Commercial Operations at Sellafield

Underperformance and Missed Targets

A Report for the Public Accounts Committee

CORE [Cumbrians Opposed to a Radioactive Environment]
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Contents

1. Commercial Operations at Sellafield - underperformance and missed targets

This paper is submitted by CORE [Cumbrians Opposed to a Radioactive Environment][1] for consideration by the Committee of Public Accounts (PAC) following the Committee's visit to Sellafield on 26th November 2012 and its subsequent report published in February 2013 **'Nuclear Decommissioning Authority: Managing risk at Sellafield** (Twenty fourth Report of Session 2012-13). This Report was preceded by a report from the National Audit Office (NAO) 'Managing Risk Reduction at Sellafield' published in November 2012.

The PAC Report has been widely welcomed as an overdue exposé of the current status of legacy waste facilities and the shortcomings in the management of major projects at Sellafield. The site's commercial operations were however outside the scope of PAC's report - as they were for the NAO, yet the latter felt able to comment that '***other activities on the site have improved, notably the increase in the amount of spent nuclear fuel reprocessed each year***'[2].

As this CORE report demonstrates, there has been no such improvement in reprocessing performance - the reprocessing facilities producing a sequence of mediocre throughput and production rates that have met neither annual targets nor design specifications. It is regretted that NAO and others[3] have been misled in this respect, particularly as such misinformation masks the yawning gap between the level at which these commercial facilities were designed to operate and the level at which they are actually operating today.

The underperformance of the commercial facilities stems from a range of technical issues that are exacerbated by the ageing of plant, the unreliability of associated facilities, accidents and other unforeseen events. And whilst a combination of these limiting factors clearly contributes to the now almost perennial failure to meet annual targets, it cannot explain why those targets are set at such unrealistic levels in the first place or why, year after year, the same misjudgements are repeated.

The extent, likely causes and ramifications of this routine failure to set realistic targets for Sellafield's commercial facilities are assessed in this CORE report which is submitted as written evidence to the PAC for scrutiny.

As the 'flip-side' of the NDA's overall Sellafield portfolio coin, the site's commercial operations play a crucial role as a major source of revenue in support of the NDA's clean-up and decommissioning programmes and thereby determine the extent of additional monies that need to be raised annually from the public purse in order to continue and complete those programmes.

The underperforming commercial facilities covered in this report are the **Thermal Oxide Reprocessing Plant** (B570 THORP), the **Magnox Reprocessing Plant** (B205) and the **Waste Vitrification Plant** (B355)**.** Further supporting information on these operations is provided in a sequence of Appendices which also include the Sellafield Plan[4] and the High Level Waste (HLW) Evaporators.

An assessment of this phenomenon of setting unrealistic targets is likely to conclude that, rather than resulting from chance, bad luck or coincidence, it stems from an alarming level of misjudgement by those who set the targets – in this case the NDA and Sellafield Ltd, the site licence company owned by parent body organisation Nuclear Management Partners (NMP).

The NMP consortium, contracted by the NDA in 2008 to deliver not only legacy decommissioning but also fuel recycling and waste management operations, boasts an impressive level of reprocessing expertise with French partner Areva claiming that '***with over 30 years of experience (Areva) is the international reference in the field of used fuel recycling***'[5]. Moreover, the ranks of the NDA itself are today populated with staff who, as ex-employees of British Nuclear Fuels plc (BNFL) had first-hand experience of Sellafield's commercial operations, with many holding senior positions as plant managers. These include the NDA's current Chief Executive who, during his BNFL days, served '***three years as Director of Production, where he was accountable for the majority of operational activities at Sellafield.***[6]

Inexplicably, such expertise and experience does not appear to filter through to the deliberations of the NDA and Sellafield Ltd today in setting future levels of throughput or production (annual targets) for the commercial facilities. Following initial discussions by both parties to evaluate any technical, regulatory or other issues likely to inhibit plant performance, annual targets are set by the NDA - with tactical delivery of those targets being the responsibility of Sellafield Ltd.

