator, the design country, whether we can trust these people to follow up on their promises in 25 years let alone 200 years. We cannot say that you really give it a full clean sheet because of the timescales, risks. We either spend all the money upfront and built massive walls around this and massive access roads, so at least the company that are making a profit out of it, pays for the totality of it and not leaving to vague time in the future when we don't know who is going to pay for it. You have to put conditions on your approvals and need to appear into any report so that any responsible body, who has to make ultimate decisions can see this. You can only guarantee up to a certain point and beyond that it is impossible to agree. We have to be careful of such a hazardous project.

Why do we permit the applicant to decide the generic site if your only looking at one site, or maybe two constructions of the design on one site? Why not make it an all-inclusive generic design approval, call it a site design approval which will protect you more in terms of decision making?

Appreciate that comments would be printed even if they are not valid but they should not be ignored as they are deal breakers, why not do it properly in one go rather than carry on over a number of years?

A: We are independent decision makers but we work in the policy that is set by government. It's a philosophical discussion which and is not for regulators because we have got to act within government policy. It was a significant step forward when they put in waste decommissioning programme, to ensure that technically for proposals for decommissioning and financially the proposals for decommissioning were good and waste disposal. Clearly we are waiting to complete decommissioning on the existing plant, because for a waste disposal site, for the geological disposal facility. We take that on trust as everybody else must do. Our job is to make sure that as long as there is an interim store, and that the waste that is there is safe, secure and environmentally acceptable, that is our role.

We can add and make the point about making the assumptions and underpinning caveats clearer in the report. We need to have a good discussion about this internally when we write the decision document.

The whole point about generic design assessment was to ensure that the regulators had early influence in the design and that the key issues that needed to be addressed were identified and one of the reasons for choosing the generic site should be identified in terms of its characteristics, because that is the key for us, was because they should know better about what their design being designed for. It was also informed by the characteristics of the sites which are in the national policy statement, the sites that are potentially suitable. We do look at those sites, the characteristics which are described and issues were picked up with some of those characteristics and addressed.

One of the ways it was looked at by us was, we looked at in the context as how would it be different if it was in different location as they have to relate to the sites from the policy document that identifies sites that are potentially useable for Nuclear New Build. How does this site compare and does it fit within the envelope that the requesting party has proposed? Does it fit within the broader envelope of the general sites that have been offered by government for new build? We looked at the parameters that would affect dispersion and to make sure that it fits within those. We have tested that in our independent assessments and the requested party have looked at it. The generic site is strongly influenced by Bradwell but not totally based on Bradwell. It is relatively conservative and cautious, in terms of the site because of the way the marine environment disperses. So they have looked at it and reconsidered it.

The key point was that it wasn't just an acceptance of what they said in their Generic site description, there was consideration and validation.

A: ONR looked at the generic site envelope very early in the GDA and whether these could be represented for a UK site. We had a regulatory observation then to say how is this reactor going to safe for the generic site envelope? If the site specific is not bounded by generic site envelope that we look at in GDA, then they will have to look at a lot of other work later on. It's at the risk of the company. Site specific matters will be addressed at the site specific stage.

Q: How can anyone know if the company will have Money for decommissioning and managing storage of waste and we don't even know how much decommissioning current stations costs? This will fall back to taxpayers and future generations.

A: This is government area and outside GDA. It is signed off by secretary of state who is advised by a group on the finance side about looking for appropriate provisions.

Q: What studies have been done to determine the decommissioning of the reactor pressure vessel being intermediate level waste?

As someone who will be answering this individually and assisting our team, how am I to be able to express concerns within the framework of the consultation? It's important to feel that you have contributed to a consultation but it's an awful lot of work to read the document let alone supporting and the submission documents. It's some encouragement that we are on the right track and that what we are talking about, and to be able to convey that within the consultation question framework.

A: We won't address the technical ones here. We are right to be consulting as the questions have been good and in the same way we can ask questions early and so can others, rather than feeling that it has all been left to when it was site specific. Please submit specific points in response and we will give a response.

Local groups and the public – 23 February

Q: What are the major concerns /risks / uncertainties that the Environment Agency feel affect the whole project and have they changed much in the two years since the design was entered into generic design assessment?

A (provided by EA): The biggest technical risk, which was similar across other GDA projects, is delivery of evidence because there is a lot of information that we (EA) assess over the time and the schedule for delivery is quite complex and long. Therefore, it is quite common to start off with a high risk of documents being delivered to programme timescales and to a suitable quality. This is a risk that does diminish overtime as both the regulators and the company progress through the delivery programme. In terms of technical risk, it's having sufficient data to provide evidence to the claims made, for example, HPR's are not currently operating, so one risk directly relates to the data being used to predict discharge limits and so a regulatory observation was submitted to the Requesting Party on this topic. Predecessor designs have been used at present to provide this supporting data as evidence but there is an expectation from ourselves that actual HPR data supplements the verification as we go forward. There haven't been many technical risks identified throughout this GDA as PWR technology is not novel and so the biggest risk has been related to provision of evidence at a technical level.

We (UK) have a non-prescriptive regulatory system, which means that we (EA) don't tell requesting parties how to make a design safe, secure of environmentally acceptable. Instead, the regulators ask the requesting parties to provide evidence for their claims. Other regulatory systems, for example the USA, tend to codify the requirements making them prescriptive regulatory systems. For each of the previous GDA's, the change to the UK's non-prescriptive system requiring the requesting party to fully substantiate their design to demonstrate how it is safe, secure and environmentally acceptable has been one of the biggest challenges. This because all of the designs have come from outside of the UK and helping colleagues from overseas and participants in the GDA understand how the UK approach that regulation has been amongst one of the most interesting areas of GDA.

Q: I came along about a year ago to a consultation that you had in Leiston, and I had just been to an environmental agency meeting on coastal management and it was all about how they were changing their scenarios and their predictions in terms of coastal management. I also went to the consultation in Leiston and I asked them what scenarios they were looking at and had they factored in the latest information from the environment agency and they said no and that they were using the information they had at the start of the project. I get the impression that it's a very laborious linear process and were talking about a very dynamic system, particularly financial, environmental and technical if you look at the Bill Gates view on nuclear technology and where it's going and I was hoping that I would hear someone talk about the holistic view as opposed to the process and the risks associated with the process.

A (provided by EA): Currently we are focusing on GDA and not at site specific. Topics like flood risk and protection are assessed by our colleagues in the Office for Nuclear Regulation as an important external hazard. By comparison, the Environment Agency would normally expect the type of events that need to be considered are beyond what the Environment Agency would be looking at in normal circumstances, but we are active in the process. ONR's responsibilities are primarily about making sure that the site is properly protected from a safety perspective. For the Environment Agency, our focus is generally outside the site making sure that the improvements or requirements to protect a site don't put other sites at unacceptable risks.

A (supplementary to above provided by ONR): In GDA, we (ONR) look at the generic site envelop from the point of view of external hazards and so we look at the parameters of the site that need to be representative of the UK, if we (ONR) think they are not, then we challenge the requesting party. This has already happened for the UK HPR1000 GDA towards the beginning of the GDA. ONR then ask the Requesting Party to look at the generic plant and the generic site envelope for the UK and identify the gaps and any potential design modifications and further proposals to ensure the design is suitable for a UK site and that the design is ALARP. ONR expect that the generic site is as bounding as possible to the site specific characteristics because the more bounded it is the less work a future licensee will need to do later on at a site specific stage in terms of assessment. If the site specific is not completely bounded by the generic site we are looking at in GDA then the prospective licensee will have to

review the characteristics of the proposed site and ensure that the generic design is adapted for the proposed site.

Q: If you look at the press, there is a press line that's says ' the Environment Agency and Natural England have raised concerns about the design changes made to Sizewell C and that they will be rushed through without adequate time to be evaluated'. You are probably aware of those comments that were published last month.

A (provided by EA): I think we have to be careful not to stray into Sizewell C territory, but to provide a response, we (EA) are considering the changes to the site and the proposals at Sizewell C at the moment as part of our role providing advice in the planning regime. There have been some changes proposed for transport arrangements for example and its right that we look at those but this is outside the scope of tonight's meeting.

Q: Regarding radiological discharges, whether that be through the cooling water or through the atmosphere, how does this plant compare to other UK plants such as Sizewell B?

A (provided by EA): For the UK HPR1000, they are all the same order of magnitude in terms of gaseous emissions, for example, Carbon 14 emissions to air is 1.6×10^{12} which is 1.6 terabecquerel and it is about 1×10^{12} for Hinkley Point C so they are the same order of magnitude with small variations because the design and the power output is different. On the liquid discharges, the UK HPR1000 design is slightly higher for tritium but lower for Carbon 14, which in terms of order of magnitude they are very similar. They are both pressurised water reactors and what often affects discharges is power output rather than the overall technology differences. There is a comparison in assessment report for discharges which is published on GOV UK.

Q: The discharges in the table in the assessment documents, the radionuclides detailed, although they are small numbers they add a large headroom figure to each of them. Please could you advise how each of these headroom figures are calculated and whether this is because this particular station isn't in operation at the moment?

A (provided by EA): The discharges are calculated with expectations for average discharge under normal operations and then there are reasonably foreseeable events, which is what happens if you have failed fuel, so there is a little bit added on. The headroom factor is uncertainty. The data that supports the discharge estimates for the UK HPR1000 is put together from operational data from a range of other power stations so there is variability across those. Due to that variability, the headroom factor takes into account that uncertainty and it's quite high. As we go to site specific and start to receive data from HPR reactors in operation we would expect that to be refined downwards and as a HPR started operating in the UK it would be refined downwards again. So the uncertainties are large but that is because the data is taken from a range of other plants and the HPR design is not currently operating.

Q: How will that affect any other environmental assessments if they choose a lower figure for the assessment when actually it's moved upwards in impact?

A (provided by EA): At generic design assessment we have a worst case scenario because the headroom is large, so the predicted discharges that are presented in the GDA documentation are actually much higher than we will expect in reality. The outcome of the assessment is actually an upper bound.

Q: So would we be expecting the higher figure (figure plus the headroom) in the Environmental Impact Assessment?

A (provided by EA): The requesting party have identified what they think their upper limit will be on their discharges which has some headroom and we assume that that level of discharge actually occurs into the generic site and into the environment around the generic site. Therefore, should the design progress to operation the permit limits will be set and refined based on operational experience so we would understand what the maximum expected impact is going to be because it is assessed at the expected discharge limit.

Our assessment are at the discharge limits which we have used in GDA, when it comes to actually permitting a site, we (EA) set discharge limits based on what's necessary for normal operation of a reactor and that includes consideration of the reasonably foreseeable events that are expected to occur over the lifetime of a station. The actual dose which is calculated from assuming discharges at those limits is well below what would be the public dose limit for example. If you set the discharge limits on the basis of dose the head room would be huge by comparison and also the permits have a requirement which is that discharges are minimised so it isn't just a case for an operator to comply with the discharge limits, they must also minimise discharges using best available techniques but also the impact using best available techniques.

Q: Referred to potential GDA issue 6: Is the assumption that spent fuel will be stored in the spent fuel ponds for say 10 years and then this would be moved to an intermediate storage location, for example, similar to the one built for Sizewell B.

A (provided by EA): Yes, exactly right. In relation to this potential GDA issue, we are awaiting advice from Radioactive Waste Management to advise that all the information that they have been provided on the intermediate level and spent fuel waste will be compatible with the GDF and they will provide advice back to GNSL on how they need to develop their information going forward. We do not anticipate any problems, we know that the spent fuel going in there is not novel in any way but what is lacking is that evidence from RWM to say it is compatible. This is a programme issue and not a technical issue, caused by the lateness of information.

Q: In your studies, can you find any innovation or any innovative ways that this plant has been put together which will reduce any environmental impact?

A (provided by EA): The design is evolutionary not revolutionary and there has been an evolution of the design from previous French designs.

