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Minutes of the SMR Stage 2 Engagement with GE-Hitachi held at 09:00-17:00 on 27/11/2018-28/11/2018 at Port Academy Building, Bootle

Present:

GE-Hitachi:

[redacted]

ONR:

[redacted] (Day 1)

[redacted] (Day 1)

[redacted] (Day 2)

[redacted] (Day 2)

[redacted] – Note taker (Day 1)

[redacted] – Note taker (Day 2)

[redacted] – Observer (Day 1)

[redacted] – Observer

[redacted] – Observer

[redacted] (Day 2)

[redacted] (Day 2)

Environment Agency:

[redacted] – Observer (Day 1)

Natural Resources Wales:

N/A

Related Documents:

- SMR MT Stage 2 Meeting Agenda – GE-Hitachi (TRIM 2018/186630)
- UK Stage 2 GE-Hitachi Presentations (TRIM 2018/375616)
- ONR EA Stage 2 SMR MT Presentations for GE-Hitachi (TRIM 2018/375567, 2018/375604)
- TRIM Folder 4.4.1.3630.

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ACTIONS

Action Number	Action	Responsible	Delivery Date (if applicable)	Time in stage 3 agenda (max total of 3 hours)
1	GE-Hitachi to update deployment options slide (slide 14) of agenda item 1 presentation [redacted].	GE-Hitachi	Early Jan 2019	N/A
2	GE-Hitachi to review ONR SAPs (para. 759) and TAG 005 (ALARP) (Section 6.25) with regards to its expectations for time at risk and confirm whether this topic should be included in Stage 3 agenda (linked to Action 4).	GE-Hitachi	Early Jan 2019	N/A
3	***Background:*** *GE-Hitachi* [redacted] **Include in Stage 3 Agenda** ONR to provide a presentation on its expectations regarding: • Unmitigated dose consequence analysis and the level of conservatism required. • Classification of [redacted] based on GDA examples.	ONR	Early Jan 2019	30 minutes
4	**Potentially include in Stage 3 Agenda (linked to Action 2)** ONR to provide a presentation in Stage3 meeting on expectations with regards to time at risk for new build plants (for example, an extreme external hazard event occurring at the same time as an infrequent resin transfer operation).	ONR	End Jan 2019	20 minutes
5	**Include in Stage 3 Agenda** ONR to provide a presentation on its expectations with regards to the identification of human initiated faults.	ONR	End Jan 2019	30 minutes
6	***Background:*** *GE-Hitachi* [redacted] **Include in Stage 3 Agenda** GE-Hitachi to provide a presentation explaining its philosophy with regards to [redacted]. ONR to provide a presentation with regards to its expectations on [redacted]	ONR and GE-Hitachi	End Jan 2019	30 minutes

	[redacted] using previous GDA examples.			
7	**Potentially include in Stage 3 Agenda** ONR to provide date for publication of TAG on security categorisation and classification. If possible on the timescales of the Stage 3 meeting, ONR to provide a presentation on its expectations for security categorisation and classification.	ONR	End Jan 2019	N/A
8	**Include in Stage 3 Agenda** ONR to provide further information on its expectations for protection against aircraft crash including the effects of impacts, vibration and fuel combustion.	ONR	End Jan 2019	30 minutes
9	***Background:*** *GE-Hitachi propose* [redacted] GE-Hitachi to provide further information to ONR on its philosophy with regards to [redacted] **Include in Stage 3 Agenda** Following review of the GE-Hitachi material, ONR to provide guidance on its expectations with regards [redacted]	GE-Hitachi ONR	Early Jan 2019 End Jan 2019	N/A 20 minutes

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MINUTES

DAY 1 **Agenda Item 0 – Design Summary** GE-Hitachi Lead, TRIM: 2018/375616		
• BWRX-300 • Effluents [redacted]		
No.	**Regulator Question**	**GE-Hitachi Response**
R1	Does the plot plan [redacted] represent one or more units?	Shaded section represents [redacted]; safety related services [redacted]. However [redacted] e.g. administrative buildings.
R2	From a Structural Integrity (SI) point of view, [redacted]	These [redacted] to the design, for example the [redacted]. Such [redacted] attractive from an economic point of view.

