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**ONR NGO Forum meeting
11 October 2018
Methodist Central Hall, Westminster, London**

Office for Nuclear Regulation (ONR) present:

Adrienne Kelbie (AK) – Chief Executive (co-chair)
Mark Foy (MF) – Chief Nuclear Inspector
Katie Day (KD) – Director Policy & Communications
Dr Anthony Hart (AH) – Deputy Chief Inspector, Technical Director
Paul Fyfe (PF) – Deputy Chief Inspector, Director Civil Nuclear Security
Mike Finnerty (MFin) Deputy Chief Inspector, Director New Reactors
Kobina Lokko (KL) – Senior Policy Advisor

Environment Agency (EA)

Alan McGough (AM)

NGO Representatives present:

Dr Jill Sutcliffe (JS) – Low Level Radiation and Health Conference (co-chair)
Sue Aubrey (SA) – Stop Hinkley
Peter Banks (PB) – Blackwater Against New Nuclear
Jo Brown (JB) – Parents concerned about Hinkley
Peter Burt (PBurt) – Nuclear Awareness Group / Nuclear Education Trust
John Busby (JBS) – Stop Hinkley
Neil Crumpton (NC) – People Against Wylfa B
David Cullen (DC) – Nuclear Information Service
Rod Donington-Smith (RDS) – Cumbria Trust
Allan Jeffrey (AJ) – Stop Hinkley
Rita Holmes (RH) – Ayrshire Radiation Monitoring Group
Dr David Lowry (DL) – Nuclear Waste Advisory Associates
Ian Ralls (IR) – Nuclear Network Friends of the Earth
Mike Taylor (MT) - Together Against Sizewell C
Chris Wilson (CW) – Together Against Sizewell C

Secretariat: Daniel Jones, ONR Communications Officer

1 Welcome and actions arising

- 1.1 Adrienne Kelbie (AK) opened the meeting by thanking NGO colleagues for making time to attend. AK welcomed some new attendees to the Forum and explained that the NGO co-chair Dr Jill Sutcliffe was running a little late but had advised to proceed with the meeting. Domestic arrangements were provided.
- 1.2 Action log was reviewed with AK noting that action 18.15 was currently shown as red (delayed). AK advised this action was progressing and that both she and Dr Jill Sutcliffe (JS) had been sighted on the first draft of the updated

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Terms of Reference for the Forum. AK was satisfied this action was being progressed, would soon be completed and confirmed the Terms of Reference would be circulated to members in due course

2 Update from the Chief Nuclear Inspector

- 2.1 Mark Foy (MF) welcomed NGO representatives and directed delegates to the two briefing papers that had been provided in advance of the forum (Update on the UK SSAC project and Update on BSSD implementation).
- 2.2 MF gave an update on the transposition of the European Basic Safety Standards Directive in respect of the emergency planning arrangements. MF also updated on the ongoing work and input ONR is having into the production of a Approved Code of Practice (ACOP) that will support new regulations to replace REPPiR 2001, and outlined when ONR expects the consultation on the ACOP to commence.
- 2.3 MF updated on the latest position at Hunterston B. He advised that Reactor 3 remains shutdown while EDF Energy NGL (EDF) develop a safety case to support the reactor's return to service and submit it to us for regulatory assessment and decision. MF also advised that Reactor 4 has also recently been shutdown to allow EDF to undertake graphite core inspections.
- 2.4 **Question/Comment:** RH asked for further information on the number of cracks that were permitted in the current safety case for R3 and sought clarity on the position in relation to control rod movement.
- 2.5 **Response:** MF confirmed that existing safety case allows for 350 cracks across the core and that for Reactor 3 at Hunterston it is considered that the existing safety case limit has been reached, based on the results of the recent core inspections. He explained that the limits set by the safety case ensure that control rod movement will not be inhibited in an extreme seismic event, which ensures that the reactor can always be safely shutdown in such instances.
- 2.6 **Question/Comment:** NC asked if the shutdown of the reactor can actually contribute towards cracking.
- 2.7 **Response:** MF confirmed that when a reactor is shut down it will be subject to significant pressure and temperature changes and there is the potential for the thermal and pressure cycling to impact on cracking, but no direct correlation has been made.
- 2.8 **Question/Comment:** JB asked about the articulated control rods in use at Hinkley Point B, and PBurt sought clarification on whether additional engineering solutions would be required at Hunterston to provide alternative shut down capability.
- 2.9 **Response:** MF confirmed that the current safety cases at Hunterston B and Hinkley Point B are based on shut down being achieved by normally

