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NFLA response to UK Government public consultation on the management of overseas origin nuclear fuels held in the UK.

1. Overview of responder

I provide the formal response of the Nuclear Free Local Authorities (NFLA) to the UK Government's Department of Energy & Climate Change (DECC) consultation on the 'management of overseas origin nuclear fuels held in the UK'.

NFLA is a local authority group made up of around 50 Councils from England, Scotland, Wales, Northern Ireland and the Republic of Ireland. It raises legitimate concerns over all aspects of nuclear policy in order to assist local government in meeting its commitment to sustainable development, environmental protection and public safety. Further details on its remit can be found at its website http://www.nuclearpolicy.info or by contacting the NFLA Secretariat using the details at the top of this letter.

2. Background and context to NFLA response

The NFLA notes that this DECC consultation concerns overseas origin spent fuel sent to Britain for reprocessing at Sellafield in its Thermal Oxide Reprocessing Plant (THORP), or for reprocessing at Dounreay under commercial contracts, with either BNFL or the UKAEA. All of the original contracts date back to the 1970s and 1980s. The NFLA also note that, since these contracts were signed, the idea of reprocessing – separating weapons-useable plutonium or highly enriched uranium from spent nuclear waste fuel – has fallen out of favour in many countries, as plans for re-using plutonium have collapsed and concerns about nuclear proliferation have grown. In the UK reprocessing facilities at Dounreay are closed and the Thermal Oxide Reprocessing Plant (THORP) at Sellafield is scheduled for closure in 2018. There are currently no plans to build new reprocessing facilities in Britain.

The NFLA notes that the UK Government, as a signatory to the Sintra Agreement of the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, is committed to achieving "*progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the ultimate aim of concentrations in the environment … close to zero for artificial radioactive substances*" by the year 2020. (1) The UK Government's first Strategy for Radioactive Discharges published in 2002 in response to this commitment said that THORP would close in 2016 unless it found new business. No new business has been found. Given that there is likely to be a time lag before some radioactive discharges can be stopped after closure, the plant needs to cease operations as soon as possible for the UK to meet its international obligations. (2)

The NFLA notes that the proposal being consulted on only applies to relatively small quantities of spent fuel which has not yet been reprocessed. Reprocessing may no longer be available for this spent fuel for practical or economic reasons, so the NDA would like to manage it by means of interim storage pending disposal, taking ownership of the fuels where necessary.

To ensure that the UK does not become a net importer of nuclear waste as a consequence of this, rather than physical reprocessing the NDA will enact "virtual reprocessing", which means a radiologically equivalent amount of waste will be allocated and then returned to the customer as if the fuel has been reprocessed.

3. Sellafield THORP facility

It is important in responding to this consultation to outline the poor performance of the Sellafield THORP facility, as this plays at the heart of Government thinking in this area. The NFLA notes that, when THORP opened in 1994, it was expected to reprocess 7,000 tonnes of waste fuel in its first ten years of operation – two thirds of which would be from overseas customers. However, its throughput was never reliable, nor to specification. Instead it only managed to reprocess 5000 tonnes in its first decade of operation due to a range of equipment failures and accidents including acid spills, pipe leaks and blockages and problems with the plant's sole high-level waste evaporator (3).

The NFLA also notes that in April 2005 it was discovered that 22 tonnes of dissolved fuel and nitric acid (18,000 litres - around 83m^3) had leaked from a fractured pipe inside the plant over the previous 9-months. Although the liquid had leaked into a purpose built, thick walled concrete cell lined with stainless steel this still had significant implications for the plant's future viability. That resulted in a damning internal report and a legal action against BNFL by the Nuclear Installations Inspectorate (NII). The accident forced the permanent isolation of part of the accident damaged cell thus reducing the design specification of THORP by 50%, so its throughput was reduced to a maximum of around 600 tonnes per year.