Agenda Item 1 – Deployment Options and Indicative Schedule GE-Hitachi Lead, TRIM: 2018/375616		
No.	**Regulator Question**	**GE-Hitachi Response**
R3	Is there [redacted] in BWRX-300?	Our status is [redacted].
R4	Who would be the licensee? ONR does not licence technologies.	The [redacted] would be the licensee.
R5	Slide 14 schedules [redacted] for the nuclear site licence grant. The [redacted] from the point of view of developing the licensee organisation.	This is [redacted].
R6	Slide 14 timescales indicate [redacted] of the engineering design complete. Should this be considered to indicate [redacted]	[redacted] may not seem [redacted] the safety case and impacts for safety will be [redacted] at the point of entry to GDA.
R7	Have these slides been shared with BEIS?	No. But GE-Hitachi is happy for the slides to be shared with BEIS (following completion of Action 1).
R8	Would you consider that obtaining a Design Acceptance Confirmation (DAC) [redacted]	[redacted] (see action 1).
R9	Where will the first of a kind (FOAK) come online? Operating experience (OPEX) is important.	[redacted].
R10	Will the operator be the maintainer? What is the value proposition?	There is [redacted] GE-Hitachi to [redacted]
No.	**GE-Hitachi Question**	**Regulator Response**
G1	Has anybody applied for a site licence [redacted]?	Hinkley Point C (HPC) was the first site to go into licensing following the EPR DAC and Statement of Design Acceptability (SoDA). [redacted] have been implemented in the licensing stage.
G2	[redacted]	The basis is likely to be [redacted]

	[redacted]	[redacted] site specific aspects.
G3	If the future licensee is known to ONR, would the schedule [redacted]	A time reduction in licensing is likely to manifest at second of a kind, [redacted]
G4	What would happen to timescales if GE-Hitachi were to [redacted] and [redacted] ?	There would be a benefit in terms of timescale.

Agenda Item 2 – GDA ONR / EA Lead, TRIM: 2018/375567		
No.	**GE-Hitachi Question**	**Regulator Response**
G5	When does the first DAC issued expire? Do you have a renewal process?	The EPR DAC expires in 2022. [redacted]
G6	Does step 2 go through the claims and arguments for fundamental safety systems?	Yes, however the steps of the GDA process no longer link directly to the assessment of the claims, arguments and evidence. Step 1 includes agreeing the scope for further steps, arrangements for access to security marked documentation, sharing information on main security claims, and developing cost recovery and documentation sharing processes. Step 2 includes changes to scope, verification and validation of software, safe operating envelope, fault schedule, and assurance that a site specific safety case could be made by a future licensee. During Step 3 a cut-off date is agreed for regulatory queries/observations/issues (RQ/RO/RI) and design changes, information is continued to be shared to underpin safety and security submissions.
G7	Is a PCSR required in GDA?	No, however there is the requirement for a generic site safety case that will enable a future licensee to develop a site specific pre-construction safety report (PCSR) with information transferred from the GDA.
G8	In terms of submission documentation suitable for multiple regulators, are you only considering formatting? Do the actual analyses need to be different e.g. fault analysis?	UK expectations have to be met. That said there is no need to re-write everything i.e. existing documentation written for other regulators may be supplemented with additional information and explanation of how UK expectations, e.g. the demonstration of ALARP, have been met. When submissions are being prepared for ONR, also have in mind the documentation that is required by other regulators. Documentation structure will be discussed in Stage 1 of GDA.
G9	What is the best time to get a licensee involved in GDA?	When the architecture of the safety case is being developed it is useful to have a future licensee involved. There will be transferable lessons from the GDA of UK ABWR.
G10	[redacted]	[redacted]
Further Discussion		
EA • Public consultation is only carried out if the Requesting Party (RP) is seeking the full DAC/SODA.		

- EA have defined further the information required from the Requesting Party at each of the three GDA stages.
- Achieving a DAC/SODA is not a pre-requisite for the permitting process.