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articulated control rods. However, to provide diverse and defence in depth shutdown capability, EDF installed a number of super articulated control rods (that can function with greater core distortion) and a nitrogen injection system. The two systems together (i.e. super-articulated control rods and the Nitrogen) enhance the functionality and integrity of the existing shutdown systems.

- 2.10 **Question/Comment:** IR asked about the injection of nitrogen into reactors and how it functioned.
- 2.11 **Response:** MF confirmed that system is designed to be capable of injecting nitrogen gas into the reactor core and reducing the concentration of carbon dioxide gas following a severe seismic event. The Nitrogen gas injected into the core will absorb neutrons (acting as a poison), effectively reducing the ability of the core to sustain the nuclear reaction.
- 2.12 **Question/Comment:** AJ expressed concern about the modelling used to predict graphite cracking.
- 2.13 **Response:** MF confirmed there are different types of modelling and computer simulations sought to underpin predictions.
- 2.14 **Question/Comment:** PBurt asked for further information on what the safety case EDF is currently developing would cover. And NC asked if ONR also requires licensees to consider other events, not just seismic events (e.g explosions), as part of the safety case.
- 2.15 **Response:** MF advised that there are various different elements EDF have to consider as part of their safety case, underpinning the behaviour of the core in all credible scenarios. He also confirmed that the safety case for any nuclear facility needs to consider all credible internal and external hazards and demonstrate its continued safety for events up to a frequency of 1 in 10,000 years. This will include things such as seismic events, high winds, extreme temperatures, fire, explosion etc. He also added that the nuclear site licence conditions require licensees to carry out a Periodic Review of Safety every 10 years, where a review of the facility and its safety case is undertaken against modern standards.
- 2.16 **Question/Comment:** IR asked what the maximum figure for a seismic event was and how it compared on the Richter Scale.
- 2.17 **Response:** MF confirmed that assessments were carried against a reference level of 1 in 10,000 year event. MF provided IR with information, which roughly compares levels of seismic acceleration against the Richter Scale (which relates to energy released during an earthquake).
- 2.18 **Question/Comment:** MT commented that the problem of graphite cracking is not limited to just HNB and asked if ONR has enough people to deal with this issue if it becomes more widespread.

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- 2.19 **Response:** MF confirmed that ONR has increased technical capability in this field and has the necessary expertise in-house and through support contracts.
- 2.20 MF then updated the Forum on a range of other regulatory matters including: the first CNI Report on Safety and Security of Nuclear Industry in GB, expected in 2019; Integrated Regulatory Review Service (IRRS) Mission to UK, due in October 2019; Hinkley Point C – First Nuclear Island Concrete; GDA assessment of Chinese HPR1000 reactor; Bradwell Care & Maintenance; Sellafield Stack Demolition; EU Exit implications and SSAC progress; on-site storage of waste and spent fuel; and the Nuclear Sector Deal, noting this is for industry to lead, but that ONR is involved as appropriate in relation to innovation/technology and associated regulatory requirements for the future.
- 2.21 MF asked that NGOs consider what information they might like to see included in the CNI report due next year and provide him with feedback. In relation to on-site storage, MF noted that if the Geological Disposal Facility (GDF) is delayed beyond planned timescales, it may be necessary for ONR to highlight to government the safety implications for long-term storage capacity.

Action 18.20 – NGOs to consider what they would like to see included in the CNI report to be published in 2019. Comments to be fed back to Daniel Jones by 31 December 2018.