A (supplementary to above provided by GNSL): This PWR is an evolution of previous PWR designs so there is no per se very big innovation. Probably the best innovation that is in this plant that isn't used elsewhere is the machine to enable removal the most active waste from the core and storing it in a safe and stable way immediately where other plants used to store it in the spent fuel pool for long term until decommissioning. This feature will enable higher activity waste to be encapsulated as it is produced and to be stored in a safe way in the interim storage facility until a geological disposal facility is available in the UK.

A (supplementary to above provided by ONR): From a safety perspective this reactor has a very interesting feature. There is a large tank of water on the top part of the containment which can passively cool the secondary circuit in which steam can enter this system and condense to cool the system if there is a loss of feed water to the steam generators. This is an evolutionary feature of this PWR.

Q: Does the plant have core catcher like EPR design?

A: It doesn't, the management of the molten core is in vessels so they have a feature to passively flood outside the reactor pressure vessel so it doesn't break and the molten debris doesn't come out of the reactor pressure vessel. The major innovation of this design is all passive cooling systems and keeping the core within the vessel.

National NGOs – 24 February

Q: What is the annual total of alpha-emitting particulate matter expected to be discharges, or licensed for discharge? What is the expected size distribution of the particles? What element and isotopes are involved?

A: Essentially PWRs do not emit alpha radiation. So the annual total of alpha emitters is below detectable levels, so essentially zero. It is not subject to a limit because it's not a significant nuclide as listed by the requirements of what constitutes a significant nuclide that requires limits. In terms of size distribution because it's so low, there is no size distribution data internationally, PWRs do not discharge particles to liquid. In terms of elements and isotopes, if you were able to detect them, they would be Am-241, Cm-242, Cm-244 and possibly Pu-239+240. We have no alpha limit because it's not detectable from PWRs and that is not just to do with the HPR, it's across PWRs generally.

Q: Just because the alpha emitter's levels are not detectable, doesn't mean they are not present? If they are present they present potential harm to individuals, as your calculations maybe wrong.

A: The limits of detection are so low, that if you were to do a dose assessment on that, they would come out below any threshold of impact, so detectable presence and harm are completely separate parameters. Our assessments are based on the international best practice currently derived. We use PHE recommendation and specifications in our dose assessment.

There is an independent dose assessment, which is based on the defined generic site that has been carried out and is part of our consultation package.

Q: As a supplement to my first question, what proportion of total alpha-emitting particulate matter is expected to be discharged to the atmosphere and what proportion of water? COMARE/Government/PHE will not have discussions with us to discuss this.

A: Given that they are both below the limit of detection, it is a question that is unanswerable. The detection limits are low

It's the same issue, whereby using the methods for assessment which are from PHE, we say that the level of discharge is very small and the impact is very small, and that's assuming it's at the limit of detection. You would see it, if it was above that level, which is the key bit of logic that we put into it. We accept and acknowledge that there is a lot of discussion, lack of acceptance of those methods in the NGO community. As both the Environment Agency and ONR, we cannot solve that. It is a debate, a discussion and resolution, if possible, with PHE as they are the advisors in the UK on radiation risk and it's their advice that we use.

When comments are submitted to us, which relate to this, we will ask PHE if there is something that you need to be advising us. This is the process that we use. Their response will be seen once we get to Sizewell C consultations stage.

Q: How many documents on radioactive waste management and arising from HPR-1000 nuclear plant has the EA to date had translated from the original Chinese (Mandarin); and can the EA provide a list of these documents to the participants and other interested parties?

A: The radioactive waste management classifications in the UK are very different to those in China, so the documents have all been produced in English, for the UK HPR because the waste system is for the UK legislation. In terms of the number, the solid waste assessment report and they have accessed 73 documents that have been listed in appendix 1. The key point is that we are not asking for translation of documents from Mandarin to English because the waste system documents have had to be written to match the UK legislation system, so therefore have been written in English.

The GDA process expects documents to be in English, so we wouldn't accept a document that has been written in anything else.

Q: The EA's documentation states that any developer must demonstrate that it can construct, operate and decommission a nuclear power station before it can be considered as a bona fide developer. Neither GNSL nor EDF can comply with these requirements. Indeed EDF is massively in debt and can't even demonstrate it can fund an EPR. Why doesn't the EA disqualify them both out of hand?

A: So where we are coming from in that statement is to construct, operate and decommission nuclear power station in ways to protect the environment. Our angle on this, because we are the environmental regulator for nuclear sites in England, is to develop and construct an operating decommission that must be in ways that protect the environment, that is where we are coming from.

Finance matters are out the GDA and would fall to Government and probably Ofgem as the regulator in this area. GNSL is the company that is bringing forward the design for GDA UK HPR100. The developers of Bradwell, currently configured would be CGN (China General Nuclear) and EDF together.

In terms of environmental protection, radioactive discharges would be within permit that we would decide to issue or not, and would be subject to the condition of those permits. Similarly for cooling water discharges and construction discharges, because these are a significant part that would have to be taken into account. In terms of fish and fish protection, our permit for Hinkley does include measures associated with that, but that is under appeal at the moment, so therefore not our decision anymore.

In operation, any station must comply with the permits as it's an offence not to. We have a range of enforcement that we can apply if they don't.

Q: Can ONR provide a list of all the documents on the security aspects of HPR1000 nuclear plants provided by CGN; how many have been translated from Mandarin; and will ONR make [translated] copies available to all interested parties?

A: Specific requirements for security they are country specific, and therefore the majority of the recommendation on security for UK HPR1000 has been developed by GNSL and their technical support contacts in the UK and has been written in English. All the documents that we have assessed and are assessing will be listed in the references of our assessment report at the end of GDA. We will not publish those documents as they are intellectual property of the requesting party but the requesting party will publish an update the Generic Security Report at the end of GDA on their website which will summarise all the security aspects of the UK HPR1000 reactor and how this reactor meets ONR's security assessment principles, those that are appropriate for GDA and it's been the same in the previous GDA so no great difference.

GNSL has a dedicated UK security team working through all this, with a high level of security clearance for the UK which is required and a number of those are restricted and secret documents that need to be maintained for UK security, so they would not be published. GSR will be published for everyone to see.

Q: NGO's asked the ONR to demonstrate their 'openness and transparency' by agreeing to processes which would 'agree to disagree' position they take with NGOs by referring intractable issues to arbitration and by involving independent experts. ONR rejected those proposals. This would have gone a long way to increasing stakeholder confidence. Why were these proposals rejected?

A: Suggests that these questions be asked formerly by a contact owner, so that we can provide a formal response. Taking question to ONR policy people to make, we give an accurate answer.

In terms of the openness and transparency in the GDA, the requesting party publishes a lot of information on safety, security and environment and we publish all our assessment reports with all our conclusions. We publish our regulatory observations which is on our joint website, which are quite comprehensively explained, what our expectations are. What is the potential gap? What we expect from the requesting party to do in response to these regulatory observations. So all our assessments are open. Comments can be sent via the comments process of the requesting party and you can also be sent via the ONR website.

We try to make GDA as open and transparent as we can. Publishing regulatory observations really gives an insight into not just the outcomes, but also the thinking and the response behind the work. The comments process is really powerful, so people who want to ask the questions, can ask the people who are responsible for it. EA are responsible for the regulation and not responsible for design.

If you have questions, ask questions in the comments process, will be kept open almost until end of GDA. We usually close about 12 weeks before we expect to get to the stage where we can complete the process. This is so that we can make sure the comments are considered as part of our final completion of assessments.

The publications of regulatory observations, which are very substantial, and did not happen in the first two GDA's. This was a lesson that we learnt and we implement it and started to publish regulatory observations from the ABWR GDA and for this one. This was to enhance the openness of our assessment and not wait until the end of each step, so that you can see our assessment progresses.

Q: If BEIS/HM Treasury decide to use the regulated asset Base (RAB) method to fund HPR1000 at Bradwell and Sizewell C, that would introduce a third regulator in the process; have the two current regulators evaluated the impact on their own regulatory process and responsibilities of the introduction of a third regulator? Has the EA or ONR discussed this separate from the treasury or BEIS about how their ability to regulate might be affected by the regulators?

A: BEIS is going to bring those proposals forward. EA and ONR will work with the third regulator to make sure that the key point made in the formal response to BEIS, which is that safety and proper environment protection is to remain paramount in decision making, alongside each other. The financial side needs to take account of that. Not been discussed between ONR and EA, but we are looking forward to those discussions, as the environmental regulator we don't want to see our decision making fettered by a third regulator. We recognise that the financial regulator is an important part to play, but safety and environment must remain paramount. Don't have a funding model for the UK HPR1000. Bradwell B haven't started that conversation with government yet, it's not certain it will be a regulated asset base. It might be something completely different. It is important to remember that someone needs to pay for these power stations, which will mean will ultimately be the tax payer or the bill payer. Also bear in mind the allocation of construction risk is really quite important that the way that these things are discussed and agreed between the UK Government and the developers. In terms of Bradwell B, nothing has been decided or agreed, and it isn't clear yet how this is going to be paid for.

Q: Is there any information on whether the GDA process will be affected by the developer's pause of at least a year in the development of the proposed Bradwell B?

Is it not the case that you are much more interested in getting this GDA done and dusted, than you are with securing a development and the unlikely prospect of getting permission to develop at the Bradwell site?

A: There is no pause, the project continues. Last year we had a lot of progress and a lot of site based things that included engagement with a record number of people at first stage for a nuclear power station being built. We had over 2000 responses that is a 97% increase on what Hinkley Point C had at stage one. That's a 43% increase on what Sizewell C had at stage 1. The additional measures that we took to ensure that everybody has access to consultation, in lieu of being able to attend a particular event, as a result of those efforts, we have increased our engagement to huge levels compared to the project.

There is a wide misinterpretation of the letter that we sent to Maldon District Council and Essex County Council, which indicated that we were going to suspend formal engagement with those councils. Simply because we have taken that engagement as far as it could be for the time being. We needed to catch up with the rest of the project, which was delayed because of the covid pandemic and getting people on planes to and from China. What we have paused is the engagement with local authorities and statutory stakeholders, whilst we catch up with some of the technical work and will resume that within a years' time.

GDA and Bradwell B are two separate projects, two separate funding streams and two separate ventures. Any change or non-change from Bradwell B makes no difference to GNSL project for delivering GDA, so still all going ahead against the schedules that we set down to complete and get to a DAC and SoDA by the beginning of next year.

When we talk about Consultation with a capital C, we talk about the specific things we need to do within a regulatory space. So in the planning space it would be two or more stages of consultations, which includes statutory consultation, usually at the second stage with particular described products. So what we are pausing is nothing to do with consultation. We have had one stage of consultation, the informal pre-application stage one and we are at some point in the future going to have another statutory stage. Those things will happen within the programme.

We are not pausing any Consultation or informal level of engagement. What is paused is the formal engagement that we have with Maldon District Council and Essex County Council, were we fund them to engage with us. We fund them so that the taxpayer doesn't have to bear the burden of the cost.

In terms of the development of the project Bradwell B, there has been quite significant amount of effort going into the development of Bradwell B and developing geological and environmental data, so there is a huge amount of confidence in the project. It's not just about GDA. We will come back in a years' time and pick up the local work again. Hinkley Point C, Sizewell C, GDA and Bradwell B projects are live and all going ahead. We have had quite a lot of encouragement from Government through the production of the white paper.

Q: How does the EA make its own assessment of whether the Government will be able to technically develop, and secure an operation license for, a GDF for solid Radwaste arising from any HPR1000 ever operated? Don't you have a policy built into the GDA, that if they don't ever get a licence, what are you going to do about any reactors that get a licence that doesn't have a waste management? Do you have a plan B if the Government fails in its policy to build a GDF?

Protection against sea level rise, climate change could have significant impact on the spent fuel store?

A: We have operated to the base case in our assumptions, Government base case, which that fuel once through interim stage is stored safely, securely and acceptably with regard to the environment and then deposited at the GDF. When it gets to the stage where people are seeking permits to investigate and if successful permits to build construct and operate, then we will go through the regulatory process and scrutiny that would be expected in our guidance.

ONR also has that part to play because the facility would need a nuclear site licence, so that would be the regulatory process. As to our confidence, we will make our decisions at the time.