ONR

- Slide 8 notes 20 technical disciplines. ONR are also considering how safeguards will be included in GDA.
- It is important that the UK design basis external hazard event is understood in defining the site envelope.
- In assessing the applicability of codes, ONR would not necessarily repeat the work of other regulators e.g. US NRC assessment of the applicability of MAAP [redacted].
- The guidance to Requesting Parties (RPs) on the modernised GDA process is currently in draft and will be published on the ONR website at the end of March 2019.
- It is important to note that it is possible for the RP to design the GDA submission documentation, e.g. the safety case, in a way that suits the requirements of UK regulators as well as regulation in other countries.
- The interim DAC (iDAC) and interim SoDA (iSODA) remain to maintain consistency and to ensure that the value of previous GDAs is not diminished.

GE-Hitachi

- [redacted].

Agenda Item 3 – Nuclear Site Licensing and Regulation Under the Licence ONR Lead, TRIM: 2018/375567		
No.	**GE-Hitachi Question**	**Regulator Response**
G11	Can the future licensee rely on the vendor for future consultation on technical issues? [redacted]	Yes, there is a role for that under an arrangement that ensures intelligent customer capability on the part of the licensee. The UK entity needs to retain an appropriate level of knowledge.
Further Discussion		
ONR • It is advisable to base the licence on the largest number of reactor units foreseen on a site, rather than having to re-visit the licensing in order to add further units. • Development of the organisational capability of the future licensee can be facilitated by bringing them in to the GDA process at an appropriate stage. • DCO is a planning permission process; ONR are a statutory consultee.		

Agenda Item 4 – Permitting and Environment EA Lead, TRIM: 2018/375567		
No.	**GE-Hitachi Question**	**Regulator Response**
G12	What are the expectations in terms of documentation structure? Is there a standard?	EA is not prescriptive. There is a requirement to demonstrate Best Available Techniques (BAT) but how that is done in terms of documentation is up to the licensee. There is a prescriptive permitting application however.
G13	Does EA's remit consist of anything that causes a release?	Yes, waste and release.
G14	Does EA cover worker radiation exposure?	Worker exposure is in ONR's vires, however there is a lot of cross-over with EA's interests. EA has an interest in public exposures.
G15	What is the definition of problematic wastes?	Waste for which there is no disposal route e.g. contaminated oil which cannot be disposed of as low level waste (LLW) due to chemical properties which result in it not meeting the waste acceptance criteria (WAC) of the Low Level Waste Repository (LLWR).
G16	Have ONR and/or EA approved any	ONR does not approve facilities. Sizewell B operate a

	commercially available dry fuel stores?	dry fuel store however, [redacted]

Further Discussion

EA

- Revised EA guidance to RPs on the modernised GDA approach will be published at the same time as the revised ONR guidance.
- The RP is required to define expected events that would have a waste or release consequence. However BAT is only applicable to normal operations.

GE-Hitachi

- GE-Hitachi commented that the US Design Control Document (DCD) process does not require justification of decision making in the same way that the BAT demonstration requires. The importance of documenting decision making during the design process was highlighted

Agenda Item 5 – Permitting and Environment
GE-Hitachi Lead, TRIM: 2018/375616

No.	Regulator Question	GE-Hitachi Response
R11	Are radioactive waste processing facilities shared between units?	[redacted]. The slides [redacted] this means [redacted] GE-Hitachi believes that [redacted]
R12	Slide 20 refers to a [redacted] UKABWR. Does that [redacted] How does the [redacted] BWR such as the UK ABWR, on a [redacted]	[redacted] The [redacted] due to the [redacted] use [redacted] and more [redacted]. There is [redacted]. The Nordic BWRs use [redacted] [redacted] The average [redacted] [redacted] The [redacted] to [redacted] Their analysis suggests that there is [redacted] but the [redacted] • The [redacted] for a [redacted] for the [redacted] If the [redacted] the operator could [redacted] worth of recoverable stored energy.
R13	Will the spent fuel [redacted]	[redacted] is anticipated.
R14	Would it be the intention for GE-Hitachi to apply for an aqueous discharge permit?	[redacted] GE-Hitachi [redacted] The aqueous discharges [redacted].
R15	Why does the design identify [redacted]	For [redacted]