- 2.22 **Question/Comment:** DL asked for further information on what enforcement mechanisms were available to ensure recommendations made from the IRRS mission were acted upon appropriately. DL also asked how the involvement/influence of stakeholders can be fed into the mission.
- 2.23 **Response:** MF confirmed that it is a peer review mission under the IAEA and there is no legal requirement to implement recommendations, but there is significant international peer pressure. KD added that stakeholder engagement and consultation is covered by the mission, and evidence – including minutes from the Forum for example – can be provided. Equally if NGOs had specific comments they wanted to feed into the mission, this could be done via KD. KD agreed to explore further how best stakeholder views could be provided and to advise the Forum in due course.

Action 18.21 - KD to check arrangements for stakeholder views to be input to IRRS mission and advise Forum members by 15 December 2018.

- 2.24 **Question/Comment:** PBurt asked if the IRRS mission would cover the MoD programme.
- 2.25 **Response:** MF confirmed that the mission would not consider the defence sector, its scope was purely civil nuclear safety. He added he was aware that following the last IRRS mission to the UK, the Defence Nuclear Safety Regulator commissioned an independent review of defence sector nuclear regulation to be undertaken by a team of consultants, along similar lines to the IRRS mission.

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- 2.26 **Question/Comment:** DL expressed concern at the depositing of radioactively contaminated mud barely 3 miles off the coast of Wales from dredging the coast just off the Hinkley Point C site, when the mud is demonstrably contaminated with plutonium particles. DL cited evidence to the Petitions Committee at the National Assembly for Wales ¹. He asked whether this would be subject to safeguards regulation. MT suggested that the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), which is funded by DEFRA, were not putting adequate information in the public domain.
- 2.27 **Response:** MF confirmed that permission to discharge material off a licensed site is the responsibility of the Environment Agency and does not fall within ONR vires. MF also stated that the radiological assessment of the mud did not highlight any specific concerns and advised that safeguards provision would not be applied to the dredged material. AK confirmed that matters relating to CEFAS were policy considerations and should be raised through the Department for Business, Energy and Industrial Strategy (BEIS).
- 2.28 MF concluded his presentation by updating on the UK SSAC project and confirmed that ONR is on target to implement a domestic safeguards regime that will meet international obligations from 29 March 2019. MF also provided a brief update on recent prosecutions and the Independent Advisory Panel (IAP). He confirmed that ONR had received applications from the NGO community to join the IAP and that sifting would commence in the next few weeks.

3 Regulating Security of the Civil Nuclear Industry

- 3.1 Paul Fyfe, Deputy Chief Inspector and Director of ONR's Civil Nuclear Security division, delivered a presentation focusing on five elements: Safety and Security – What's common, what's different; Who we regulate and who we don't; How we regulate - Security Assessment Principles; Design Basis Threat and Adversary Capabilities; and Security Components – Physical, Information, Personnel.
- 3.2 As part of the presentation PF also addressed the specific questions raised by the Forum in correspondence: What activities does ONR undertake to regulate security on civil licenced sites? What standards apply? What processes are used? How do NGOs feel they can realistically be involved in scrutiny of ONR / industry performance on security sensitive issues?
- 3.3 PF acknowledged that due to the sensitive nature of the subject matter it is difficult for NGOs to get involved in the scrutiny of ONR/Industry performance on security matters. However, PF did advise that great effort is being placed

¹ * Petitions Committee, National Assembly for Wales - Summary of evidence Petition P-05-785 Suspend Marine Licence 12/45/ML to dump radioactive marine sediments from the Hinkley Point nuclear site into Wales coastal waters off Cardiff
<http://www.assembly.wales/laid%20documents/cr-ld11548/cr-ld11548-e.pdf>

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on improving transparency citing the publication of the Security Assessment Principles and the inclusion of security performance in the ONR Annual Report. PF encouraged NGOs to provide any feedback/comments they may have on the Security Assessment Principles, which are available on the ONR website.

Action 18.22 – NGOs to feedback to ONR any specific comments they have regarding the Security Assessment Principles. Comments to be fed back to Daniel Jones by 31 December 2018.