Engineering modifications needed to be carried out which meant THORP was closed for almost 2 years. Although regulatory consent for THORP's phased re-start was given in January 2007 only 33 tonnes were reprocessed over the next year. There was a mechanical failure of the elevator system that lifts fuel out of the spent-fuel feed pond in January 2008. It was not until March 2008 that a slow return to operation was begun. Returning to full operation had to be delayed again over the next few years because of a lack of high-level waste evaporative capacity.[xi] (4)

When the NDA took over operations at Sellafield in April 2005 THORP was expected to complete its reprocessing contracts by 2010, but these contracts are not now expected to be completed until 2018. In November 2011 the NDA reported there was still just over 2,000 tonnes of waste spent fuel from UK AGR reactors and 400 tonnes of overseas waste spent fuel which it was contractually committed to reprocessing. The NDA also expects more than 4,000 tonnes of waste spent fuel to arise over the remaining lifetime of the AGRs, which could either be reprocessed or stored at the NDA's discretion. (5)

In June 2012 the NDA announced that it would only reprocess the waste spent fuel it was contracted to reprocess – in other words it would not attempt to reprocess AGR waste spent fuel for which the contracts allowed for storage or reprocessing. Yet THORP is still scheduled to remain open until 2018. This means the plant will be limping along with a low throughput of around 350 tonnes per year until it closes – less than half the throughput rate it was originally expected to achieve. (6)

One of the reasons why the throughput at THORP is expected to be so poor over the next four years is because the availability of evaporators – vital equipment in the waste solidification process - is limited, until a new evaporator can be built or the capability of the current evaporators is improved. A new evaporator is not expected to be available until 2016. (7)

[xi] High level liquid waste needs to be treated in an evaporator to reduce the volume of the liquid before it can be "vitrified" or solidified into glass blocks.

The NDA says that if THORP were to operate beyond 2018 it would need to build replacement storage tanks for the highly active liquid waste at a cost of around £500m. High level liquid waste generates its own heat, so has to be constantly cooled, which is why the storage tanks are so expensive. (8)

4. Future Plans

The NFLA notes that the consultation document says around 300 tonnes of overseas origin spent fuel still remains to be reprocessed. The NDA expects to be able to reprocess the great majority of this remaining spent fuel as originally intended. However, a residual 30 tonnes of this fuel (out of the original 5000 tonnes overseas order book) is made up of small amounts of prototype fuels, experimental fuels, MOX fuels and some materials leftover from research programmes to substantiate the in-reactor performance of irradiated fuels, which would be challenging to deal with, through reprocessing, before the planned closure of THORP in 2018. NFLA understands that around 25 tonnes of this spent fuel is probably spent MoX fuel from Germany. (9)

This residual fuel also includes roughly two tonnes of overseas-origin fuel currently held at Dounreay which will be transferred to Sellafield for future management, alongside similar UK-owned materials, in line with NDA's published strategy for Exotics fuels. In the main, the spent fuels in question have already been 'Advance Allocated' meaning that the NDA already owns them having previously swapped, with the customer, an equivalent amount of products (uranium and plutonium) and wastes with that contained in the spent fuel.

In 1996, when the dissolver in the plutonium reprocessing plant at Dounreay failed, there were 2.1 tonnes of overseas "customer material" remaining at Dounreay from sixteen outstanding overseas contracts for spent fuels and nuclear materials management. With Government approval a series of 'Advanced Allocation' arrangements were put in place for thirteen of the sixteen outstanding contracts, with the UK taking title to 1.6 tonnes of spent fuel and nuclear materials. Intriguingly to the NFLA, this means three of the sixteen contracts, comprising ~0.46 tonnes, remain unsettled. The customers for these contracts were not prepared to close out the contracts on an advanced allocation basis.

5. NFLA view on this consultation

The UK Government says that if it allows the NDA the option of not reprocessing remaining overseas fuel, it will then be able to choose whether to place the fuels in interim storage or to go ahead with reprocessing as planned.

The NFLA View is that the NDA should not have the option to continue reprocessing and that THORP should be closed as soon as practicable.