Given the level of expertise available, the NDA's failure over recent years to set realistically achievable targets therefore begs the question as to why such expertise is ignored or discounted by the NDA, or why the potential threat from factors likely to limit plant performance - well understood by many stakeholders outside the industry who follow proceedings closely, is routinely ignored or misunderstood.

Whether the repeated inflation of target figures stems from a desire by the NDA to impress or placate anxious customers and/or its sponsoring Department of Energy & Climate Change (DECC) – or to conceal from them the realities of 'conditions on the ground' at Sellafield - is open to debate, as is the view that, overstretched by the expansion of its original remit of clean-up and decommissioning to include oversight of nuclear waste disposal and involvement in new-build issues in the UK, the NDA has become overstretched and it's judgement and performance adversely affected.

Common sense dictates that given the technical complexity of the facilities and the processes involved, together with their dependence on associated plant, a failure to meet annual targets might be expected periodically – but not on the current scale as shown in **Table 1** below.

Table 1

	B570 THORP Reprocessing tonnes		B205 Magnox Reprocessing tonnes		B355 Waste Vitrification canisters	
f/yr	target	actual	target	actual	target	actual
2000/01	833	362	500	366	n/a	131
2001/02	734	736	800	786	300	120
2002/03	500	502	800	765	250	333
2003/04	671	671	905	1038	340	341
2004/05	725	599	1000	1008	460	478
2005/06	*	51	720	243	500	482
2006/07	*	0	900	594	450	322
2007/08	*	51	900	457	355	314
2008/09	280	116	540	430	400	242
2009/10	200	217	770	451	400	382
2010/11	<400	350	703	233	228	96
2011/12	419	429	800	603	231	221
2012/13	408	228	695	383	197	148
key:	met	failed				

Sources: Government, BNFL, BNG and NDA Reports, presentations and FoI requests

Table 1 shows that, in percentage terms, 72% of the targets set for the three facilities have been missed during the 13-year period 2000/01 to 2012/13. In many cases the failure has been by significant margins – with Magnox reprocessing leading the field for major discrepancies. By contrast, on the relatively few occasions when targets have been met, the margins are generally very small – or have been met exactly.

Significantly, the overall failure rate of 72% has increased to a startling 92% for the 8-year period commencing 2005/06 when the NDA took ownership of Sellafield and its operations. For THORP's performance it should be noted that the missed targets between 2005/06 and 2008/09 – with little spent fuel reprocessed - can be attributed solely to the extended closure of the plant following a major leakage accident in 2005. As will be seen, the damage caused by the accident has had significant implications for the plant's future throughput rates.

Whilst the setting of ambitious annual targets may be viewed as a driver for encouraging enhanced plant performance, the downside of failing to meet those targets - for Sellafield's reprocessing plant THORP and B205 particularly - is the knock-on effect of further extending the scheduled plant closure dates. Past underperformance by both facilities has already necessitated life extensions to THORP (from 2010 to 2018) and B205 (from 2012 - 2016/17 or beyond) - the current closure dates representing major milestones in the NDA's clean-up and decommissioning programme. that will be undermined by further extensions.

In addition, such extensions to reprocessing programmes also pose a serious threat to the ability of the UK to meet its radioactive discharge commitments made under the Oslo/Paris (OSPAR) convention – to which the UK Government is a signatory. Further, for THORP reprocessing particularly, the continued underperformance creates uncertainties as to the final composition of the UK's radioactive waste inventory for the purpose of the Government's Managing Radioactive Wastes Safely (MRWS) programme. These issues are outlined in the Appendices on Magnox (**Appendix 4**) and THORP reprocessing (**Appendix 2**) respectively, the former relating to meeting, by 2020, the target for concentrations of radioactivity in the marine environment set by OSPAR in 1998, and the latter to the amount of UK-owned spent fuel in the inventory of spent fuel/wastes requiring final disposal.

Whilst the now-closed Sellafield MOX Plant (SMP) is not covered in this CORE report, the plant's failure as a production facility to meet annual targets more than matches the failures of the reprocessing and vitrification facilities. Commencing operations in 2002/03 and projected to produce 120 tonnes of mixed oxide fuel (MOX) per year, not a single annual target was met during its lifetime – its best performance of 4.7 tonnes of MOX fuel being achieved in its penultimate year of operation 2009/10. On its closure in 2011, SMP had produced a total of 13.8 tonnes in 9 years of operation[7].