- 3.4 **Question/Comment:** PBurt asked if Design Basis Threat (DBT) was a UK sector wide assessment.
- 3.5 **Response:** PF confirmed that this was sector wide. He also outlined the defence in depth approach to security regulation.
- 3.6 **Question/Comment:** PB asked about the ratio between the number of physical threats and cyber security threats received from adversaries.
- 3.7 **Response:** PF confirmed there is significant focus on both armed personnel, and cyber security staff where necessary, but no specific ratio requirements. With regards to the protection of critical systems, equipment or information, PF confirmed that other techniques and protection measures are used such that we do not rely solely on a cyber-security solution to protect against potential cyber-attacks i.e. we will take account of the already existing and comprehensive safety measures that would ensure a 'nuclear system' would always 'fail safe' no matter if the cause was an error, malfunction or malicious attack. He emphasised that ONR is very conscious of cyber security threats.
- 3.8 In response to a further question regarding HPC, PF advised that the levels of protection on systems will be in line with the recommendations and specialist advice from colleagues within the National Cyber Security Centre, the Centre for the Protection of National Infrastructure and ONR's requirements under our Security Assessment.
- 3.9 **Question/Comment:** NC asked about the interface between dutyholders and government and emphasised the clear lines of communication he felt were needed. NC asked if MoD explosives could potentially be placed on a site and also commented on next generation warfare and whether government understood the threat posed by that.
- 3.10 **Response:** PF advised that ONR regulates dutyholders to the level set by government via the Design Basis Threat (DBT) and that certain very 'high-end' threats are the responsibility of the State. However, he gave assurance that the DBT level was a high bar that was kept under review, noting as threats evolve they will be looked at.
- 3.11 **Question/Comment:** DL questioned the security implications of a new GDF and whether or not it would be an accessible or closed facility. He questioned

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if the government would need to sanction licensing of an above ground store in the event that material needed to be retrieved from the GDF, in the event there was a problem.

- 3.12 **Response:** PF confirmed that from a security perspective ONR didn't see tensions with a GDF. He emphasised that safety and security specialists would work together to determine security level of any GDF facility. PF also advised that ONR would have to be satisfied with durability of a GDF before licensing it.
- 3.13 **Question/Comment:** DL commented that transport is the most vulnerable part of the 'nuclear business' and questioned if ONR would be able to regulate transport effectively if Small Modular Reactors (SMR) were built, thus increasing transport regulation requirements.
- 3.14 **Response:** PF acknowledged that if SMRs were built this would most likely lead to increased transport security requirements. However, he advised that ONR would respond as necessary, including ensuring it was sufficiently resourced to effectively regulate from an increase security need in the transport of materials, components and assemblies.
- 3.15 **Question/Comment:** IR asked what PF's opinion was on Chinese involvement in energy infrastructure.
- 3.16 **Response:** PF noted it was a matter for government to determine what countries get involved in UK energy infrastructure projects. He explained that security measures are in place to safeguard sensitive nuclear information (SNI) and intellectual property.
- 3.17 **Question/Comment:** P Burt asked for further information on the security exercises that take place at sites and DL asked if it was possible for a site to fail a security exercise.
- 3.18 **Response:** PF advised that the number of exercises depends on the categorisation of a particular site. He confirmed that ONR can impose an exercise on a site if it chooses to do so and advised that ONR is encouraging sites to undertake more 'table top' exercises. PF confirmed that sites can fail a security exercise and the reason for doing so would determine the ONR response i.e ONR can demand a full or partial 'retest'. PF confirmed that over last 12 months ONR has not issued a security direction because it has not been necessary. Where shortcomings have been identified, the relevant action has been taken to achieve compliance.
- 3.19 **Question/Comment:** DC asked for further information on 'aftercare' following initial security clearance.
- 3.20 **Response:** PF confirmed that ONR does look at 'aftercare' across dutyholders, to ensure that culture towards employees is appropriate and there is no risk to their security clearance.

