

NDA radioactive waste management strategy

Response to public consultation

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Introduction

On the last morning of the period for this consultation, 12 hours before the end of the consultation, the respected and influential House of Commons Public Accounts Committee (PAC) published a swingeing critique of radioactive waste management at NDA-owned Sellafield, nuclear waste and fissile materials storage plant where the vast bulk of the UK's radioactive waste burden is located.

(<https://publications.parliament.uk/pa/cm201719/cmselect/cmpublicacc/1375/137502.htm>)

The day before the consultation was planned to close, Sellafield Ltd, who work very closely with the NDA chose to release another very relevant report, *Sellafield medium to long term research needs*,

(https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752392/Sellafield_Medium_and_Long_Term_Research_Needs_2018.pdf)

The very late release of these two reports complicates the ability of interested parties to respond to the consultation. However, as a result of these two publications, I have redrafted my reply to take into account the specific concerns the MPs raise over plutonium management.

Commentary

The paragraph below comprises the PAC report's very critical conclusions on the current status of plutonium management at Sellafield.

The NDA's programme to deal with the plutonium stockpile in the near term is *late and its costs are increasing*. (emphasis added|)

The Department [BEIS] is no closer to understanding what to do with plutonium in the long term. Sellafield is home to 40% of the world's global stock of plutonium. The Department is responsible for setting the government's policy for dealing with plutonium in the long term. In 2014, we reported that the Department did not have a strategy in place for the plutonium stored at Sellafield. The Department has still not decided between the two options available to it: readying the plutonium stockpile for long-term storage in a geological disposal facility (that has yet to be constructed); or reusing it as fuel in new nuclear power stations. In the meantime, the NDA is responsible for ensuring that the plutonium currently at Sellafield is stored safely and securely. It has a programme in place to do so, which consists of projects to repackage plutonium canisters for long-term storage until the Department decides what to do with them. However, the NDA has recently discovered that some of the plutonium canisters have been decaying faster than expected. This concerning development is made worse by the fact that the NDA's project to repackage these canisters is at least two years late and expected to cost over £1.5 billion, £1 billion more than it first expected. The NDA told us that it has put in place a series of contingency arrangements to manage these decaying canisters.

But these are short-term fixes for a long-term problem and the Department has yet to set out clearly what its strategy is and the associated costs to the taxpayer.

Recommendation: *Within six months, the Department should write to the Committee, setting out its plan for deciding on the long-term use of plutonium. The NDA should also write to the Committee explaining fully its contingency arrangements to manage plutonium at the site, and the reasons behind cost escalations and delays.*

NDA's Integrated radioactive waste management strategy executive summary, issued on 30 July 2018, states:

"In the 2016 NDA Strategy we made a commitment to develop a single radioactive waste strategy for the NDA Group. This strategy applies to all radioactive waste generated within the NDA estate, (including materials that may become waste at some point in the future). The radioactive waste strategy provides a high level framework within which waste management decisions can be taken flexibly, to ensure safe, environmentally acceptable and cost-effective solutions that reflect the nature of the radioactive waste concerned. A single radioactive waste strategy provides a consolidated position and greater clarity of our strategic needs in this area; promotes cross-category waste management opportunities; supports a risk-based approach to

waste management and provides an integrated programme to deliver suitable and timely waste management infrastructure to support the NDA mission.”

Like motherhood and apple pie, it is impossible to oppose this proposition. However, because of the indecision over the future fate of the 140,000kilogrammes of plutonium at Sellafield, integrating its custody into the overall waste management strategy is hamstrung.

As the PAC states, Government indecision has left the NDA unable to decide plan between: “readying the plutonium stockpile for long-term storage in a geological disposal facility (that has yet to be constructed); or reusing it as fuel in new nuclear power stations

NDA should press ministers to decide on declaring all the separated plutonium as a waste, as there is no UK facility available to turn it into a fuel; and to construct one bespoke at Sellafield is likely to cost billions of pounds; there is no national or international market that makes plutonium-based mixed oxide (MOX) fuel economically competitive, and any re-use of plutonium in MOX nuclear fuel increases manifold the opportunities for terrorists to disrupt facilities and transports, and continued plutonium infrastructure creates conditions for proliferation (see the new 150-page international study covering, UK, Belgium, France, Germany, Japan, Netherlands, and Switzerland ‘*Plutonium for Energy: explaining the global decline of MOX*’ edited by Alan J. Kuperman, Nuclear Proliferation Prevention Project, University of Texas at Austin, October 2018; <http://sites.utexas.edu/prp-mox-2018/files/2018/10/Plutonium-for-Energy-2018-Oct-19-book-style.pdf>)

The Sellafield Ltd report on research priorities states that amongst the technology priorities is work on : Novel materials which may have the potential for future uses or to replace existing materials.