We need a GDF whether there is new build or not, for existing waste which helps to give emphasis and we pleased to see that Government is pursuing it. One of our assumptions is that regulations carries on for that 100 plus years. Government programme timescales for GDF are shorter than that. Our basis for assumption is basically that GDF will be available. If it's delayed further then other decisions would have to be made. From the perspective on a regulator, we would ensure that any interim facilities are acceptable with regard to the environment, ONR would ensure safety and security and that regulation would carry on until there was a solution. Flood risk is taken into account in terms of site specifics

Installations in the UK have to have a valid safety case, which is non-negotiable. We look at the safety case and the current assumptions in GDA.

Refer to regulatory observation number 50

Q: Due to the assumption that the fuel will be stored for 100 year more or less, it's impossible to make a definitive statement or to sign off a GDA saying that you are comfortable that the waste can be managed on site or anywhere else for that period. Would it not be advisable for you to say that the waste cannot be well managed?

A: We have set out our assumptions, which is consistent with Government policy, and implicit in that is that regulation does carry on and there would be continuity, and there would be options in the future. It might be that somebody decides that the fuel should be re-processed and recover the uranium which is there in bulk.

The operator are responsible for all the waste on the site from an operations point of view, for all the costings for that. We undertake periodic safety reviews, so every 10 years we review all of our safety cases to see if there are any major changes that would take into consideration climate change, sea rise, temperatures and any modifications that requires to any interim storage facility, however long that might be. Outside of the current assumptions that all will have to be updated and maintained safely under ONR's regulation to make sure that we take all those changes into consideration. In current operations regulations those things are accounted for and is being delivered across the UK.

EA & ONR are independent regulators, it's important that we are independent from both Government and industry, but we do work within Government policy. We will work to make sure that the environment it protected and that it's safe and secure within those confines. If there is an issue with the policy then that is a matter for Government.

Q: In the Government's white paper it mentions one nuclear power plant, but there are two GDA's. So where does that stand with Government policy? Is Sizewell C not the one? Is it going to be Hualong One and Sizewell C?

A: The paper states 'At least one large new nuclear power station brought to the final investment decision', so not just one.

The white paper says, by the end of this current Parliament, Governments objective is that, at least one large nuclear power station is brought to the final investment decision. That isn't saying that it will go ahead, but that, that decision can be made as to whether it does or not, it says at least one.

Q: Radioactive substance regulation environmental principles was written 2010. Why is it 10 years out of date? When will it be updated and who would answer that question? Will there be any more documents out of date?

Concerned about ONR lack of resources which is not giving confidence to outsiders and would like to see a much more robust regulator.

A: On the Radioactive Substance Regulations Environment Principles, those were our very first ones. They are not 10 years out of date, they were produced 10 years ago.

They are still good for use. We do like to review and revise and that process is ongoing at the moment. The technical material that's in them is still relevant. Some of the references may well have changed. We are in the process of updating.

In GDA we have updated the GDA documents in the light of our experience. One of the things that was added was the Publish Regulatory Observations which wasn't done in the first GDAs which was for the UK EPR and the AP1000. We decided we could make it even more transparent by publishing Regulatory Observations.

The latest version is 17 which has been updated, what we want to do is to make reference to the process about access to GDA, so that's clear and has a holistic overview given through that document. We are waiting at the moment for publication of Government access process into GDA. Once that's done, you will see a new document shortly after. This is associated with the new process, in which ONR changed into three steps from four completely aligning both regulators together.

The Environment Agency as a whole have published a report which was regulating for people, the environment and growth, which is an annual summary 2019 which does reference work that we do.

Regarding ONR's resources and the statement that was made in 2017/18 report, we have made significant effort and put specific plans to mitigate challenging areas, for example: human factors and conventional health and safety, which has been very successful. We have modified our framework, because in the past ONR use to only recruit people coming with a lot of experience from the industry. We are recruiting and building up less experienced people which has been very successful, ensuring that our knowledge of the more senior generators is retained in the organisation, but building up the younger generation. Companies like Horizon that didn't progress with their plans for nuclear construction, gave ONR an opportunity of recruiting quite experienced and knowledgeable people.

I can provide reassurance that we are in a much better position in terms of resource.

ONR is looking at a review of the entire website in this new financial year.

ONR will take back comments to Communications and Quality Manager.

Q: What are the timescales for each stage of the process and given it will be many years, if ever, that a GDF is built, how can you state that waste from the site will go to a GDF when there might not be one?

In respect of environmental impacts

A: Key questions which must be posed at the outset

Q: In respect of environmental impacts, does the EA take into consideration demographics and population density now and projected with particular reference to radiological impacts?

A: We consider demographics in terms of dose assessment for infant children and adult because the consumption rate and inhalation rate are very different, so the amount they actually internalise is very different. Also the habits are different as children tend to be out more. In terms of demographics and population density there is a measure of collective dose which is dose adjusted for population. We do not tend to publish it and we don't tend to use it locally because the annual dose is a better measure, but it is looked at. For this GDA, the results came out at nanosievert range, which is considered below regulatory concern. So yes we do consider it and it hasn't shown to be a concern at present. It will be looked at again at site specific, because that is where the dose is used in terms of exposure, whereas at the GDA we are looking at using the dose assessment to point back to the design features that require greater scrutiny.

Q: Can the EA explain the process by which they continuously keep under review the current science on radiological hazards and radiation risks when updating their own radiation exposure modelling? Where is this work published?

A: We go with what PHE advice is provided. EA agreed to take this question away and put the response in the consultation.

Q: How many of the 415 unresolved safety issues ONR has on its list for Hinkley Point C are generic to the HPR-1000 reactor design and associated facilities?

To say that they are specific to Hinkley Point C, when really they are not, is misrepresenting the data that you publish yourself.

Do you know whether any of the 40 assessment findings identified for the HP1000 are similar or exactly the same to any of the 415 that were identified at Hinkley Point C?

Could the GDA and the ONR collectively publish a document which shows the similarities across however many Generic Designs they are looking at, so that we know how many outstanding issues which are generic to all the designs that are outstanding, so that we have some ideas of the numbers?

Could you add a comparative document that all of your specialist assessors can look at to find out where these are at in terms of their status of resolution at each reactor design?

A lot of those 415 issues are very specific to the Hinkley Point C and can only be done when it reaches a certain stage, like the checking of welds etc. There are a whole lot of them which are clearly self-standing independent technological issues. There must be cross learning between you GDA and Hinkley Point C, GDA HPR1000, Sizewell C and any future design that may come for GDA. Is there enough coordination in your teams to know exactly how fast things have already been technically resolved and how many still need to be evaluated to see that they meet the standards that you require?

A: The definition of assessment findings are those matters that the future licensee will have to address. This is because they either require the plant to be in a certain state of construction or require decisions by manufacturing decisions, final detail design decisions by the licensee. Therefore they are not generic, they are going to be site specific. We look at everything that has happened in the previous GDAs, including the EPR to inform our assessment, even though those assessment findings are not generic for the HPR1000, they will be site specific for EPR. We do take into consideration all the assessment that we did for the EPR to make sure we learn lessons and we articulate our findings and our reporting in a manner that is improved.

The resolution of that findings will have to be done by the Hinkley Point C, because it will require the decisions that are specific for the licensee regarding the organisation and regarding that they sign the manufacturing, which is the definition of assessment findings, and that is very clear in our guidance to the requesting party.

Every one of my specialists are very familiar to all our assessment, not only the EPR, also for the HPR1000 and as relevant for the ABWR, to make sure that our assessment is consistent and that we are learning from the previous GDAs. At this very moment we are in step four of our GDA. We are looking at the evidence. We are finalising the assessment of the submissions. We have still not identified assessment findings which will be identified once we have closed all our Generic Assessment. If there are areas that require input from a future licensee, those will constitute assessment findings and we publish all of them. Be assured that what we have done in the previous GDA is something that we use on a daily basis.

In our consultation document, we identify 40 assessment findings, which would be for the future operator to address. These are matters which are not for addressing in GDA but for the future operator because it needs their input.

The 415 includes the EA assessment findings, so what we did with those assessment findings is bind most of them into the permit itself as information requirements, because of they are requirements for providing information or for review at the site specific stage. In terms of similarity with this one, our assessors would have looked and seen what was done in EPR and ABWR and HPR1000, so that they learn from experience. If they think there is some to be taken forward because they are the same, it's still about the operator's decision, and I would expect there are some similarities.

The assessors do go back at all the previous GDA's and look for themes and check that there is consistency across the GDA's, so that learning would have been carried forward if there are themes across all the GDA's.

They are tracked through to make sure that they are addressed and take benefit of what has been done in the past. We do not have any list that exists at the moment.

Some of the assessment findings also relate to matters that need to be decided for the site.

One that was put in was about the implications that having more than one reactor in the need to review in the light of that. Which was to do with the integrated waste strategy that GNSL had produced as part of GDA. If a single operator puts in more than one station, there is a requirement for them to look at economy and scale, to ensure BAT applies for waste management type aspects.

One of the things to ONR that is quite important is that we don't reinvent the wheel. There is quite a lot of knowledge transferred from one GDA to another, as different roles have been in all the GDA's, Lead Assessor, Technical Inspector, Head of GDA, Programme Manager, one of my Managers have also been involved in GDA.

We have been very clear to the team that they have to be familiar with what was done in the earlier GDA's. Our regulation in the UK is non-prescriptive and for requesting parties coming from other teams that are more prescriptive, sometimes they find it more difficult to understand what the expectations in the UK are. We use all the previous learning from the previous GDA's to make sure that we are consistent. We make our expectations clear and our inspectors also use the lessons from the previous GDA's. Even if there are matters that Hinkley Point C solve for that reactor, sometimes we necessarily have to ask the same question for these reactor, because the reactor, the technology even though it's very similar, the actual evidence and details maybe different. The points that were raised will be considered.

NGO

Discussion problematic because we haven't really discussed GDA

Environment Agency and possibly ONR are feeling pretty comfortable about this GDA and it looks as if it's moving forward, inextricably & inevitably to its satisfactory conclusion, which is issuing DACs and SoDA. This process is doing nothing more than it seems to me to be legitimating that. There are things that are not being discussed. In terms of the ONR, we're just assuming a straight through cooling system where there are proposers for cooling towers and those sorts of problems. They can't be looked at because we are looking at generic site. This is really a letter of comfort to the presumed developer, and we are hanging around on the edges of this, unable to lay a glove on anything. Every time you do, you retreat into Government policy or mishmash of regulation. The EA have been conspicuous in their habitats assessments and so on, where they take a very hard line.

Are EA and the other guys looking at actual specific sites going to be tougher? The GDA process is interesting but more intellectually interesting than practically interesting and we heard it all really from the developer today, that they still think that they are ramping up and they are given every help by the EA. So unless you come clean and challenge aspects of Government Policy as being nonsensical, I do not know where we go. The idea that you can say that you will be satisfied with the arrangement for the long term management of nuclear waste is risible. There is no way that you, or the public or even the Government can be satisfied that effective means will be available. Be honest, set you assumptions out so that we can see clearly where you are coming from and what kind of risks you are prepared to take with the future, if this proposal goes forward.

Why don't you take a proper look as regulators?

EA

Generic Design Assessment goes so far when it addresses the bulk of what you would repeat at every site.

Some things are different because of the nature of the site and because of what the operator wants to do. Those would be addressed at site specific stage. We would use the information which we have on Generic Design Assessment, that's why we think it's so important to do GDA. For us, the EA, is because we consult as part of the permitting process, and we are included in this process.

We took robust approach on all of our regulation and nuclear sites

We are not going to change Government Policy here, but you do have the opportunity for those discussions with Government as we are independent. In the white paper, Government have said it will be doing the national policy statement, and I'm assuming this will be a consultation process, so you will have the opportunity to contribute to it.

We do respond to Government Policies in their formulation and we work within them, once they are set. It is not for us to set Government Policy and that's how the system works. Local impacts would have to be considered at the local impact stage, and those wider impacts, in positions of communities, that's what the planning process is about. It's important that we as regulators, do not take ownership for things that we do not own.

The following questions were raised in the chat but were not addressed at the meeting due to time.