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- 3.21 **Question/Comment:** MT asked if 24 hour manning of emergency response centre at Sizewell was a condition of the site licence, and whether any new nuclear power plants would have to have similar centres.
- 3.22 **Response:** MF confirmed that the centre was an EDF facility that allows them to deploy plant and equipment in an emergency. It is off the licenced site and not subject to direct regulation, but its equipment is called upon as part of EDF emergency response arrangements, it provides defence in depth and can be deployed to other stations in the fleet. On new build, the provision would need to be considered case by case.
- 3.23 **Question/Comment:** RH asked if spent fuel rods are classed as Cat 1 material.
- 3.24 **Response:** MF confirmed that due to its uranium and plutonium content, spent fuel from UK nuclear power stations is not classified as waste and it is managed in a similar way to HLW due to its higher activity and heat generating characteristics.
- 3.25 **Question/Comment:** RH asked if there was a league table for vulnerability of sites and also asked who provides permission for helicopters to land in the vicinity of flasks containing nuclear material. DL also cited a Canadian airforce helicopter landing within the grounds of Berkeley in fog during a NATO exercise and asked how designated exclusion zones can be policed.
- 3.26 **Response:** MF advised that ONR does not rank sites based on security vulnerability but instead considers regulatory attention levels based on site characteristics for safety and security. PF advised that the DBT is set very high for those sites that require it, but that he would need to come back separately on the question regarding helicopter landings.

Action 18.23 – Paul Fyfe to provide response to RH and Forum on who provides permission for helicopters to land within the vicinity of flasks containing nuclear material. Response to be issued by **30 November 2018**.

4 UK implementation of Council Directive (2009/71/ Euratom); and Council Directive 2014/87/Euratom

- 4.1 Kobina Lokko, Senior ONR Policy Advisor, and Dr Anthony Hart, Deputy Chief Inspector and Director of ONR's Technical Division delivered a presentation covering seven areas: Rationale for the first Nuclear Safety Directive (NSD); Rationale for the second NSD; Implementation of EC Directives and Government policy; UK approaches to the NSD including consultation; Difference on the ground; Relationship between NSD and BSSD; and Brexit implications
- 4.2 As part of the presentation KL and AH outlined some of the key differences between the first and second Nuclear Safety Directives and explained how

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ONR has complied with both directives and what difference this had made to things on the 'ground'.

- 4.3 **Question/Comment:** DL questioned what notifications arrangements in relation to safety standards would be in place after we exit Euratom.
- 4.4 **Response:** KL confirmed that ONR's understanding is that Directives that have already been implemented wouldn't be reversed or changed because the UK has decided to leave Euratom. He added that mechanisms already exist that place the UK at the forefront of setting international safety standards via the IAEA and that would continue.
- 4.5 **Question/Comment:** DL commented that currently in the event of a disagreement between one EU state and another, the matter can be taken to the European Courts. DL asked for clarification on the adjudicating body when the UK leaves the EU.
- 4.6 **Response:** MF advised that inter-government diplomatic relations would most likely need to determine any course of action taken in the future, noting that ONR has information exchange arrangements with many nations already. MF added that post EU Exit, ONR expects to continue attending the European Nuclear Safety Regulators Group (ENSREG) meetings, so would have an opportunity to consider safety standards and legal implications through that route.
- 4.7 **Question/Comment:** IR expressed concern in ONR trying to implement directives in a cost effective way and to remove burdens.
- 4.8 **Response:** KL advised that when implementing directives, the intention and advice is to avoid 'gold plating', which can mean legal instruments (which can be costly and time consuming) are not always appropriate. For NSD, aside from the Direction issued to ONR by the government in relation to information sharing, this was not deemed necessary and BEIS were satisfied with the implementation. KL also explained further the principle of subsidiarity when implementing EU directives.
- 4.9 **Question/Comment:** PBurt requested that as part of the NSD process if there would be opportunities to look at stakeholder engagement across nuclear industry.
- 4.10 **Response:** MF explained that AK had taken up the concern raised by NGOs in respect of the issues experienced with SSG/LLC meetings and had discussed the matter with the chair of the Safety Directors Forum (SDF) who had since committed to looking into this matter further.
- 4.11 AK commented that the SDF Chair had responded directly on the issues raised, offering to undertake a review. However the wider point on stakeholder engagement needed further examination and she agreed that ONR would

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look at what is required in this regard

- 4.12 **Question/Comment:** DL commented on problems accessing documents from the Nuclear Energy Agency (NEA) Stakeholder Engagement event last year (and more widely their working group on public communications), and why stakeholders (beyond NEA members) were not invited.
- 4.13 **Response:** KD advised that in her new role she had re-engaged with this Group and would make enquiries as to how the public are kept informed of its work and involved in events, such as the one held last year. MF acknowledged that the level of stakeholder engagement varies considerably across states; and AK commented that a number of organisations don't involve NGOs.