If the Government can sanction "virtual reprocessing" for 30 tonnes of residual spent so that THORP can shut in 2018, it begs the question from the NFLA why can't the same be done now for the remaining 300 tonnes of overseas fuel, and any remaining AGR spent fuel which is still slated for reprocessing, so that THORP can shut down now?

The NFLA notes that Sellafield has been under the microscope recently as the House of Commons Public Accounts Committee, the National Audit Office and KPMG have all investigated the performance of NDA and Nuclear Management Partners. Performance has been found to be woefully lacking at a huge cost to the UK taxpayer. Some 60% of the NDA's entire UK budget is being lavished on Sellafield where clean-up costs are put at £70bn and rising.

However, whilst this clean-up and decommissioning work continues to catch the media's eye, in the NFLA's view it inadvertently obscures the equally important flip-side of the NDA/NMP's portfolio - the site's commercial operations or reprocessing. Whilst reprocessing continues to be sanctioned today - largely because of the (declining) revenue it provides to help offset spiralling clean-up costs - the Magnox and THORP plant continue

to churn out yet more unwanted plutonium, create unnecessary additional volumes of higher activity nuclear waste and further pollute the environment through their radioactive discharges. The NFLA notes that, for financial year 2013/14, the NDA projected revenue of £633m from reprocessing and fuel management services. Yet Sellafield's combined operating expenditure, (operations and capital), not including decommissioning and clean-up costs will be £972m. (10)

Yet, strangely to the NFLA, these commercial operations remain largely unchallenged by the Government. Evidence by the pressure group Cumbrians Opposed to a Radioactive Environment (CORE) to the Public Accounts Committee highlights how, over the last decade, operational targets have been missed and the record has ***been getting worse, not better, since the NDA took ownership of Sellafield in 2005.*** (11)

6. Overseas waste

In the NFLA's view the consultation seems overly concerned with sticking to the nuclear waste policy devised almost 20 years ago in 1995, rather than assessing what is proposed against a clear set of environmental principles.

Two such principles are:

(1) 'Dilute and disperse' should not be used as a form of radioactive waste management (i.e. discharges into the sea or atmosphere). Instead a policy of 'concentrate and contain' (i.e. store safely on-site) should be implemented;
(2) The proximity principle - wastes should ideally be managed on-site where produced (or as near as possible to the site) in a facility that allows monitoring and retrieval of the wastes; The unnecessary transport of radioactive and other hazardous wastes be opposed;

The first principle argues against any further reprocessing, and the second argues against transporting waste back to the country of origin. Waste is at its most vulnerable to accident or malevolent attack during transit. Once reprocessing has ended it could be far preferable to leave the waste where it is.

In January 1976, following considerable political and press furore over plans to build THORP, highlighted in the infamous Daily Mirror front page headline on 21st October 1975:

"*Plan to Make Britain World's Nuclear Dustbin*"

the UK Government announced that future reprocessing contracts should include an option to return the resultant waste to the country of origin. In the NFLA's view, the main problem with this is that some of the overseas contracts with THORP had already been signed by 1976. In fact around one third of the total tonnage of overseas fuel contracted for THORP is from pre-1976 contracts. So roughly a third of the waste will be remaining in this country anyway. (12)

An argument could have been made that under the polluter pays principle the countries which had produced this waste should take responsibility for it to prevent hem continuing to generate highly dangerous radioactive waste with impunity. However, since most of the overseas spent fuel at Sellafield either came from European countries which have already agreed to phase out nuclear power or from Japan which is struggling with the aftermath of the Fukushima accident, this argument no longer applies.

7. Concluding remarks

In the NFLA's view, it is hard to fathom why most of this 30 tonnes of spent fuel was imported in the first place. The three Dounreay contracts which are refusing to agree to Advance Allocation are intriguing, and could cause further problems in the future, but without more information it is difficult to comment. Since these contracts could involve

returning bomb-grade uranium to the country of origin NFLA hopes that paramount importance will be given to the proliferation implications of any final deal.