Question

Will the EA provide these Radwaste docs to interested parties?

Question

Do the 73 bespoke Radwaste documents have any references to original documents in Mandarin? If so, how do EA experts check he sources?

Question

I find ONR's hiding behind commercial secrecy/propriety sensitivity in their response totally unacceptable. I also found the response by Chris Hall disreputable, and the hiding behind secrecy from the earliest part of the GDA

*process bodes ill for a fair and proper transparent examination. I am losing confidence in this process already, 31 minutes into this event. **Not a question***

Question

Two weeks ago HPA stated that not all organisations use 1 in a million health detriments as a regulatory criterion for assessing acceptable risk, and the “work is going on about tolerability”. What criteria will be applied to the technology you are discussing here? How will any discrepancies be resolved? Can EA brief NGO’s on any ongoing work on tolerability?

Question

Given that the EA considers all the six issues are resolvable and that granting of SoDA seems likely, is the GDA process basically to enable GNSL to gain UK regulatory approval for development? In effect, Bradwell is simply a facilitation site and GNSL has little intention of pursuing development at the site.

Question

When will EA update RSR Environ Principles 2010?

Question

In 2017/2018 Annual Report highlighted staffing issues. Have they been resolved?

Question

I am told that the EA has said discharges of alpha-emitting particulate matter will be below the limit of detectability. Really? UNSCEAR has published data on particulates discharged from every NPP in the world up to 1997 [http://www.unscear.org/docs/publications/2000/UNSCEAR_2000_Annex-C-CORR.pdf]. What has changed?

Question

The long term spent fuel is not yet resolved for the EPR and is still in assessment findings. **Not a question**

Question

Regarding waste storage safety case – is there a time limit e.g. 80-120 years on-site and if so what happens post the time period, or is the permission ‘indefinite’ or perpetuity?

Question

What is ‘critical friend’? This the position that has been said the ONR occupies with regard to the nuclear developers.

Question

Could ONR separate AFs into generic and site-specific?

Question

Multiple sites do not appear to have any future in that the grid is likely to be unstable and difficult to manage. I.e. Sizewell B ran out half output during the first lockdown and is likely to have to do so again.

Question

There is still no up to date government siting policy as has been pointed out. Without a new policy this cannot be legitimate.

Q: What is the annual total of alpha-emitting particulate matter expected to be discharged, or licensed for discharge? What is the expected size distribution of the particles? What elements and isotopes are involved? EA addressed this by saying discharges of alpha-emitting particulate matter would be below the limit of detectability. Since I found this unsatisfactory, I posted "UNSCEAR has published data on particulates discharged from every NPP in the world up to 1997" and I gave the

URL http://www.unscear.org/docs/publications/2000/UNSCEAR_2000_Annex-C-CORR.pdf.

Table 34 of that report - "Particulates released from reactors in airborne effluents" - shows that operating NPPs emit particulates, and you may note that the amounts of such emissions are expressed in units of radioactivity. I did not ask the question in terms of what would be detectable; we already face a situation in the UK where CEFAS purports to determine the alpha activity of mud in the Severn Estuary using a test that cannot detect alpha-emitting particulates.

A: Table 34 does document Particulates released from reactors in airborne effluents in GBq, but no indication is given of detailed radionuclide composition or particle size distribution.

Paragraph 141 notes that the particulate composition has been looked at for each reactor type, of all the nuclides noted in the text, none are alpha emitters:

The radionuclide composition of releases has been examined for the various reactor types. In general, the releases of noble gases from PWRs are dominated by ¹³³Xe, with a half-life of 5.3 days, but short-lived

radionuclides such as ^{135}Xe (half-life = 9.2 h) are also present. For the BWRs the composition of the noble gas releases is more varied, with most krypton and xenon radionuclides included. The releases of particulates from BWRs are also variable and difficult to generalize from the limited data available. The radionuclides ^{88}Rb (half-life = 17.8 min), ^{89}Rb (half-life = 15.2 min), ^{138}Cs (half-life = 33.4 min), and ^{139}Ba (half-life = 83.1 min) were prominent in the large releases mentioned above from the Ringhals 1 reactor. The radionuclide compositions of liquid releases from PWRs seem to vary from reactor to reactor; the cobalt isotopes (^{58}Co , ^{60}Co) as well as the caesium isotopes (^{134}Cs , ^{137}Cs) are usually present. In some cases, large relative proportions of ^{110m}Ag and ^{124}Sb are reported. It may be that some differences are accentuated by the various measuring and reporting practices at reactor stations.

Based on the above it would be incorrect to assume that the PWR particulate data in UNSCEAR 2000- Annex C Table 34 indicates alpha discharges or can be considered as a proxy for alpha discharges.

Q: I asked for GNSL's estimate of the alpha activity in airborne effluents. It is a simple enough question and I would expect you to be concerned about the answer as a matter of due diligence. Will you obtain one?

A: GNSL have not presented an estimate of alpha discharges in either liquid or gaseous discharges. The reason they have not done so is because there is no data available on which to base any such estimate. The reason that data is not available is because PWRs do not discharge alpha activity in any detectable quantity. Noting that the UNSCEAR data quoted above is not representing alpha activity. We accept the RP position on this and will not be asking the RP a question to which we know they cannot respond with any useful information.

Q: I look forward to responses to my other questions, which were:- "... what proportion of total alpha-emitting particulate matter is expected to be discharged to the atmosphere and what proportion to water? "

A: Given that alpha activity is not discharged at detectable levels this cannot be determined.

Q: "On 4th February PHE stated in a zoom meeting with NGOs that "not all organisations use 1 in a million health detriments as a regulatory criterion for assessing acceptable risk", and that "work is going on about tolerability". What criteria will be applied to the technology you are discussing here - i.e. UK HPR1000? How will any discrepancies in "health detriment" estimates be resolved? Can the Environment Agency brief NGOs on what this might mean?"

A: Awaiting answer

Local groups and the public – 25 February

Q: Is this design completely new?

A (provided by EA): This design is based on PWR technology and PWR technology has been around for a long time so it's an evolutionary process. This design is an evolution of all existing PWR technologies to deliver the best technology available for this type of reactor. A HPR1000 design is currently being built in Fangchenggang at present and that is expected to be operational in 2022. For this GDA the design is based on the Fangchenggang plant which in turn is based on existing PWR designs.

A (supplementary to above provided by GNSL): This design is an evolution from existing designs. This design has incorporated some very minor innovation and improvement that reflect the evolution of the technology and techniques worldwide but overall is a very similar PWR to what exists worldwide.

Q: How much can we trust anything that comes out of China in relation to specifications of design and data to support it?

A (provided by EA): The assessments the EA undertake are based upon design substantiation and we (EA) look at this in a highly detailed way in the same way we would do for any design. Any design that is proposed to be constructed in the UK would have to be acceptable to us as regulators. The assessments we undertake are there to ensure that there is proper protection of the environment and we do look at how other designs are substantiated as well and we would expect to see consistency. This is a robust process. If what the question refers to is a socio-political area then that is not for us, as regulators, to comment on. Our job, as regulators, is to assess safety, security and environmental protection.

A (supplementary to above provided by ONR): This is a partnership between CGN and EDF and EDF plays an important role in this reactor. In ONR's step 3 assessment report which is published, it explains that EDF provided technical expertise to support the GDA and this includes reviewing technical documentation, providing experience of construction and other such areas. As regulators we review the documentation submitted to us and we engage with the requesting party. This is a partnership between two big organisations and the role of EDF is also quite important in this GDA in terms of reviewing documentation.

A (supplementary to above provided by GNSL): PWR's has evolved from an American design, through to a French design, through to a Chinese design with French input and then to what GNSL are doing here in the UK. Many of the staff working for GNSL have been in the nuclear industry for a number of years and all the reviewing that is being undertaken by GNSL is based upon this years of knowledge and expertise of working in the UK nuclear industry and taking oversight from this. GNSL also receive a large amount of support from EDF colleagues who are one of the largest nuclear operators in the world.

Q: With such a technical consultation, how meaningful is consultation with the public? For example, how many people have joined in consultations such as this previously and how many people are providing a response?

A (provided by EA): For this consultation, we (EA) are conducting more meetings in a virtual format with a wide variety of stakeholders including national NGO's, local groups, members of the public and various local and town councils. EA colleagues also joined the February Bradwell B community forum event to speak about the GDA consultation. This event was well attended including attendance by a local MP. The EA understand the benefits of face to face consultation but unfortunately social distancing restrictions have prevented this. The EA do accept that this is a technical consultation but we try to make it as clear and as plain English as we are able to. Our consultation is open until the 4th April 2021 and there is usually quite a slow number of responses at the beginning of the consultation period reaching a peak a week or so before the consultation closes and sometimes the week following the closing. The EA will continue to accept responses for as long as we reasonably can.

We (EA) have done lots of wider comms to try and get as many people involved as possible. This has included activities such as press releases, advertisements in local newspapers and the local regional life to raise awareness of this consultation. We have also published our documents online via GOV UK, one of which, the public facing summary document, has been reviewed by a plain English expert who is external to the EA. Looking at previous GDA consultations, they don't tend to get a huge amount of public interest but they do get some and we recognise that it is important to try and engage with everyone and bring them into the process. A few years ago, the EA undertook some market research called Sciencewise, and this focused on public engagement on the GDA and findings demonstrated that the public were interested in these issues and that gave us (EA) insight into how

we should communicate and do more social media infographics. We do appreciate that this is a technical consultation and we do also appreciate that not everyone will be comfortable joining online but it is important that we do provide an opportunity for those who are interested in this to contribute.

A (supplementary to above provided by BRB Co): There are a significant number of other opportunities for involvement with consultations within the entire process, both in GDA and the proposed Bradwell B project. For the proposed Bradwell B project there was a large consultation process in 2020 as part of Stage 1 of the planning process. In between those consultations, the company hold a large amount of engagement activities, for example the Bradwell B Community Forum, which is something the company try to hold once a quarter. This is a genuine process as the planning requirements in the UK require it to be, the company have to demonstrate that they have done honest engagement and consultation with people living in the vicinity of the project in order for the company to make a successful application.

A (supplementary to above provided by GNSL): We have a comments process within GDA and we have had 62 comments directed at us throughout the whole process, and about 20 during step 4. There are some technologically savvy people with nuclear experience and background that have asked us some quite detailed questions on different parts of the technology through that process. When we receive those comments, they get shared with both the EA and ONR along with the answers provided by GNSL.

Q: Unless you are a nuclear physicist, we are not equipped to ask the sort of questions that are relevant, it is box ticking as what is happening here is the EA are going to have the ability to say that EA have consulted with the general public on the technicalities of a general design assessment which means that we have trust the EA entirely to evaluate the design. The kind of consultation we can really get involved in is the effect that this design will have on the environment and the Dengie and the effect on the people who live in the area and the wildlife of the Dengie. I cannot give you a comment that is relative to this design or piece of equipment.

A (provided by EA): We would like to ensure you that this isn't a box ticking exercise. The reason we consult is that people may have views on the reactor design that they wish to contribute to the Environment Agency. There is also opportunity for people to provide technical comment via the comments process which is managed by the company. The comments process is open throughout the generic design assessment and it is a process that we require the requesting party to set up whereby anybody can ask a question of them and they will respond to it should it be relevant to the reactor design. We, as regulators, see both the comment and the answer provided and we can use this information provided to inform our assessments. The reason we consult at this stage, is because consultation is a normal part of the Environment Agency's practice when it comes to environmental permits. This allows for people to provide their comments at the earliest possible stage, and this really is the earliest possible stage to allow meaningful comments because we have done meaningful assessment. We (EA) haven't made up our minds, we are waiting to see what the consultation says and we will continue with our assessments and then we will come to a view. We see the benefits of consulting at this stage rather than waiting until a stage where applications have been made for a specific site and giving people that early opportunity for engagement in the process and for people to provide their comments. We fully accept that this is a technical consultation and we consult with a wide range of stakeholders as part of this consultation.