		[redacted] There is also [redacted] With the use of [redacted] GE-Hitachi [redacted] As a result, [redacted]
R16	Will waste and spent fuel storage facilities be shared between units?	[redacted]
R17	Will the gaseous waste treatment systems be similar to that of UK ABWR?	[redacted]
R18	Are there any differences in the relative source term to UK ABWR?	[redacted]
Further Discussion		

GE-Hitachi

- Approach is to minimise and simplify the liquid radioactive waste processing systems to minimise [redacted].
- Currently working [redacted].
- Not the intention to use [redacted].
- Materials selection will be [redacted].
- [redacted] will be [redacted] plus [redacted] UK ABWR.
- [redacted] to [redacted] transferred to [redacted].
- The current concept is [redacted], but [redacted] site specific and subject to [redacted].
- The reactor is [redacted] and does [redacted].
- The concept will be based on [redacted], to enable the use of [redacted] technologies.
- GE-Hitachi would like the opportunity to [redacted]. However, GE-Hitachi considers that [redacted]

Agenda Item 6 – Design Process and Requirements Management GE-Hitachi Lead, TRIM: 2018/375616		
No.	**Regulator Question**	**GE-Hitachi Response**
R19	How do you manage the interface with your suppliers?	Depends on the situation, [redacted] in the project. A supplier of a component is provided with a specification to meet. If the supplier cannot supply what the specification, based on the concept design, requires this means a change. So essentially through requirements and acceptance criteria.
R20	Do you envisage mapping this process over for use in the GDA steps?	The design outputs from this process are evidence which could be used in [redacted]. GE-Hitachi would look to map the process with the GDA process and determine the differences.
Further Discussion		

GE-H

- The claims, arguments, evidence approach is helpful for requirements management and change control.
- Writing clear and well defined requirements is key to effective management of requirements in such a complex project.

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Agenda Item 7 – Safety Analysis ONR Lead, TRIM: 2018/375567		
No.	**GE-Hitachi Question**	**Regulator Response**
G17	It is possible to introduce such conservatisms that the sequence of the fault changes completely? How conservative does GE-Hitachi need to be?	ONR would not specify a particular approach; however the analysis needs to be conservative. ONR would consider approaches aimed at reducing conservatism, such as the best estimate plus uncertainty approach, on a case by case basis.
G18	Can a risk-based approach on plant configuration be employed? E.g. what about a flooding event coinciding with [redacted]	The RP wouldn't be expected to compound the impact of completely separate events, unless the combined frequency indicated that the combination should be considered within the facility design basis. But ONR would expect the worst normally permitted configuration of equipment outages for maintenance, test or repair to be assumed in the analysis.
G19	Can credit be taken for the time at risk to move the event into a different fault treatment category?	ONR would not accept a time at risk approach in isolation for a new build plant (and provided information on guidance on this in the SAPs and TAG 05).
G20	What is the difference between 'significant' and 'principal' in classification of SSCs?	If the SSC forms a principal means of fulfilling a Category A safety function, it maps to class 1. Significant would apply to the backup SSC for which the expectation would be class 2.
G21	[redacted] is being considered, [redacted] 'How proven' do such novel techniques need to be?	ONR would expect techniques to be code approved as a minimum, additional evidence would be required for components where claims discounting gross failure are applied. Also need to consider through life demonstration of materials properties and defect tolerance claims through reliable in-service inspection when selecting fabrication methods, design geometry and materials.
G22	What is meant by 'highest reliability claims (HRCs) are to be avoided wherever possible'?	It is ONR's expectation that the plant should be designed to include suitably robust engineering protection measures, which avoid reliance on a single component to prevent radiological release. A HRC claim should not be the first option for a component design and should only be considered when it can be demonstrated that all reasonable measures to reduce risk have been considered and can be discounted using the ALARP principle. ONR recognise that [redacted] is a claimed HRC; that cannot be avoided.
G23	Is the R code series a UK code?	Yes, but not nuclear design/construction codes as per ASME or RCC-M. They are a set of assessment procedures used to demonstrate material integrity including impact assessment (R3), structural defect assessment (R6) and high temperature integrity assessment (R5).
G24	Does ONR prescribe the use of R series codes?	No, ONR does not prescribe the use of specific codes. The R series are EDF codes.