I believe that NDA/Sellafield Ltd needs to prioritise the urgent development to ceramic matrices to immobilize the plutonium currently being stored in inadequate temporary canisters in the Sellafield Plutonium store, in readiness for long- term secure stewardship.

As a start Sellafield Ltd should publish the joint research it has done collaboratively with the national Australian Nuclear Science and Technology Organisation (ANSTO), Nexia Solutions and the National Nuclear Laboratory (NNL) on plutonium containment. (<http://www.nnl.co.uk/news-media-centre/news-archive/history-treating-plutonium-residues/>)

Endnote:

I share NDA’s stress on the importance of information governance. So the paragraph

5.2.2 on Information governance is concerning for what it omits. It asserts: "we will work with our SLCs, subsidiaries and regulators to ensure that effective knowledge management systems are maintained."

The fact this omits to include nongovernmental environmental group (ngo) stakeholders, interested academics and trades unions, limits the scope of the governance of information to a too narrow group, The wider stakeholder community needs to be incorporated, and participation needs to be paid for, including the independent expertise these stakeholders may wish to invite to participate.

NDA needs to be involved in the European Joint Programming first round of co-operation on long term radioactive waste management, which will start its collaborative research in 2019, and which does include ngos and independent experts

Para:5.2.2

"Effective and robust information and knowledge management systems are necessary for the development of strategic opportunities for the implementation of the baseline plan. Furthermore, knowledge retention over very long timescales, such as many decades to a century or more, is an essential consideration. The ultimate product of radioactive waste management is a waste package and its associated waste package record. The waste package record has to support future operations over the lifetime of the waste package namely interim storage, transport and disposal. The requirements around what information constitutes a waste package record for each step are broadly the same but there are some specific differences and so each lifecycle step must be considered. Plans are already in place to ensure that a robust information governance process is in place and we will work with our SLCs, subsidiaries and regulators to ensure that effective knowledge management systems are maintained"

Annex 1

This is part of the new PAC report with most worrying sections highlighted.-DL

Progress and constraints to reducing risk at Sellafield

Nuclear Decommissioning Authority: risk reduction at Sellafield

1. On the basis of a report by the Comptroller and Auditor General, we took evidence from the Department for Business Energy & Industrial Strategy (the Department), the Nuclear Decommissioning Authority (NDA), Sellafield

Limited and UK Government Investments (UKGI) to examine the NDA's progress with reducing risks at Sellafield.

2.The NDA is a non-departmental public body, sponsored by the Department and overseen by UKGI. The NDA is responsible for operating and decommissioning 17 nuclear reactor and research sites in the UK. Sellafield is the largest and most hazardous of the NDA's sites, home to ageing facilities that store radioactive nuclear materials, including 40% of the global stockpile of plutonium. The NDA oversees and funds the work of Sellafield Limited, a site licence company tasked with daily operations to decommission the site. It also carries out other commercial activities, such as reprocessing spent fuel, that generate an income for the Exchequer. In 2017–18, the NDA spent £2 billion on activities at Sellafield. It expects operations to decommission Sellafield to continue for over 100 years at an estimated cost of £91 billion.

4.The NDA's biggest challenges, and those that post the highest risks at Sellafield, include decommissioning four legacy ponds and silos, and managing plutonium stores. The Office for Nuclear Regulation regards these risks to be intolerable, meaning the NDA should prioritise reducing the risk in these facilities, and that other considerations, such as funding, should not hinder its progress in doing so. The NDA estimates that it will take decades to decommission these facilities. For example, the Magnox swarf storage silo, considered the greatest risk at Sellafield, will pose a significant risk until 2050, when work to retrieve the waste is expected to complete. For these programmes to proceed, they often require the successful completion of one or more major projects which means that progress at Sellafield must be assessed through at both programme and project level. The NDA has a set of 14 major projects that support the completion of these long-term programmes of work, with a lifetime cost of £6 billion.

Constraints to faster progress

9.The NDA and Sellafield Limited told us that their strategy for decommissioning Sellafield is based on prioritising the reduction of the

highest risks first. The NDA and the Department confirmed that Sellafield Limited's ability to carry out its work is not constrained by the available of funding. The NDA and Sellafield Limited consider that there are, however, three factors that constrain their ability to make faster progress at Sellafield. These are: the physical congestion of the Sellafield site; challenges to workforce productivity; and the complexity of the decommissioning task, which often requires bespoke innovative technologies, such as the six new reinforced doors the NDA recently installed at the side of the pile fuel cladding silo that has enabled Sellafield Limited to start the retrieval of waste materials earlier.