In short, NFLA believes that by applying environmental principles to decision-making about overseas spent fuel remaining at Sellafield, reprocessing should stop as soon as possible and transportation of nuclear materials, waste, plutonium and highly enriched uranium, should only be undertaken if it is impossible to come to agreement with the companies who signed reprocessing contracts with British Nuclear Fuels Limited (BNFL).

8. Specific Consultation Questions

Are there any possible consequences of this proposal which the Government might not have anticipated?

The NDA needs to clarify its accounts, but at the moment it looks as though reprocessing will make a loss of £339m in 2013/14. Therefore it is no longer economic to continue with reprocessing. The NDA says that the owners of the majority of remaining 300 tonnes of spent fuel have already agreed to Advance Allocation. In the NFLA's view, if 'virtual reprocessing' can be agreed for 30 tonnes of this material, then why not the whole 300 tonnes?

Are there any significant factors that we may have overlooked or under / over estimated that would influence our decision on the NDA's proposal?

If 25 tonnes of the 30 tonnes of spent fuel is indeed spent MoX as NFLA suspects, its future management will require some serious thought. The lack of work on the disposal of spent MoX fuel was highlighted at the February 2011 CoRWM meeting and it was suggested that such spent fuel may require cooling for up to 150 years before it could be disposed of. Spent MoX fuel could, therefore have a very significant impact on the size of a future underground waste repository footprint. According to '*The Independent*' the Massachusetts Institute of Technology has found that spent Mox fuel takes about seven times as much disposal space compared to spent uranium fuel. (13) After 10 years, the heat generation from spent MOX fuel is twice as high as that of spent uranium fuel. After 100 years, it is three times higher. Given the very long half-life of Pu-242 (380,000 years), and Neptunium-237 (2.14 million years), in the NFLA's view it is much more complicated to store MOX than normal spent fuel. (14)

If you have any queries with this response please do not hesitate to contact me. NFLA is content for this response to be publicised.

Yours sincerely,

REDACTED

REDACTED
NFLA Secretary
On behalf of the NFLA UK & Ireland Steering Committee

9. References

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(2) See NFLA / KIMO report on radioactive discharge concerns at Sellafield to the OSPAR, Commission Radioactive Substances Committee, February 2014, NFLA Radioactive Waste Management Policy Briefing, No.47
http://www.nuclearpolicy.info/docs/radwaste/Rad_Waste_Brfg_47_OSPAR_RSC_2014.pdf

(3) Forwood, M. The Legacy of Reprocessing in the United Kingdom, International Panel on Fissile Materials, July 2008 http://fissilematerials.org/library/rr05.pdf
(4) ibid
(5) Oxide Fuels: Credible Options, November 2011 http://www.nda.gov.uk/documents/upload/Oxide-Fuels-Credible-Options-November-2011.pdf
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(7) Towards a Safer Cumbria by Pete Roche, Friends of the Earth March 2013 http://www.no2nuclearpower.org.uk/wp/wp-content/uploads/2013/03/Towards_a_Safer_CumbriaMarch2013.pdf
(8) Consultation on the management of overseas origin nuclear fuels held in the UK., DECC, March 2014 para 6 https://www.gov.uk/government/consultations/management-of-overseas-origin-nuclear-fuels-held-in-the-uk
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(10) NDA Business Plan 2013-16 http://www.nda.gov.uk/documents/upload/NDA-Business-Plan-2013-2016.pdf
(11) CORE 22nd Feb 2014 http://www.corecumbria.co.uk/newsapp/pressreleases/pressmain.asp?StrNewsID=335 CORE's submission to PAC 'Commercial Operations at Sellafield -Underperformance and Missed Targets' (which also includes Appendices on the individual facilities) can be accessed at http://www.no2nuclearpower.org.uk/wp/wp-content/uploads/2014/02/Commercial-Operations-at-Sellafield.pdf
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(14) What is plutonium MoX Fuel? The fantasies and the reality, Greenpeace (accessed) 20th March 2014 http://www.greenpeace.org.uk/nuclear/what-is-plutonium-mox-fuel