Whilst CORE's report does not infer that the underperformance of commercial facilities or the failure of the NDA to set realistic targets directly compromises health and safety at Sellafield or to its workforce and the general public, it is clear that any extension to commercial operations at Sellafield resulting from continued underperformance must necessarily prolong the period of potential risks to health and safety from those operations.

Summary

There has been a repeated failure since 2000/01 for Sellafield's commercial facilities to meet not only design specifications but also the annual performance targets set for them by the NDA. Since 2005, when ownership of Sellafield and its operations passed to the NDA, the failure rate has deteriorated further – with targets for the current year already under threat.

The result of the failure of the facilities to meet targets has been the need to extend their operational lifetimes which in turn threaten the prospect of major milestones in the NDA's clean-up and decommissioning programme being achieved. Further, as a source of revenue in support of the NDA's programme, the underperformance also impacts on the level of extra monies that have to be levied from the public purse to meet the NDA's financing requirements.

Whilst the age, reliability and other limiting factors of the facilities and associated plant covered in CORE's report have contributed to their overall underperformance, they cannot explain the perennial setting of inappropriate and patently unrealistic targets by the NDA.

A logical assessment of the underlying causes of this year on year failure might conclude that the NDA's failure bears the hallmark of an organisation incapable of making best use of available expertise, and one poorly equipped to understand the capabilities of the site's commercial facilities. Alternatively, it may either point to a covert desire to impress customers and Government that 'all's well' at Sellafield or suggest that the expansion of its original clean-up and decommissioning remit to include other Government policies has resulted in the NDA becoming overstretched and its performance thereby adversely affected.

Whatever the reason, this abject record represents poor value to UK taxpayers who expect Sellafield's commercial operations to be managed with nothing less than the upmost competence and financial rigour. In their financial context, the commercial operations of reprocessing and fuel management for the current financial year 2013/14 are projected to provide over 70% of the NDA's total projected income (£633M of £887M) whilst incurring a projected operational expenditure of £706M and capital expenditure of up to £266M – a total of £972M[8].

As noted earlier, Sellafield's commercial operations lay outside the scope of both the NAO and the PAC reports on the NDA's management of risk on the site. An update by the NAO (October 2013) which provides a summary of the NDA's activity and performance for the financial year 2012/13 includes references to the work of '***a number of other bodies (who) regularly produce independent analyses of how the Authority is doing and of the challenges it faces***'[9]. Once again, an analysis of Sellafield's commercial operations is conspicuous by its absence.

Recommendation

The absence of Government scrutiny or analysis of NDA's performance in relation to Sellafield's commercial operations needs to be addressed with urgency. Unless and until a sense of operational reality can be instilled within the NDA, its current failures – particularly in forecasting and setting future performance levels - are likely to be perpetuated. This carries implications not only for the NDA's overall programme at Sellafield and related Government policies but also in respect of ensuring that UK taxpayers are getting full value for the significant monies expended on commercial operations.

2. Appendices

Appendix 1

The Sellafield Performance Plan (the Plan).

The Plan was published by the NDA in August 2011and was the first such performance document to be placed in the public domain by the Authority since 2006[10]. The Plan was billed as enabling the vital monitoring of the progress of operating plant and other key activities. In the event, the glossy Plan disappointingly contains significantly less detail than the Near Term Work Plans (NTWP) and Life Cycle Base Line Plans (LCBL) that preceded it and which, for many stakeholders, provided a more valuable scrutiny tool than the Plan.

Despite the advance billing, operational target figures were wholly absent from the Plan on its publication date. This omission of targets was partly rectified some months later with the publication by the NDA of an Appendix[11] to the Plan in early 2012 and only some 15 months later (November 2012) were specific figures provided in a further Appendix[12].

Examples of the shortcomings of the Plan (both initial and subsequent) and the NDA's target-setting optimism is provided in **Tables 2 & 3**. Omitted from the original Plan, the Tables are extracted from the additional appendices and, as examples, relate to the throughput projected for Magnox reprocessing.