10. The NDA and Sellafield Limited told us that turning Sellafield Limited into a direct subsidiary has allowed for more innovative thinking around these constraints. Sellafield Limited also said that its new masterplan takes into account the congestion of the site. However, we were concerned that the NDA and Sellafield Limited have not carried out any analysis to understand how and to what extent these perceived constraints affect the pace of, and options for, decommissioning. Without this thorough understanding, the NDA and Sellafield Limited cannot be sure that their strategy for decommissioning the site is the right one, nor can we be sure that they are doing everything they can that they are doing everything they can to reduce risk at Sellafield as quickly as possible.

Lessons learned

11. The NDA has cancelled three major projects since 2012 because it says it has found more cost-effective ways to complete the work. The NDA spent £586 million in taxpayer money on these projects before it decided to cancel them. For two of the cancelled projects, the Silo direct encapsulation (SDP) plant and the Box transfer facility, the NDA expected combined cost overruns of £2.1 billion and delays of over 9 years before it decided to write them off. The NDA told us that to comply with the Office for Nuclear Regulation, it must always have a strategy in place to manage high-risk facilities. It therefore progressed work on the SDP project because it was the most technically advanced option at the time. Meanwhile, it worked

with universities to pursue other strategies that would simplify the work and make it more cost-effective.

12.The NDA also cancelled a third project that involved building new storage tanks to store highly active liquor. It told us that following its decision to end reprocessing activity at Sellafield in 2020, the Office for Nuclear Regulation agreed to allow Sellafield Limited to use two tanks, previously kept empty to provide reserve capacity, in place of building new tanks. Sellafield Limited told us that while the regulator has been holding it to account, it has also been supportive in trying to find new ways of completing the work on the site more quickly and cost-effectively.

13.The NDA and Sellafield Limited have not quantified what, if any, benefits have been derived from these incurred costs and the work undergone up to the point the projects were cancelled. The NDA asserted that it would find alternative uses for some cancelled projects, like the box transfer facility. It also told us it is getting better at learning the lessons from strategy changes and from past mistakes. But it acknowledged that it is not yet able to evaluate to what extent changes in strategy have generated savings to the taxpayer.

Progress with managing plutonium

14.The Department is responsible for setting government policy for dealing with the UK's stock of plutonium in the long term. The Department told us that there are two options available: readying plutonium for long-term storage in the geological disposal facility (GDF) that the Department expects will be available by 2048; or reuse the plutonium as fuel in new nuclear power stations. Either option would require several decades to be implemented. When we last examined the Department's progress in dealing with the UK's stock of plutonium in 2014, we found that, while the Department's preferred option was to reuse plutonium as fuel, there was not yet a market, or any power stations, that required fuel from reused plutonium. Four years later, the Department is not any closer to deciding a course of action. It told us that is not comfortable with any of the potential

options for managing plutonium other than disposing it in the GDF. In the meantime, the NDA must ensure that the stockpile currently at Sellafield continues to be stored safely and securely for decades to come.

15. The NDA asserted that it faces three main challenges in managing the plutonium stockpile at Sellafield. First, the majority of the plutonium canisters need to be repackaged to ensure they can be safely stored over the long term. The NDA's project to build a repackaging plant at Sellafield to enable this is still in the early design phase. The project is already experiencing significant delays and is expected to cost £1 billion more than originally planned. Secondly, the NDA has recently discovered that a number of plutonium canisters are decaying faster than it had expected. These canisters will need to be repackaged before the repackaging plant is available, so the NDA will have to implement contingency plans in the meantime. Lastly, the two stores that the NDA are constructing to hold these canisters are expected to cost £200 million more than expected. The NDA has not yet set out its strategy for these contingency arrangements or their associated costs.

16 Qq 21, 60, 62

21 Qq 74–78, 82

28 Qq 17, 46, 47, 53

<https://www.nao.org.uk/wp-content/uploads/2018/06/The-Nuclear-Decommissioning-Authority-progress-with-reducing-risk-at-Sellafield.pdf>

Annex2

Sellafield Ltd
Sellafeld medium to
long term research needs



[Sellafeld Medium to Long Term Research Needs](#)

PDF, 8.07MB, 32 pages