Action 18.24 – ONR to raise issue of accessibility to information and attendance from NEA when group next meets in April 2019, or sooner if the opportunity arises.

Action 18.25 – ONR to review current legal framework to determine what provisions exist requiring dutyholders to engage more proactively with stakeholders and report back to next Forum meeting (March 2019). For example, if existing Licence Conditions allow ONR to take action when concerns are raised about a dutyholder's approach to stakeholder engagement.

- 4.14 **Question/Comment:** RDS commented that ONRs activities mainly related to 'onsite' and that 'off-site' issues are mainly down to Environment Agency (EA). He suggested there should be a meeting with EA for them to provide further information about their role, purpose and degree of independence.
- 4.15 **Response:** AMc (EA) advised the Environment Agency is an independent regulator and that EA would be happy to meet with NGOs. He noted that any EA specific meeting would also need to involve Scottish Environmental Protection Agency (SEPA) and Natural Resources Wales (NRW) to give a complete picture.

Action 18.26: ONR to arrange for EA to provide an overview of their regulatory vires at a future ONR NGO Forum meeting.

- 4.16 **Question/Comment:** MT added that it is crucial that the advice/comments of regulators on the siting criteria to inform the (nuclear) National Policy Statement (2026-2035) (NPS) are made public.
- 4.17 **Response:** KD advised that ONR expects their assessments (currently in progress) to be made available by BEIS in due course. AMc added that it was his understanding that consultation on the NPS is expected next spring.

5 Introduction to Advanced Nuclear Technologies (ANTs)

- 5.1 Mike Finnerty, Deputy Chief Inspector and Director of ONR's New Reactors Division, delivered a presentation which outlined ONR's regulatory philosophy

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and how this was relevant to ANTs. MFinn also outlined ONR's work so far on ANTs and gave an overview of work to advise BEIS on Advanced Modular Reactors.

- 5.2 MFinn updated on how ONR is building internal capability to potentially regulate ANTs and how ONR is currently reviewing its guidance/processes to ensure they are suitable to regulate ANTs. MFinn also commented on some of the challenges and opportunities that ANTs would present to ONR.
- 5.3 **Question/Comment:** DL advised that he has tried to obtain further details regarding cost estimates of SMRs from BEIS but has been unable to obtain this information. He asked why ONR could not recover costs from SMR vendors.
- 5.4 **Response:** MFinn advised that funding has been made available for ONR to up skill staff, should it be required to assess SMR designs. He explained that until an SMR commences the GDA process there is no mechanism for ONR to recover costs from vendors. MFinn added that it was government policy to pursue ANTs and reiterated that at the moment it was difficult to attribute costs to a specific vendor, but emphasised that if a SMR enters the GDA process, cost recovery from the vendor would then be an option.
- 5.5 **Question/Comment:** NC commented on the potential of SMRs to learn from the UK submarine reactor programme. DL also cited a piece of research completed by academics from the University of Sussex² regarding civil-military nuclear interdependencies.
- 5.6 **Response:** MFinn advised that with ANTs, ONR would be looking for advanced design features, which make the reactors inherently safe, beyond the features provided in the current Generation III reactors. MF recognised that the UKs naval PWR programme was effectively based on a SMR type reactor but confirmed that due to the sensitivities associated with the naval programme it would remain completely independent and separate from the UKs civil SMR programme.
- 5.7 **Question/Comment:** JBS asked if plutonium stockpiles at Sellafield are an asset. He asked if ONR was advising BEIS what to do with plutonium stocks.
- 5.8 **Response:** MF confirmed that ONR has previously provided advice to BEIS on options for the stockpile, but the final decision on whether the stockpile was waste or an asset was a matter for government, ONR would then regulate the storage/treatment of the material based on the government's decision.