Agenda Item 8 – Large Break LOCA GE-Hitachi Lead, TRIM: 2018/375616		
No.	**Regulator Question**	**GE-Hitachi Response**
R21	[redacted]; where does the highest reliability boundary [redacted]? For safety classification in the UK	[redacted]

	context, it is expected that internal hazards e.g. pipe whip, jetting, flooding, steam release into containment will be considered.	
R22	Are [redacted] maintainable?	Yes, maintainable and replaceable.
R23	Is the pressure vessel water level measurement [redacted]	No, this is actually [redacted]
R24	Is a guillotine failure of the pipework at [redacted]?	Yes.
R25	What are the consequences of [redacted] failure?	This would be a severe accident. [redacted]
R26	In a severe accident condition, is the containment externally cooled?	[redacted] decay heat.

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DAY 2 Agenda Item 9 – Defence in Depth GE-Hitachi Lead, TRIM: 2018/375616		
No.	**Regulator Question**	**GE-Hitachi Response**
R27	Are safety classes linked to numerical targets?	The GE-Hitachi approach [redacted]. The [redacted] approach adopted by GE-Hitachi should give [redacted] GE-Hitachi [redacted] framework [redacted]. Determining the event frequency [redacted].
R28	How are combinations of hazards dealt with?	GE-Hitachi noted that combinations of hazards will be considered in part within PSA and in safety analyses that will determine if events are screened in. Secondary hazards will be considered as part of this process. GE-Hitachi is aware of the work on combined hazards as part of the ABWR GDA. GE-Hitachi noted that they will be considering this further.
R29	How does [redacted] deterministic DBA differ from PSA?	The deterministic baseline [redacted] what safety functions are in place when the plant is operating in a normal state and using plant and safety systems to respond to an event if possible. [redacted].
R30	Does [redacted] initiate [redacted]	If [redacted] is the initiator of an event, [redacted] will then be used to mitigate the event. [redacted] (Safety class 1) is independent from [redacted] (Safety class 3).
R31	Are the outputs from PSA being included and incorporated with the rest of the safety assessment framework?	GE-Hitachi noted that the outputs from PSA [redacted] it is an iterative process. ONR noted that we focus on deterministic analysis first then look at PSA. GE-Hitachi noted that their approach is intended to integrate and iterate the deterministic and PSA analyses.

Further Discussion

GE-Hitachi

- The current intention is to keep [redacted].
- Human Operation Hazard Evaluation has been [redacted] internal and external hazards.
- GE-Hitachi is using failure types to initially categorise events until PSA has been completed.
- There are [redacted] between an initiating event and a radioactive release.
- [redacted] ONR's expectations and GE-Hitachi's approach to Design Extension Conditions and Severe Accidents needs to be reviewed in light of emerging IAEA guidance.
- GE-Hitachi noted that they have mainly done [redacted] and there is increased focus on [redacted].

ONR

- ONR recommended that GE-Hitachi read the Post Fukushima report on ONR's website, in regards to consideration of human factors in hazard evaluation (http://www.onr.org.uk/fukushima/final-report.pdf) .
- ONR noted that the event/sequence categorisation approach presented by GE-Hitachi [redacted] this would

likely be an area for early engagement and key scrutiny.

- ONR noted that under the modernised GDA approach, defence in depth should normally be submitted in Step 2. However, given that GE-Hitahci have highlighted this now, ONR would welcome some early discussions about this in Step 1.
- ONR's guidance is benchmarked with IAEA's standards.
- ONR noted that GE-Hitachi may want to consider presenting their defence in depth approach to the Design and Safety Analysis sub-group of the IAEA SMR Regulators' Forum.