Q: How robust does a generic design have to be against particular meteorological factors for example severe sea, winds and other adverse weather conditions and rising sea levels? Given the lifespan of a nuclear station will the design be robust enough, both in operation and decommissioning given that waste will be stored on site for a long time.

A (provided by EA): In terms of impact from the environment, the dose assessment that we have undertaken for the radioactivity impact on the environment uses annually averaged weather. That annual average does not consider extreme events, however the safety case, which is within ONR's remit, does.

A (supplementary to above provided by ONR): The first thing that ONR look at is the generic site envelope, and this generic site envelope has to be suitable for the UK sites. ONR have to be satisfied that the generic site envelope represents UK characteristics. Site parameters such as seismic activity, weather and other extreme events are considered within the site envelope of the plant. Whilst all these parameters are determined, ONR look at ensuring the design is safe for very extreme events, such as extreme weather, earthquakes, extreme temperatures, extreme winds and other such events. These such events are only expected to occur 1 in 10,000 years and even this has to be estimated conservatively and ONR look at the design to ensure that the plant remains safe for these very extreme events. In addition to looking at extreme weather events, ONR also consider

cliff edge effects of these extreme events and whether this would take the reactor to an unsafe position. ONR also look at the impact of climate change using the latest climate change predictions. The requesting party must put a safety case to ONR demonstrating to ONR how they have taken these events into consideration in the design of the plant, ONR assess this safety case and have a strong team of internal specialists and an independent expert panel who specialise in all of these areas. ONR also look at the interim fuel storage facility. As regulators, ONR not only have to be confident that the reactor and the interim fuel storage facility are safe but also the design that has been put in front of ONR has had any risks reduced as low as reasonably practicable. This is the legal requirement in the UK.

Q: Are the parameters that are used to assess the GDA published?

A (provided by EA): The generic site envelop for safety is defined in Chapter 3 of the pre-construction safety report and for environmental parameters that are used for the radiological assessment and conventional impact assessment are detailed in Chapter 2 of the pre-construction environmental report. Those reports are published on the UK HPR1000 GDA website. The regulators also submitted a Regulatory Observation (Number 2) to the requesting party on this topic.

A (supplementary to above provided by GNSL): Within the UK we also have a periodic safety review, which is that every ten years the operator needs to go through and identify any changes that might have happened to the station during that time. Specifically, the operator will review anything to do with the safety case and the operator must identify that it either remains safe within the original safety case or it needs to modify the plant in order to be safe. This will happen all the way through operation and through decommissioning also.

A (supplementary to above provided by ONR): As regulators, we do check those parameters which are specified to make sure that they are realistic for a UK site and the events considered within the safety case reflect very extreme events taking account of the latest advice, for example on climate change predictions. If a station was built at Bradwell B, periodic reviews of both the safety and the environment cases would need to be undertaken by the operator to allow for any new learning relevant to safety, security and environment of a nuclear power station to be brought in and taken account of.

West Mersea Town Council - 26 February

Q: Concerns identified the site as estuarine and flat land. Will consideration be given specifically the regional importance of Mersea Island, which is less than one and a half miles away from the proposed site? In the summer season it can have over 30 thousand people as temporary inhabitants. That would suggest that the methodology is flawed as Mersea is one and a half miles away from the site?

A: The GDA Impact Assessment is a generic site, so we look at the closest impact, because that is the worst case scenario. Specific things like regional importance will be covered as part of the site specific assessment, because at a generic site things like that are too complex to consider. That is a very site specific matter and we cannot cover that at generic site assessment.

For the generic site assessment, we based it on a generic site, and that generic site, its description and characteristics are those that we check and are specified by the requesting party are consistent with potentially suitable sites which are identified in the National Policy Statement. GDA isn't about Bradwell it's about the generic site.

Bradwell specific issues, like populations, Mersea Island have to be considered at the site specific stage, wherever it falls, for whoever is the decision maker. If it's a planning matter, like visual impact, that would be for the planning inspector to think about.

The basis of radiological protection is if the impact and the people most affected is acceptable in terms of dose limits, constraints, then it's acceptable for everybody else. In that sense it takes into account everybody else who would be in the vicinity of the site.

Q: Exposure to ionising radiation doses – methodology seems to disregard the importance to both the local economy and the local identity of the native oyster industry, and that that product is exported both nationally and internationally?

A: The assessment undertaken at generic design assessment is only on ionising radiation. There are many other impacts that would be considered at site specific stage for and other factors that would go into Environmental Impact Assessment for planning.

We do undertake wildlife assessment, and this looks at all sorts of species that could be found in the vicinity. We take the worst case discharges and assume all the species scenario that are in that area, and shellfish is one of those species we look at. The outcome of that assessment is detailed in one of the assessment reports, but the risk to any species is well below the threshold for concern, in the outcome of this assessment. There will be no detrimental impact from the radiation on oysters.

In terms of perception, that would probably have to be something brought in at site specific as a social economic factor. Certainly in terms of radioactivity impact assessment, oysters are considered and there is no evident risk. The applicability of the design of the HPR1000 across the country is not specifically about the Bradwell site, so it will only look at things on a generic basis based on the reference site. That is not the only time that oysters are considered, they will be considered at EIA (Environment Impact Assessment), which is part of the planning process, so the EIA is quite a large piece of work that forms a substantial part of the ultimate application for the development consent. That piece of work has been taking place for a couple of years now and all up until the point of which the application is made and it involves lots of different stakeholders. On that basis the Environment Agency is a statutory stakeholder that we are going to consult on that basis, rather than a regulator because it is a different process. So the regulator in that process is the planning inspectorate. When we get through to the application, the application goes in, the planning inspectorate takes 18 months to 2 years to look at the application. It asks the Environment Agency, Essex Wildlife Trust, Historic England and Natural England all of the various issues that are related in a site specific environmental context, if they are satisfied with these proposals, the responses will go into the process and that determination will take place. The Environment Agency is also a regulator in the permitting space, so once we get through the GDA and they make the determination and we step into the site specifics, then what Bradwell B is going to need to do is secure several permits. One of the permits is going to be a radioactive waste discharge permit, so for any of those radioactive waste discharges that we make will have to be within the limits and they are regulated by the Environment Agency. It will also have another consultation on that permit because that's what the Environment Agency does, it forms a determination, puts the information out into the public domain and invites responses. So there are at least two other basis that oysters are going to be looked at as we go along.

There are a multitude of permits, consents, licences that are needed for nuclear sites.

BrB - The EIA will ultimately lead into what is referred to as the Preliminary Environmental Impact Report (PEIR) which is a large part of the statutory further stage of consultation and will take place before the application is made. The report is big and will have a non-technical summary to help people who are not familiar with the jargon and will help guide them to the right parts. There will be an opportunity to read, review and comment.

Q: Concerned as a community that this it's on doorstep and all the issues that come before us, whether it by the EA or other parties don't seem to realise how close this to a very large and expanding population in the summer, which is completely under valued.

There are a number of issues which come forward don't seem to have been recognised and we don't want to miss out on putting forward our points, only to find that later on in the process, because it's been dealt with on a generic basis, that we are somehow unable to put forward detailed views, which is a concern.

There are very specific Issues which arise about flooding and coastline erosion protection in this area, and as indicated there are great concerns about habitats and wildlife aspects. If there are compelling reasons, will the Environment Agency say at the end of the process that this is not going to be a desirable site or a desirable basis on going forward?

Delay by BRB because they want to undertake further work on costs - how does that match up with what you are doing in terms of consultative procedures here, because that will lead to a great deal of confusion? If there is a state of execution or involvement with Bradwell B or is the process still going ahead previously determined?

A: From an EA perspective we are very aware of where Mersea is and we engage with people who live on Mersea Island as much as we can. We have been communicating with BANNG for a long time, also meeting with town councillors and public meetings in West Mersea. We recognise also the interest that can be increased where you have estuary communities who live in the opposite sides to power stations. We understand how that can raise interest and concern and people might think that we have forgotten about the proximity and I can assure you we haven't. The points that have been raised are right for the site specific stage for consideration. What we are doing in GDA is getting an early assessment of the reactor design. The bulk of what you would build at any site if this was going to be built in the UK. So this is an early opportunity to engage with those design aspects, but it is a technical consultation. It's an early opportunity for us, because we are the independent regulator in an independent industry and Government, and it's our job is to make decisions that are for us, that would be on the Environment permit that would be associated with both a construction site and with operation of a new nuclear power station.

The planning aspect is not our job, however, we want to make sure that we influence them in a proper way, so we provide advice into the planning process on things like flood risk or coastal erosion for example, impacts on wildlife and fish. We do not make the decision as that is for the Secretary of State.

On matters where we are the decision makers then we would say no if the Environment isn't properly protected and it's not acceptable. Usually what we would do as the Environment Agency is we try to say 'yes if this is done, then we would be able to say yes'. There is evidence that we do say no when it's necessary.

GNSL - GDA doesn't allow us to do anything and the reason that we do GDA is to de risk the design. Which means rather than starting at one site and then having to change design midway through building which would be very expensive. This allows us to identify the core of the design that we can pick up and build anywhere after we have got all the licences in place, all the pre requisites checked all those different local sites. We can move onto Bradwell and onto different sites in the UK. They will all need their own assessments for all the site specific areas. This is why we do a GDA.

EA - We have Bradwell identified as a potential site, we try and support the Bradwell licensee, and who will become the licensee by taking information from the Bradwell site and incorporating that into GDA. The GDA is supposed to be a bounding situation that bounds everything, so should be able to by doing local site design changes or moves, we should be able to reduce the impact even further. So we are starting out wide and then as we move to the site we should be coming in closer to improve everything that we can do.

BrB - There is no pause, the project continues. Last year we had a lot of progress and a lot of site based things that included engagement with a record number of people at first stage for a nuclear power station being built.

There is a wide misinterpretation of the letter that we sent to Maldon District Council and Essex County Council, which indicated that we were going to suspend formal engagement with those councils. Simply because we have taken that engagement as far as it could be for the time being. We needed to catch up with the rest of the

project, which was delayed because of the covid pandemic and getting engineers on planes to and from China and back. What we have paused is the engagement with local authorities and statutory stakeholders, whilst we catch up with some of the technical work and will resume that within a years' time.

We are not pausing any Consultation or informal level of engagement. What is paused is the formal engagement that we have with Maldon District Council and Essex County Council, where we fund them to engage with us. We fund them so that the taxpayer doesn't have to bear the burden of the cost. We have informed them that we are not going to do that for about a year because we have other work to catch up on. Project isn't paused it just has a slightly different focus for the next year.

Q: Not 100% sure, we have this generic design Specific investigation, do they both occur on the planning application or does the specific come in after they put a planning application in? (Inaudible)
What is the timing between the site specific application and the environmental assessment? (Question clarified by EA)

A: EA - The Environmental Impact Assessment would form part of the planning application so it's important that the planning authority have the right information to be able to make their decisions. It's a very comprehensive application which is made. The planning inspectorate who do the work on behalf of the Secretary of State then make recommendations to the Secretary of State, who does further deliberations and then makes that decision. Those environment assessments are done up front. That planning process is separate from our permitting process and the Office for Nuclear Regulations licencing process, which go alongside and preferably a little bit in advance of the planning process.

Q: Statement regarding that there would be no harm to the oysters, how can that statement be made?

A: EA - There is no harm from Ionising radiation, but there will be assessment undertaken at the site specific stage for impacts like cooling water for example, and other discharges that would occur from the site. From the ionising radiation perspective, it is well below the thresholds for any potential impact. This is a generic assessment, it will be redone at site specific and all those factors of designations will be considered as part of that assessment.

Q: Look at nearest occupied building with a distance of 100 metres, is this true and is it the same for all GDA's?

A: The dose assessment methodology that we use is to a receptor, it means an individual who is exposed to radiation at 100 metres from the boundary of the fence. So, we assume that all their foods, in terms of vegetables and meat come from around 500 metres away, so it is a very conservative assessment of radiation exposure. Yes for all GDA's, it is a standard methodology.

Q: Protecting nuclear information IT systems – what stage would that be looked at? Do you look at where systems are developed UK/China?