² Briefing on Costs and Impacts of Hidden UK Civil-Military Nuclear Interdependencies
Prof. Andy Stirling and Dr Phil Johnstone, Science Policy Research Unit (SPRU), University of Sussex
June 2018
https://www.researchgate.net/publication/328420538_Briefing_on_Costs_and_Impacts_of_Hidden_UK_Civil-Military_Nuclear_Interdependencies

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- 5.9 **Question/Comment:** JB expressed a view that plutonium stockpiles should not be used for MOX and should be immobilised on site.
- 5.10 **Response:** MF reiterated it is for government to decide on what to do with plutonium stocks and immobilisation was one of the options being considered.
- 5.11 **Question/Comment:** IR asked if ONR has further information on the funding approach being considered by SMR vendors.
- 5.12 **Response:** MFinn confirmed that as part of the early GDA process ONR does look at financial viability of companies to undergo and complete the full GDA.
- 5.13 **Question/Comment** DC asked further questions regarding supply chain.
- 5.14 **Response:** MFinn advised this is an area that ONR is interested in and MF added that 4 years ago ONR established a specialist team focusing on regulation of the supply chain.
- 5.15 **Question/Comment:** PB commented on the additional costs with SMRs if modules need to be shipped out to be refuelled.
- 5.16 **Response:** MF advised that the cost base for SMRs has yet to be fully determined; the concept of construction and operation for SMRs would be very different to existing reactor technologies and may well require ONR to consider how it regulates this sector to ensure it remains effective. MFinn added there are lots of issues that would need to be addressed.
- 5.17 **Question/Comment:** DL asked if SMRs could be scaled down and used in military programmes. DL suggested it be worthwhile looking at some of the latest academic arguments in this area³ and consider whether clarification was needed in the public domain
- 5.18 **Response:** MFinn advised that reactors used in submarines vary significantly from civil nuclear reactors.
- 5.19 **Question/Comment:** DC commented on the complex interplay that could exist within organisations committed to developing both reactors for the civil and defence sectors.
- 5.20 **Response:** MF stated that there is clear separation and independence between civil and defence reactor technology development.

6 AOB/Summary and Close

- 6.1 **Question/Comment:** JBS raised concern regarding the design of the ABWR for Wylfa B and similarities with reactor designs at Fukushima. JBS

³ Interdependencies Between Civil and Military Nuclear Infrastructures: military interests as drivers for lifetime extension and new-build? Chapter 18 in World Nuclear Industry Status Report 2018, September 2018.

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commented on how it appears that spent fuel will be stored in elevated ponds. He asked for further details on what happens when the ponds are at capacity and what mechanism there was to extract fuel from the ponds. NC also raised concern about elevated ponds.

- 6.2 **Response:** MFinn confirmed that ONR experts have looked at the mechanism to remove fuel from ponds once they are at capacity. MF added that that were a number of reasons that contributed to the incident at Fukushima and that through the GDA process, ONR has sought to ensure that the shortfalls at Fukushima have been addressed in the design of the UK ABWR.
- 6.3 **Question/Comment:** DL asked what lessons have been learned about ABWR security. IR also asked for further information about processes for inserting control rods into the ABWR reactor.
- 6.4 **Response:** MFinn confirmed that security is an implicit part of the GDA process. MF also advised that guided by the Safety Assessment Principles, ONR looks to ensure any risks are as low as reasonably practicable. He also noted that GDA is not site specific.
- 6.5 MF confirmed that control rods are inserted from below the reactor via a 'fail-safe' system, with automatic insertion if power is lost. This achieves comparable reliability and speed to gravity driven systems. A hydraulic system inserts the control rods in just a few seconds and several back-up systems are in place – such as electric motors to insert control rods and borated water injection, to provide defence in depth.
- 6.6 **Question/Comment:** MT asked for further information about financial viability to build new reactors.
- 6.7 **Response:** MF advised that the government is considering the Regulated Asset Based model for future nuclear reactors, which could provide a mechanism to reduce the level of risk for investors.
- 6.8 AK and JS closed meeting by thanking all attendees for their contributions throughout the day. RH thanked MF for his helpfulness in answering questions concerning Hunterston B nuclear power station. Feedback from attendees noted the meeting had been productive, that ONR colleagues demonstrated an exceptional breadth of knowledge across a broad range of topics, and the engagement had been collaborative and helpful.