Agenda Item 10 – Design Features
GE-Hitachi Lead, TRIM: 2018/375567

No.	Regulator Question	GE-Hitachi Response
R32	Are Uninterruptible Power Supplies Class 1?	[redacted]
R33	Is UPS time limited?	[redacted] in this design. [redacted] the intention is that [redacted] noted that the [redacted], but the [redacted] will provide the [redacted] removed. GE-Hitachi noted that [redacted] can also be [redacted]. [redacted] have to be [redacted] but are [redacted] they are [redacted]
R34	Are [redacted] in the Isolation Condenser System (ICS)?	[redacted] decay heat removal and depressurisation while [redacted]
R35	Will the heat exchangers be constructed using [redacted]?	[redacted] it uses [redacted]. The heat exchanger [redacted]. It is [redacted] and will use [redacted].
R36	What sort of water will [redacted]?	[redacted]
R37	Where are the [redacted]?	Adjacent [redacted] physical separation [redacted]
R38	Is the intention to maintain independence between [redacted]	[redacted] intention.
R39	Will the containment be [redacted]?	This has [redacted].
R40	Which parts of this sketch indicate concrete structure? (Slide 85)	The [redacted] structure [redacted]. This [redacted] will be largely [redacted] and will [redacted]. The [redacted] provided by [redacted] considering [redacted]. [redacted] concrete [redacted].
R41	What about water getting in to the containment from the surface due to external flooding?	There is [redacted] containment structure. This structure [redacted]

		[redacted] etc.
R42	What is driving [redacted] of concrete?	The concrete [redacted] because it is [redacted]. It is also [redacted]. GE-Hitachi is [redacted] that is [redacted] or [redacted] wherever possible.
R43	Is there precedence for [redacted]?	There may be in the nuclear industry, looking at [redacted]. The code NB-7120 tells users that any of a number of options can be used to [redacted] one of the most likely [redacted]. ONR noted that if there is a significant safety claim on [redacted] (as GE-Hitachi [redacted]), a lot of reliability would be claimed on [redacted] From a UK perspective, GE-Hitachi may need to demonstrate [redacted]. This relates back to comment G22 on highest reliability and ALARP justification to demonstrate that all reasonable options to provide engineering protection have been considered and discounted.
R44	What causes [redacted] and [redacted] scoping calculations with and without [redacted]?	[redacted] and [redacted] leads to the [redacted] that is [redacted]. GE-Hitachi could [redacted] and subsequent [redacted]; the [redacted] is the same [redacted].
R45	Would the normal process be for [redacted]? What would be the thermal effects of [redacted] and could this lead to [redacted] of the [redacted]?	The normal process would be for [redacted] is required. It would probably [redacted] but there would be a [redacted] is greater than [redacted], there would be [redacted] this.
R46	Would AC power be required for [redacted]?	[redacted] would be [redacted] On UK ABWR, [redacted]
R47	Is [redacted] case significantly different?	[redacted] For UK ABWR GDA, [redacted] were [redacted]. ONR asked that they be treated in the design basis. ABWR already [redacted] this. GE-Hitachi want to [redacted] systems [redacted] into [redacted] if required, [redacted] GE-Hitachi [redacted]
R48	Is there a possibility of [redacted]	[redacted] of [redacted] enter [redacted] the [redacted] would [redacted] this.
R49	Do GE-Hitachi intend to support arguments for ATWS mitigation using [redacted] with experimental tests?	If [redacted].
R50	Are there any issues with stability when injecting [redacted]?	GE-Hitachi has [redacted] using [redacted]. There are some [redacted]