A: ONR - In the GDA we look at the security aspects and that involves the protection of the plant. We also look at cyber security too, because we have security assessment principles that require us to look at cyber security at a generic basis because later on the licensee may make choices about site specific choices. At the generic site we do look at all the security related to the design. We look at the instrumentation and control systems which are digital and look at how they are protected against cyber security events.

We look at technology on its own merit and we look at the technology according to our security assessment principles and technical assessment guides. It offers protection against cyber-attacks. The recommendation that is put to us about this technology to ensure those systems meet the requirements in our safety assessment principles.

We look at how the technology is developed, we have a lot of regular engagement with the developers of the instrumentation systems. We look at production at systems, we look at design of system in a lot of detail in GDA. The future licensee will have choices of the systems as technology evolves quite quickly, so we look at it at generic basis, later on any modifications at the site specific stage will be looked at again. This scrutiny would be done at any design as cyber protection is needed for whatever design.

We have UK security based team looking at cyber security and the physical security aspects, following the UKs Her Majesty's Government guidelines and being overseen by ONR security side and cyber security side. So has a particular UK oversight to it making sure systems are independent of one another, so there cannot be any cross contamination as systems move information from one system to another and properly air gapped. This would be

heavily regulated to make sure it meets UK requirements for safety and security. The level of scrutiny will only increase as we go to any build phase.

Q: Is there a timescale for site specific? Where moves from GDA to site specific? Generic stage things would be considered around the cooling waters and what the processes are on a coastal marine based site as to how they mitigate impacts on the landscape or the marine wildlife?

A: EA - It's about value of when the results are meaningful.

For generic design, when you are assessing for ionising radiation, you are assessing the impact over the course for the year as that's the way the body takes in and is exposed to ionising radiation. It is very different to how, for example, an oyster would react to temperature. So the modelling that is done and the assessments that are done for cooling waters are short term changes. This can only be done with value at site specific. It's a case of we do our assessments where it adds value to the outcome. For ionising radiation we can do that very early and we can do it generically. For things like short term changes and temperature, that can only be done at the site specific stage.

If we look at the difference between the intakes and outtakes, the difference between the cooling water going in and coming out, is about 12 degrees, which is in line with all the other designs, but we cannot assess it with any value at the generic site.

When it comes to looking at the impacts of cooling waters specifically, it is very difficult to do assessments because they are very site specific as the environment is different in different places. For example: One of the big considerations at Hinkley Point C was the impact of the cooling water discharges in terms of temperature on the Baltic clam, because it is a soft shell clam which itself wasn't protected. It was the birds who eat it, who are protected. So very specific considerations by the Environment Agency in making our decisions about the acceptability at Hinkley Point C turbine condenser cooling water discharges, were about the impact on the Baltic clam because of the protection of the birds and its use for food. It has to be very toned and would be the same if proposals are made for Bradwell and applications are subsequently made, then it would be the specifics of the site which would be looked at.

In terms of timescale, we as regulators carry out GDA, we can only make decisions about permit if applications being made. On GDA if we grant a DAC and a SoDA, the validity period for that is around 10 years under our guidance. If nothing has come forward then we would expect that to be reviewed for it to be maintained. Applications would be made by Bradwell B to construct Bradwell and that is not for us as regulators that is for developer.

BrB - In parallel there are other things going on. The application to build a new nuclear power station started 2 or 3 years ago, when we started looking at environmental baselining and various things that have taken place on the site. It's a multiyear activity, we don't have a define date for when that application is going to be made. Within that period of time, public consultation would be done, statutory public consultation and all of the engagement. In parallel what would be happening is that we would be determining, for example: with the ONR when do we want to apply for a nuclear site licence, when do we need to be starting to talk to the ONR about that and we have started to talk to them about that.

Bradwell B will be looking to get those site licence applications in and determined probably a little in advance of that development consent order application. Within both of those regulatory regimes you would make applications for permits and consents with both of those regulators. That is not the end of it when you apply for a licence or a permit, it's really just the beginning of it because complying with these permits and various applications consents to do things as you move forward.

GDA isn't about Bradwell B, it's about UK HPR1000, although there is a connection.

In terms of a developer, potential operator bringing forward proposals it's not just about design itself but about company that brings forward those proposals. As regulators in the Environment Agency, we need to make sure that the company that brings this forward has the competence, skills, and resources to be able to make those applications properly. To make sure it develops itself into the future operator, which is really important to us.

EA - One of the first things that we do is before we get application we go and look at company which is called a readiness review to make sure it has everything it needs to make those applications in a competent way and to control the information flow in the management systems. The reason for that is, once the developer has made an application there are legal requirements that they have to fulfil and we need to make sure that they are ready to make those applications.

GNSL - We do not need to do GDA as it is not a requirement. It is something we choose to do to de risk our programme, but seen as good practice – it's a government expectation.

Q: Who monitors safety and security of transportation? Who monitors discharges? Who monitors tanker transportation by sea? If new reactors are better, why is the site 4 times bigger than Bradwell A?

A: ONR - The interim storage facility will be there for 100 years and then fuel transported to GDF. There are strong regulations and requirements in the UK with respect to spent fuel movements, through the road, rail or through sea. They are strictly applied and there have already been some spent fuel movement around in the UK. We will use the containers, which are tracked and approved by the regulators. We will be fully compliant with regulations and will ensure that movement of spent fuel is fully safe and protecting the environment.

EA - Discharge limits are part of the Environment Permit, so come under the remit of the Environment Agency. The operator of any power station, part of their permit has to monitor it to certain standards which we set out. They have to demonstrate that they are complying with the permit, so any variation from what we expect, they have notifications levels on a weekly, quarterly and annual basis. If they exceed the threshold they have to tell us in advance, so we control that. We also have legal powers to go in and do independent monitoring if we want to test their monitoring systems. We also have the powers to force them if they don't comply.

Q: Can you close down if they don't comply?

A: Under regulatory system in the UK, to make radioactive discharges for certain activities, then you need a permit. We decide whether a permit should be issued in the Environment Agency and we also decide what conditions it contains. Those conditions are more than just compliance with the discharge limits. They also relate to maintenance, supply which is used to minimise discharges because there is another requirement which is to minimise discharges using the Best Available Techniques (BAT). It is one those conditions that help to minimise any impact at all. Having issued a permit and conditions, it's not an option not to comply with a condition because it is a Criminal offence not to comply. Under Environmental permitting rights we have various remedies that we can take if there is a non-compliance we take proportionate approach. It ranges from a telling off, to sending a stiff letter to giving them an enforcement notice, to serving a prohibition notice, which would mean you would probably have to shut down. So it's a very powerful legislation and ultimately, you can do all of those and you can also prosecute if they don't comply with permit. So we do take action when it is necessary. We have an enforcement policy is on our website which sets out a proportionate approach, depending on the nature of the non-compliance.

We can revoke permits

Publication of all the discharge data is also a requirement in the UK and all European countries that a nuclear power plant operator, the operator should publish data over the past 25 years on a public register that the public has access to.

We can actually revoke permits and take significant regulatory action to stop whatever it is that is a non-compliance.

We have an environmental monitoring programme which is independent for all of the nuclear sites.

The eventual hectares of the operating power station is likely to be under 100 hectares, the existing Bradwell power station is significantly bigger than that. It is going to be a significantly higher power rating as we are going to be generating about 2 gigawatts of power and to compare that with the existing Bradwell, its's operating capacity was about 300 megawatts. Then you have to factor in modern nuclear power stations are far safer, they have significant amounts of redundancy and lines of defence in terms of safety, so they require more equipment and kit.

BrB - Look at stage one proposals and look at the overview of the site, the red line is the planning area and within that will be the construction area. Following the construction period it will shrink right down. The area marked in grey will indicate where the operating site will be. So it seems bigger at the moment than it's going to be, because you need space to construct, to move earth around, to landscape afterwards. So if you look at the charts in the proposals, there is a key and it indicates what goes where in terms of the colours.

Q: 10 x size of BRB is misleading

When we are talking about scale, let's not forget that the cooling towers are going to be 60 metres – BRB lecturing us on the impact on our community is misplaced and inappropriate.

Generic point of view – spent fuel interim storage, there is only one spent fuel storage in the UK that is not in cooling ponds. Where in the document were you referred to (BAT) can anyone address that?

A: ONR - GNSL Website there is a documentation that we are assessing, the pre-construction safety report. Chapter 29 is the interim storage of spent fuel of this facility.

We have asked for information that GNSL have sent to us and we have asked for additional information. On the joint GDA website, we have issued the Regulatory Observation number 50 and it is published there. It is detailed about what we are looking for in the demonstration of safety of the interim storage facility. At the GDA it is still a conceptual design. In future the licensee will have decisions about the final design. We have asked GNSL to demonstrate that the risk associated with this concept design is As Low As Reasonably Practicable (ALARP) which is the requirement in the UK.

There are requirements for continued learning from international context as we get more information about spent fuel storage. We do ask the requesting party and in future the operator to provide evidence from international context and not just UK context.

Public available data – difficult to track down information – GNSL to provide link to documents

Bradwell B Action Network (BAN) 3 March 2021

Q: If you would like to meet the local population face to face why not wait until after 21/6/21 when it would be likely be possible. Considering that BRB have announced a delay to the project and the circumstances are so unusual?

A (provided by EA): These circumstances are definitely unusual and nobody expected the Coronavirus pandemic and we would certainly like to hope that things are back to some sort of new normal and we can get to meet with stakeholders after the 21st June. We (EA) think that these consultation events through Zoom are very effective and some people may argue that this form of consultation is a better way of consulting than face to face. We (EA) can certainly look to organise a face to face meeting for June 2021 pending government guidelines at the time to come and talk to stakeholders and meet face to face.

We have advertised online events to wider public to ensure that those who wish to be involved in the consultation have the opportunity to join our online events. We have also offered telephone appointments to the public should they wish to ask the EA any questions to ensure we have been inclusive. It would always be nice to come and meet people face to face and under normal circumstances we would hold drop in events as we have done for previous GDA's and permit consultations in the past. We haven't had huge numbers attend these drop in events for GDA's and permit consultations in the past but we have had some (on average less than 20 people attending past drop in events) and they were well publicised. Going forward, our proposals are to do a mixture of both online and public drop in events. Once government regulations allow, we can come and do a 'meet the regulators' event in the Bradwell area should this be desired.

A (supplementary answer provided by BRB Co): Bradwell B Co held five events before a decision was taken in advance of the government restrictions. A decision was taken based on assessment of safety of visitors and colleagues to curtail the live events and take them online and extend the consultation. BRB Co held events online, conducted telephone surgeries and video call surgeries and the net effect of that BRB Co were very pleased with as this increased engagement to such an extent that it doubled what the first stage of engagement equivalent at Hinkley Point C was and 43% higher than what Sizewell C's did. Although it would be been better to have meet people undoubtedly we (BRB Co) think that this situation has been much better for national infrastructure projects across the whole country and has meant that developers have had to 'up their game' online to make sure the general public can access consultation materials efficiently. We (BRB Co) think we have learned a lot about making consultations better generally, so if there is a silver lining it's that online consultations have become better and more engaging and that actually we are getting more people engaging than we did beforehand. We (BRB Co) think the future is going to be a blend between doing the traditional events meeting face to face as well as a much stronger online presence.

Q: It's a well-known fact that Zoom meetings work well, but they work well for people who are very 'au fait' with technology and who have the infrastructure to do that. Are you not discriminating against people who, a) don't have technology and b) perhaps older people who don't? The BRB meeting in the village hall was very well represented and I think if you had another one in the local area over the GDA it probably would be as well.

A (provided by EA): One of the virtual methods we put into place during this consultation is the option for telephone appointments and also providing paper documents to those who request a copy.

Q: Virtual engagement doesn't compensate fully for the ability to meet people face to face and ask questions which you can do if you have a public consultation, whereas if it's done in an online forum you've got to have the technology to do it and you have got to get up and be willing to speak on it and isn't like speaking to a person face to face.

A (provided by EA): If anybody would like to contribute to the consultation but didn't feel as though they could ask their questions in an online event then please contact us (EA) and we can arrange for a format that is suitable for them (i.e. telephone appointment).