		core. Extensive [redacted]
R51	How will the control rods be inspected? What sort of periodicity?	[redacted] control rods would be [redacted] period. [redacted] control rods would be taken [redacted] more easily than [redacted] these would be maintained as part of [redacted].
R52	Is there any more information about the [redacted]?	Would [redacted], prefer to [redacted].
R53	Where is the additional water on site coming from for [redacted]?	The thinking behind this concept is [redacted], it has [redacted] where this water [redacted].
R54	What would be the implications of removing the head from the core during outages?	When removing head from the core, [redacted]. Calculations [redacted]
R55	Is GE-Hitachi's approach to unmitigated consequence of bundle drop during refuelling focused on consequences?	[redacted], using [redacted] features to undertake a conservative assessment.
No.	**GE-Hitachi Question**	**Regulator Response**
G25	Which stage would the RPV over-pressure protection systems be submitted to ONR during GDA?	Step 2 of the GDA process would be the most appropriate step for ONR to look at these systems in more detail. As [redacted] in GDA.
G26	For unmitigated consequences, have to assume [redacted] will be mitigating fact. Would this be acceptable?	ONR are not assessing so no response given. ONR's expectation is for conservative assessment.
G27	What can you do to mitigate worker dose if you drop the fuel bundle?	ONR are not assessing so no response given. GE-Hitachi noted tha [redacted] workers in the area.

Further Discussion

GE-Hitachi

- [redacted]; simple ([redacted]) and few or no support systems. Fail safe where practicable.
- [redacted] Diesel Generators in design.
- Isolation Condenser System is [redacted]
- In [redacted] and [redacted] to achieve 100% heat removal. Reduces the risk of common cause failure.
- Slide 82 shows how [redacted] fits with [redacted].
- Primary Containment Vessel is a [redacted].
- [redacted] of containment water. [redacted] for this. Containment [redacted]; this has [redacted].
- [redacted] concrete structure houses [redacted].
- Intention is for design to be [redacted] to [redacted].
- [redacted] from the design. ASME codes do not allow you to have [redacted] – [redacted] and higher [redacted].
- GE-Hitachi noted that the transient [redacted] that over-pressure protection [redacted].
- ATWS sequences (control rods not going in) would [redacted] events.

- The [redacted] configured in a way that helps [redacted]. This can also [redacted], in a similar way that [redacted] has been used [redacted] in other BWRs.
- [redacted] days of water in spent fuel pond, depending on decay heat load of fuel in the pond.
- GE-Hitachi requested further information on whether [redacted] in the SFP and whether there was OPEX on [redacted]. ONR did not provide a response.
- Discussion around classification of fuelling machine and previous experience with ABWR.

ONR

- ONR noted that they would be looking for appropriate demonstration of structural integrity of containment depending on its classification. GE-Hitachi need to have confidence in accessibility for through-life weld examinations, demonstration of defect tolerance for transients such as potential issues with thermal shock etc. GE-Hitachi noted that [redacted], ONR re-iterated that meeting code is a minimum and additional demonstration may be required depending on the safety classification of the steel containment.
- ONR commented that yesterday GE-Hitachi noted that [redacted]. ONR noted that [redacted] in a UK context as most sites will not meet the IAEA definition of a 'dry site'. ONR noted that they have just accepted an ALARP case for a non-dry site and external permanent barriers [redacted].
- ONR noted that containment design to accommodate severe accidents would be an area that might be appropriate for early discussion with GE-Hitachi.
- ONR would expect Class 1 systems to be backed up by Class 2 systems (where a backup is deemed to be required).
- ONR to consider if they can prepare a presentation on their experience of heat removal of spent fuel pools from previous GDAs (see action 5).
- ONR noted that in the SAPs, ONR encourages a less conservative approach for worker dose. This is embodied in TAG 45 where the wording is "conservative but not overly pessimistic". This is to avoid for example assuming a worker is located right next to a leak site, ventilation is off and they remain there for the release duration. Off-site the assumption would be more pessimistic in that we expect exposure for full duration of release at location of highest dose rate.
- ONR suggested that [redacted] from GE-Hitachi on the unmitigated consequence scenario, might enable ONR to provide some more information on OPEX, lessons learned.
- ONR noted that TAG 45 contains more information on radiological doses.

Agenda Item 11 – Security
ONR Lead, TRIM: 2018/375567

No.	GE-Hitachi Question	Regulator Response
G28	Does malicious effects from the "insider" stretch as far as the supply chain?	It also includes the supply chain, not just staff working for licensee. However you have to adopt a risk-based approach. If personnel are working on a key security component, for example, you would expect a higher level of vetting or checks that is clearly auditable.
G29	Is the same classification used for security as for nuclear safety?	Yes, it is based on SSCs. There is currently an ONR TAG under development to apply the equivalent system to security as there is to safety. There is some additional information in the SyAPs annex that is classed as Official-Sensitive. Also more detail in Guidance to Requesting Parties.
G30	Are there examples where ONR are regulating servers containing SNI (such as the Official-Sensitive annex of the SyAPs) outside the UK?	Yes, ONR has a process to gain assurance that the SNI is being managed appropriately under Reg. 22 of NISR 2003. ONR also liaise with Cabinet Office to ensure that they are content with information going out of the UK.
G31	How can you go through the process of accessing the annexes to the SyAPs without going through GDA?	ONR noted that you can voluntarily request to become a Reg. 22 dutyholder under NISR 2003 outside of GDA. ONR CNS will come and inspect the area where you propose to hold the information. If

		ONR are content, you are then added to List N and will be granted access to the Official-Sensitive annexes of the SyAPs. However, ONR will be charging for these regulatory activities. Coming in as a Requesting Party during GDA means that the costs will be covered as part of the cost recovery agreement for GDA.
G32	If an area includes some Safety Class 1 systems, will it automatically be a Vital Area?	If you can create radiological consequences by malicious actions, then it will be a Vital Area. It does not automatically become a Vital Area because it has Safety Class 1 systems.
G33	Is malicious aircraft crash considered as part of the Design Basis Threat?	It is considered elsewhere, as part of External Hazards. Information on which aircraft to consider in terms of malicious aircraft crash is provided to ONR by the Government. The information on these types of aircraft is classified as Official-Sensitive. It is accessible to dutyholders who are covered under Reg. 22 of NISR 2003. GE-Hitachi noted [redacted].

Agenda Item 12 – Security
GE-Hitachi Lead, TRIM: 2018/375567

No.	Regulator Question	GE-Hitachi Response
R56	Have scenarios been considered where power is kept on but the plant is stopped from operating maliciously?	[redacted] to safely shut down the plant.
R57	What happens if you lose [redacted]?	If [redacted] as well.
R58	Is there any priority with trip signals?	There [redacted] Cyber security can be an example of common cause failure.
R59	Are [redacted] robust against the insider?	The [redacted] and the [redacted].
R60	Would there be a single control room for all reactors on a multi-unit site?	[redacted].
R61	Is [redacted] for the same purpose as [redacted]? Is [redacted]	[redacted]
R62	Could the structures [redacted] to limit the intruder's path?	[redacted] security benefits.
R63	How have GE-Hitachi been developing the Design Basis Threat without access to the Annexes of the SyAPs?	GE-Hitachi [redacted]. GE-Hitachi [redacted]

		[redacted]
R64	Are there health monitoring systems to check the health of different systems?	These [redacted].
R65	Is the intention to keep equipment hard- wired or to use WiFi?	WiFi [redacted] architecture [redacted] measures to protect [redacted].
R66	Technical Access Controls – when will these be considered?	These [redacted] vendors often have their own specific requirements).
R67	Turbine control systems can be particularly vulnerable from a cyber security perspective.	Turbine control system [redacted]; it [redacted]. In some countries, there may be more focus on this, [redacted]
No.	**GE-Hitachi Question**	**Regulator Response**
G34	GE-Hitachi asked if it is possible to discuss the acceptance criteria for the malicious aircraft impact threat.	ONR noted that this could be discussed in Stage 3 or ONR could send some existing guidance through to GE-Hitachi on the acceptance criteria for aircraft impact threat in the UK.
G35	Against which international standards has ONR previously reviewed cyber security?	Until March 2017, ONR mandated a risk assessment approach (HMG IS1 and IS2). It is loosely based on 27001. There are a number of approaches being adopted. IEC 62645 has been used recently, as well as EPRI Technical Assessment Methodology (TAM). UK outcome based regulation. ONR's focus is on the process and if the outputs match with the process at a high level.

Further Discussion

GE-Hitachi

- [redacted] reduce [redacted].
- [redacted] physical access controls [redacted].
- [redacted] use of cyber security [redacted] IAEA guidance.