Q: 23 micro-Sv a day x 365 days = 8395 what is the cumulative impact of that over 15 years?

A (provided by EA): The dose is a maximum of 23micro-Sv per year not per day. In terms of accumulation we (EA) do assess how radioactivity accumulates in the environment and it does stabilise after 20 to 30 years depending on the type of activity.

Q: When will a GDF be operational and where will the fuel remain until then?

A (provided by EA): Until a GDF is available, the higher activity waste will be stored in specialised interim stores on site and they will be moved when a GDF becomes available. There is no date at present for a GDF facility but design life for an interim store is designed to be in excess of 100 years to ensure that waste is stored appropriately at site.

A (provided by ONR): This topic is of a lot of interest to ONR and ONR saw the initial proposals by the requesting party and ONR wrote to the requesting party to make ONR's expectations clear for GDA. ONR have a regulatory observation published on their website (RO 50) which sets out very clearly ONR's expectations on what evidence is expected to demonstrate the safety of this facility. We (ONR) don't expect a detailed design of this facility during the GDA but we expect a conceptual design and consideration of any potential faults and hazards and how to mitigate these to have an initial demonstration that the risks associated with this facility has been reduced as low as reasonably practicable. At the site specific stage when there is a detailed design for the interim fuel storage facility, ONR will assess the safety case further for this detailed design in the conditions of the site envelope to ensure that ONR is confident that risks have been reduced is as low as reasonably practicable. Every ten years there will be a periodic safety review in which the safety case for this facility will be re-evaluated by the licensee and will need to consider the latest predictions of climate change and any changes to standards and demonstrate to the regulators that the risks remain as low as reasonably practicable or make the modifications that are necessary at the time.

Q: If Higher Activity Waste is stored on site what are the generic distances to private residences?

A (provided by EA): For the generic design assessment it has been assumed that there is 100 meters from the site but in reality when it gets to site specific permitting the actual distance will be taken into account for several directions and distances around the station.

Q: Question relating to the preliminary detailed assessment of gaseous, liquid and radioactive discharge. In reports is talks about the OpEx methodology and comes up with the conclusion that that may not be appropriate for the GDA and obviously its moving onto discussions with Sizewell / EDF's / CGN's / GNSL's. From what I can read from it really what it is saying is that there isn't any actual real hard evidence and data that's available for these discharges, this is all based upon information that's based upon information provided by manufacturers and then debated so you come up with an opinion about what the levels are. I am just wondering about how difficult this will be and how accurate this will be given this is relatively new technology? Also, will this data be available for public analysis at some point in time?

A (provided by EA): The first thing to say is that the design is not a revolution, it's an evolution of previous pressurised water reactor designs. We wouldn't expect the discharges to be wildly different from the predecessor design. The discharges are based on data from the previous generation of the design. The EA raised Regulatory Observation (RO) number 10 on the discharges to challenge the discharge data that was used because the fleet of data that was used to underpin the discharges initially was quite new and it wasn't able to consider long term trends to show that there would be no increase or decrease over the operating period, so RO 10 looked into the data more thoroughly. The nuclear industry is global and the information provided by GNSL based on the predecessor designs in China is compared to designs from all over the world and they are within what you would expect and very similar. As soon as Fangchenggang starts operating, discharge data from this plant will be looked at and compared and as the UK HPR1000 starts operating the discharge data would be under severe scrutiny to try and reduce the headroom factors and limits as close as possible. We (EA) think that there is sufficient data been presented based upon designs that are equivalent and there will be measures in place to assess new data as this becomes available.

A (provided by GNSL): This data has not only been used because it is data from predecessors, we have also looked at this design very carefully to identify any differences and the EA has reviewed this work. We have identified any differences that would challenge the use of this data and we have justified whether we could use these data sets as they are or whether we could slightly correct them to make them fully applicable to UK HPR1000. We (GNSL) have been doing an analysis of the applicability of this data and we (GNSL) have corrected some of them to ensure that what we propose is appropriate for the UK HPR1000. Once we (GNSL) have data from a HPR1000 or a UK HPR1000 this will be assessed and looked at again to ensure that first best available

techniques (BAT) is applied and second that what we have derived is appropriate and still relevant for use to determine this discharge limits.

Q (follow up to above question): The data is only as good as the credibility information provided with them around the world. Obviously the regulators will do the best they can but really what is being said is at this moment in time is that it's more of a judgement as opposed to hard facts.

A (provided by EA): It's more than a judgement, it's a professional scrutiny of the data, It's also looking at how other stations do around the world and if the data was terribly inconsistent then it would stand out. However if the UK HPR1000 was constructed and operated in the UK then one of the requirements is for the operator to monitor discharges and emissions and any departure from expected performance would be picked up pretty quickly. Generally the discharges from PWR's are pretty low as evidenced by the assessments conducted in the GDA.

Q: What will the impact of the microseverts have on local wildlife?

A (provided by EA): In the 7th assessment report there is an assessment for radioactivity on wildlife and it comes out as the risk factors are well below screening levels. In reality, the habitats regulations work that will be done for site specific permitting will have far bigger impacts but the radioactivity assessment is only a small part of that and is the only bit that can be done at generic design assessment and the rest will be very site specific. In terms of radioactivity, the impact we have will be well below all screening limits for all species.

Q: I attended the local roadshow in Steeple where I was very concerned that the mapping data, traffic modelling etc. was based on data that was 12-18 months out of date. Has this been rectified?

A (provided by BRB Co): The traffic data was that which is used by the Highways Authority so in the case of the non-strategic road network that would be Essex County Council. This is also supplemented by other information. The first stage of consultation it's important to note is the start of a multi-year process by which an application will be formed during which there will be more stages of consultation. The first stage is the stage which you have assemblance of information and a site plan that people will be able to understand as a connected project which works together, so the data isn't going to be very advanced at that point and is a very strategic consultation whereby the information is put out there so it is a meaningful consultation. In doing this early consultation we are testing the information we have about the roads and we are asking local residents about their views on the road network and where any particular bottlenecks may occur that aren't represented in the data. Over the years there are going to be several other data surveys and other primary evidence developed in conjunction with Essex highways department but also with the various other road specialists they use will be supplementing this data and also scrutinising and validating this data. We are moving from a 2D model and building upwards and into that model with also go all of the information about how we are going to build this thing, what sort of materials and what quantities we are going to need and so the traffic proposals at the moment is based on very early information that will change as the project becomes more mature and we understand how much we of it we can deliver by marine, whether there is a rail option that can be included also. This first stage of consultation is a voluntary stage and isn't something that we are required to do under the planning act but it is something that the planning inspectorate very much wants you to do. The planning inspectorate wants developers to go out with the basic minimum information at the first stage you possibly can and get that information back in from the public and from other stakeholders with varying degrees of knowledge about the project and proposals and then build on that.

Q: I spoke to people at the roadshow who found out that one of the proposed routes for traffic would run in between their own and a neighbour's property. They would not have known about this had they not attended the road show. How can we trust that such important information is being shared with local residents if everything is done virtually? I think virtual consultations have a place but it would be preferential to meet face to face. There is an elderly community in the local Bradwell area who don't all have access to this technology and I think there needs to be consideration that we, as the local community, can voice our opinions in person.

A (answer provided by EA): If proposals for Bradwell B were brought forward, there would be opportunities for stakeholders and the general public to be involved in further consultations on the environmental permit applications. We (EA) consult on both the applications as they are received and also on our proposed decisions.

Q: Is the reference site Fangchenggang operational yet? If not when will it be, and will this be prior to the end of the GDA process?

A (provided by GNSL): Fangchenggang should be operational in 2022. GNSL are hopeful to reach the end of the UK HPR1000 GDA prior to Fangchenggang becoming operational.

Q: If Fangchenggang is the reference site and you are going to be basing your facts and figures on the GDA on the reference site and you are hoping that the GDA process will be finished before the reference site is actually operational, how does that actually equate? Please would you be able to clarify this?

A (provided by GNSL): The reference site is used as a base design and the design for Fangchenggang is fixed in that build programme. GNSL have taken the Fangchenggang design and ensure that this meets the UK regulatory standards. This is why Fangchenggang can be used as the reference plant. PWR's have existed for many decades, so this plant under this design isn't novel or new. The in core instrument assembly and removal disposal process is the most novel feature about this design, everything else in the design is used in other PWR's around the world. It is a collation of all of that design information into one reactor design. For instance, we may have changed the metallurgy of certain pipework in this design to that used in Fangchenggang but the metal used in the UK HPR1000 design will have been used in another PWR design. Information is pulled together from various PWR designs around the world, this is then bound and allows us to identify the boundaries that this design should work within. We (GNSL) are very conservative in all of our calculations and data usage. When we (GNSL) start to work through understanding our discharge limits more information will be available from Fangchenggang and then these can be compared with our (GNSL) calculations and methodologies used for this GDA. The data has been independently checked by the EA and independent people for the EA to ensure that they are in line with expectations.

A (provided by EA): This approach whereby there was a reference plant was also used for the EPR reactor design, this was Flamanville 3. The EPR design was also being built at Taishan in China. When we started GDA for the EPR reactor, there wasn't an operational plant, but there is now in Taishan 1 and 2.

Q: What is the current % shareholding in GNSL by CGN?

A (provided by GNSL): GNSL is 2/3 funded by CGN and 1/3 funded by EDF.

Q: What management standards are used for the QMS? Are they internal to the EA or to a recognised International standard such as ISO, or is there a specific ISO for nuclear reactors that is used, and is this available to look at alongside the Issue information.

A (provided by EA): What the EA are looking for in GDA assessment in regards to management systems is really to see that the arrangements that the requesting party has in place are fit for purpose, structured logically and effectively and are capable of delivering a good generic design in a timely manner. A designer, or indeed an operator can choose to develop and have certified certain types of management systems, e.g. ISO standard quality management system 9001, Environmental management systems ISO 14001. They are not mandatory and we as a regulator don't mandate that those systems have to be put in place and certified to those standards but we do expect similar standards to be in place. In this particular case, the constituent organisations of the requesting party, CGN and EDF, do have those accredited standards in their organisations. The GNSL organisation has chosen not to go down that route of certification but have committed to implement arrangements that are equivalent in their rigour and approach and to have those arrangements externally assessed to confirm that that is the case. GNSL may wish to provide comment on why they have chosen not to take that route but I think the duration of the company and it being a relatively transient organisation with a fixed duration lifetime is probably the one of the reasons there. What we look at as assessors is the components of the management system and how effective they are whether they have an ISO badge or not.

Q: Do you have a template or guidance to assess the QMS against?

A (provided by EA): Yes we do. We have our own guidance internally and we also refer to external guidance (e.g. IAEA standards, ISO standards). All of these standards are very similar and specify very similar sets of arrangement, similar components and similar emphasis on audit and assurance.

Q: Is there a document / template that MSQA arrangements were assessed against for this GDA available to the public?

A (provided by EA): At the very top level I would recommend the International Atomic Agencies Standards GSR Part 2 is the guiding document that sets out what our expectations should be for management and leadership arrangements and that is certainly one that has been referred to for this GDA. We (EA) have our own internal guidance documents which isn't published externally anymore but it is one that is used internally for guidance on how operators management arrangements should look so we would have regards to that in GDA work. Our (EA) principles are published externally which covers 'managing for the environment' as a section setting out the top level principles for what we would expect to see from an operator and similarly in a requesting party.

A (provided by GNSL): We are a transiting organisation so once GDA is complete, GNSL will set as a holding company to hold the GDA we won't operate so there isn't a need to carry a number of ISO certifications for us. GNSL have their own independent review along with the reviews by the regulators (EA & ONR).

A (provided by ONR): ONR has a GDA technical guidance document which is published on the ONR website and one of the chapters within this explains in detail how ONR review MSQA information GDA and this document also lists the standards ONR use. When ONR produce their assessment reports for GDA a list of the guides and standards use for assessment of MSQA is also included. Within the Step 2 assessment report for Management for Safety and Quality Assurance (which is also published on the ONR website), under section 2.2, it details the standards and criteria, safety assessment principles and lower level guidance (technical assessment guides) used within ONR assessments of MSQA. Also listed within this chapter is the national and international standards guidance ONR use during assessments such as, IEA and Western European Nuclear Regulators Association (WENRA) and other such international standards. A final list of all of the standards that ONR use along with the safety assessment principles and technical assessment guides will be listed within Step 4 assessment report on MSQA but if you would like to understand what standards have been used so far to assess within this area then refer to the Step 2 assessment report for Management of Safety and Quality Assurance.

Q: Bradwell has deaf/hard of hearing residents one of which I believe has several times commented to inform you of this.

A (provided by EA): Please do contact the Environment Agency via the nuclear@environment-agency.gov.uk email address and provide contact details of anybody who wishes ask questions on the GDA and we will contact them to enquire as to their preferred method of contact and we will ensure that they have the opportunity to ask their questions and provided a response. In the summer, we will look at opportunities to host a meet a regulator event in the area but we will need to review the government guidelines closer to this time. The GDA comments process will still be open until around 3-4 months before we make our decision so there are still opportunities to get comments in and we could link this into any meet the regulator event.

Q: When will the disposal route be decided and will this be by road, rail or sea?

A (provided by EA): This will be a long time in the future for removal of high level waste because of the need to cool the waste and awaiting a GDF to become available. I'd like to relate this question to the ones noted below.

Q: How is GNSL planning to deal with the long term storage of higher activity waste on site, bearing in mind that a Geo Disposal Facility (GDF) in the UK is not currently available, and if ever built it is likely to be many years away?

A (provided by EA): This would be for a future operator to determine.

Q: How can the Environment Agency not be responsible, in the scope of this GDA consultation, for assessing the potential hazards of GNSL having to transport HAW to a GDF that is (if ever built) likely to be a very considerable distance from the nuclear facility?

A (provided by the EA): The Environment Agency isn't the regulator for nuclear transport, this falls under the vires of the Office for Nuclear Regulation.

A (supplementary to above provided by ONR): Transport is not within the scope of what ONR assess in GDA, but transport of nuclear materials is heavily regulated within the UK and ONR is the enforcing and competent authority for this area. ONR have powers under the Energy Act to regulate transport and these regulations include the Carriage of Dangerous Goods Act 7 which covers transport of radioactive material. Obviously transport is something that is international so the regulations in the UK come directly from the IAEA standards and Regulation 5 refers to the fact that international standards and regulations have to be met. The regulations are prescriptive but are graded depending on the characteristics of the waste. For transporting spent fuel, the requirements are

quite strict and whomever wants to transport spent fuel will need to seek approval from ONR. The applicant will need to produce a safety case which ONR will need to assess and produce an assessment report. Once ONR are satisfied that the safety case has met expectations then ONR will issue a certificate which is valid for a number of years. Once a certificate has been issued, ONR will also undertake regular inspections of the duty holder who does the transport and also the transport designer and manufacturer. Even though transport is not included in the scope of GDA, transport is very heavily regulated not only in the UK, but internationally.

Q: Bearing in mind the low lying area, the proposed site for this facility, how can storage of radioactive waste, of any level of activity, be considered safe for the hundreds of years it will need to be stored?

A (provided by ONR): When ONR assess the safety justification submitted by the requesting party ONR review the assumptions used in the generic site envelope and the hazards that have been considered and look at the design to ensure that it will remain safe within that envelope. ONR look at very extreme events with a very low probability (1 in 10,000 years) for the design basis to ensure that the design remains safe for those events. ONR also look beyond the design basis to ensure that there is no disproportionate increase risk if the hazard becomes stronger, which is what is referred to as a 'cliff edge effect'. ONR also expect the requesting party to have taken into consideration the predictions of climate change. With all this in mind, ONR are confident that the risks for the generic design have been reduced as low as reasonably practicable. At the site specific stage, when the final design has been decided and the specific characteristics of the proposed site are known, ONR will look at the site specific safety case to be confident that the risk has been reduced as low as reasonably practicable which is the legal requirement in the UK. This facility will be regulated throughout its lifetime and will be subject to periodic safety reviews in which ONR will look at the evaluation of safety and if ONR are not satisfied then ONR will take actions and it will also require the developer to review the latest standards and the latest climate change predictions.

A (supplementary answer provided by GNSL): Everything is documented in the documents that are published on the UK HPR1000 website. As just explained, GNSL look at many hazards both external and internal and do the assessment for the interim storage facilities because they are conceptual designs stage GNSL look at that at the conceptual design level. The assessment will be further detailed at site specific stage and reviewed by ONR to ensure that the safety case is appropriate and further data will be more site specific and more appropriate for a full hazard identification, hazard risk reduction and demonstration that the risks associated with the storage of higher activity waste and spent fuel is reduced as low as reasonably practicable. There is further detail available on this on the GNSL website within the Pre-Construction Safety report (Chapter 23 and Chapter 29) and there is also some information available in the pre-construction environment report (Chapter 4) which provided the full waste arrangement strategy for the UK HPR1000 design.

A (supplementary answer provided by EA): There are assessment that are undertaken at the generic design assessment stage, there would be further assessments carried out during the site specific stage and as regulators we don't just leave it there, there are ongoing reviews right through the lifetime of a site and of a facility to ensure that there is ongoing safety and that the environment continues to be protected.

Q: Will information in respect to any agreed resolution that is less than BAT or ALARP be made available to the public with explanations as to why they have been agreed? I.e. an explanation as to how the filter is considered acceptable if it falls below BAT.

A (provided by EA): The regulators, ONR requires risks to be reduced as low as reasonably practicable and the Environment Agency requires the use of best available techniques and so if whatever is proposed doesn't meet ALARP or BAT then it is not resolved and the issue continues. As regulators, we wouldn't accept less than ALARP or BAT.

A (supplementary answer provided by EA): BAT is a bit of a misnomer because it says 'best available techniques' which implies that the best is applicable in every scenario and one of the things that underpins the BAT assessment for this one is the impact. The actual filtration stream is very low activity, so where there is lower impact there is no point spending a fortune to completely re-engineer a facility, it's what you would call gold-plating, and it's disproportionate. The argument around whether it is BAT is the balance of what needs to be done vs. the impact and the impact in this case is very low. Looking at the information that is being provided as case can be made for the rectangular HEPA filters being BAT based on the very low impact. The information will be made available because the write up in the decision document will describe how the potential GDA issue has been closed out, what information has been provided and how the EA have assessed it.

Q: In the assessment docs it referenced ONR's preference to incineration of low level waste on site - has this been concluded - as LLWR also had issues with the proposal to NOT use this BAT, and what are the impacts of incineration on local environment, including population?

A (provided by EA): For the generic design assessment there is no incinerator on site however it doesn't preclude the operator from changing that in the future at which point the impact would be assessed also there are incineration facilities available in the UK that waste could go to that are already permitted for radioactive discharges.

A (supplementary answer provided by EA): Again, it would be subject to site specific proposals, if proposals are brought forward.

A (supplementary answer provided by BRB Co): The current proposals for Bradwell B do not propose incineration of low level waste. The strategy will be to package reduce the waste as much as possible and then send this to a suitable repository so no incineration proposed.

Q: Out of interest as a lay person what kind of volume of Higher Activity Waste is the developer going to be looking to store on site over the life time on of the plant and beyond?

A (provided by GNSL): It's about 600m² of higher activity waste over the 60 year operation of the plant. This includes spent fuel. This volume is after higher activity waste has been put into containers and sealed up.

Q: If there is no time scale for the Geological Disposal Facility what will be the life span of the expected interim store?

A (provided by EA): The Geological Disposal Facility information from RWM's advises that they are working towards the 2040's as a waste acceptance. The design life of the fuel stores for the UK HPR1000 design exceeds that proposed timeline indicated by RWM so there is an overlap.

A (supplementary answer to above provided by EA): it's also important to note that even if a geological disposal facility was immediately available then there would be a period of time to allow the spent fuel to cool and the radioactivity to fall before it would be transported to a geological disposal facility.

Q: I'm a bit concerned by some of the wording that has been used tonight, there have been a number of people that have said "when this progresses or when this is built". There is the concern of a predetermination approach of the design being passed through the GDA process.

A (provided by EA): We can assure you that this is not a box ticking process and it is very tough to bring forward proposals and they are scrutinised by regulators and it is not easy to get a permit by any manor of means or indeed to get planning permission. When we have said 'when' we mean 'if', not least because it is not the regulators decision whether proposals are brought forward, that would be subject to the developer bringing those proposals forward. We, as the regulators, are independent of government and industry and this is really important to us and we make our decisions independently as well. We have our colleagues from Bradwell B Co and GNSL here tonight to help provide a rounded response to questions because we think it is important to provide as much information as possible. We, as regulators, have not made any decision on the generic design assessment yet but we are consulting on them to help to better inform those decisions.

A (supplementary answer provided by ONR): It is the same for ONR. The GDA does not give permission to do anything on any site. For an organisation to be able to build a nuclear facility, the first thing they have to do is obtain a Nuclear Site Licence which is quite a tough process in which they have to demonstrate that they have the capability and the arrangements to become a credible licensee. From that moment on, when the license is granted, we enter into the legal regulatory regime and ONR have a lot of powers to make sure that every step of the construction, operation and decommissioning is regulated. So, even a licence doesn't give permission to start nuclear related safety construction, ONR would also have to give a consent should they be satisfied with the site specific safety case to start nuclear safety construction and the same for all other steps in the process (operation and decommissioning etc.). There is no decision now and there won't be decision at the end of the GDA in terms of site specific licensing or construction.

Q: The only place where this design could be placed at the moment is the Bradwell site, whilst you have to keep it generic (because it is a generic design assessment), there must be some review of sites that it can be used at and the impacts to local areas of those potential sites?

A (answer provided by EA): When GDA was put together it was thought that the vast bulk of assessment of a design, the detailed assessment of a design, could be carried out, which is what we do in GDA but then it could be applied to any site. Government in its National Policy Statement, identified eight potentially suitable sites for which there are specific proposals now for Sizewell C which is to replicate Hinkley Point C and definitive construction at Hinkley Point C. But, in principle, this design could be taken, if the site is available to the developer, and proposed for a different site. It is not mandatory that it is Bradwell and it up to the availability of sites and a developer's ability to secure that site for their purposes which is outside of what regulators do and is down to the developer and commercial matters and not for us as regulators.

A (provided by GNSL): One of the reasons to do a GDA is to reduce the risk of our design not meeting UK context and to give GNSL the opportunity that should more than one site becomes available or if a site wasn't suitable, GNSL still have a generic design that could be moved somewhere else. Although, you are right at the moment that Bradwell is the lead site, this gives the developer an option. We have to make that choice early on when we move into GDA and so that is why we have a generic site and so it financially de-risks the developer and de-risks the design.

A (provided by Bradwell B Co): It's no secret that CGN, who are the lead in both the GNSL and Bradwell B project, would be very amenable to looking at other sites in addition to Bradwell. In fact, there are a lot of benefits to the UK nuclear industry in terms of the development of the supply chain if you start building a particular reactor design at more than one site. There are a lot of advantages there and whilst there aren't any specific proposals or any specific conversations, there are five sites available throughout the rest of England and Wales and CGN in particular has never ruled out taking any additional sites.

Q: Will the geological facility be sited in the UK?

A (provided by EA): Government policy is that we should have a geological disposal facility. The government has charged Radioactive Waste Management Ltd with the job of securing a geological disposal facility. They have identified a programme of work which is still based around volunteerism whereby local communities can volunteer to be part of the geological disposal facility process. There are, at the moment, two communities with Working Groups, one is Copeland which is the district in which Sellafield sits and the other one is Allerdale, who are engaging with the process at the moment. As regulators, we are not involved in the site selection process except for being there to explain what our role is and our approach is. The time in which the Environment Agency would get involved would be at the site investigation stage where for if example boreholes are required to characterise the rock formation then that requires an environmental permit. This work is ongoing with RWM. Further information can be found at: <https://www.gov.uk/guidance/regulating-the-geological-disposal-of-radioactive-waste-environmental-protection>