Table 2

Operations	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018
Magnox reprocessing	233te	19%	17%	16%	16%	16%	16%	Pc

As can be seen, Table 2 provides projected annual throughput figures as percentage figures which, unless the total volume of Magnox spent fuel to be reprocessed is known, is meaningless to most stakeholders and of little use as a scrutiny tool.

Table 3

Operations		2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019
Magnox reprocessing	Tonnes	450te	233te	603te	695te	664te	664te	667te	664te	Poco	
	% of remaining programme			19%	17%	16%	16%	16%	16%		

For its part, Table 3 shows that whilst the targets are still provided in percentage figures, they have also been converted to tonnages. Though this allows some check to be made of actual performance against the projections made in the Plan (the principal object of the Plan), the figures are simply not considered to be credible.

As an example, during the period 2005/06 to 2010/11, 2408 tonnes of Magnox spent fuel was reprocessed at an annual average of just 400 tonnes (see **Table 1**). For thw Plan to now credit the plant with projected throughputs of 600 to 700 tonnes per year from 2012 onwards therefore appears to be wholly out of kilter with the plant's track record. Neither does it take into account the increasing age of the plant, the acknowledged potential for failures in vital associated facilities nor the statutory biennial shutdown required under site licence. This biennial outage generally lasts for three months and usually results in a reduced throughput for that year.

In the absence of another explanation it appears likely that in an attempt to present its commercial projections to the wider world, the NDA has simply divided the outstanding tonnage of fuel to be reprocessed by the number of years remaining before the plant's scheduled closure date. This mathematically convenient method results in a relative 'flat lining' of the figures and obscures the sometimes widely fluctuating throughputs as recorded historically. The apparent use of this method throughout the Plan and its appendices raises questions about the overall value of the Plan and undermines its credibility.

In a nutshell, and despite the NAO plaudits, the Plan falls far short of what might be expected from a collective of organisations lead by the NDA which, between them, have a wide range of expertise and resources to draw upon. The visible failure to capitalise on these resources – as the missed-target figures suggest is, in CORE's view, equally as disturbing as the concerns relating to legacy and major project issues previously raised by NAO and PAC.

Appendix 2

B570 Thermal Oxide Reprocessing Plant (THORP).

THORP's failure to meet annual throughput targets set by successive operators, as shown in **Table 1**, is equalled by its failure to achieve its original design specification throughput rate of 1000 to 1200 tonnes per year as claimed by BNFL. This annual rate related specifically to the plant's 'Baseload' contract period which was described as the first 10 years of operation – 1994 to 2003. For the 'Post-Baseload' contract, throughput would be reduced to 850 tonnes annually.

Achieving its highest Baseload annual throughput of 890 tonnes in 1999/2000, THORP averaged 514 tonnes per year over the ten-year period – just 50% of its design specification and BNFL's claim. The promised completion of the Baseload's 7000 tonne order book, due by 2003/04, was eventually achieved in December 2012[13] – some 9 years late.

In April 2005, BNFL admitted to a major leakage accident at THORP that involved the spillage of 83,000 litres of spent fuel dissolved in nitric acid. Subsequently classified as Level 3 on the International Nuclear Event Scale (INES), the irreparable damage caused by the spilled liquor to one of two storage tanks and associated pipework in the plant's Feed Clarification Cell resulted in a plant closure of over two and a half years and reduced future throughput by some 50%. NDA maintains today that THORP is still capable of achieving a reprocessing rate in the order of 600 tonnes per year.

Currently there remain approximately 2,500 tonnes of spent fuel to be reprocessed in THORP. This is comprised of c300 tonnes from Overseas, c150 tonnes from Dounreay and the balance of c2000 tonnes from the UK's EDF-owned AGR reactors. Against this, THORP's closure *'with all contracts completed'* is scheduled for year 2017/18 in the Plan which projects an annual throughput varying from 330-450 tonnes[14] (the targets) which, barring unforeseen events, lie within THORP's capability.

The issue of exactly how much UK AGR fuel will be reprocessed rests with the NDA. One tranche of AGR fuel is specifically destined for reprocessing and aligns with THORP's Baseload and Post-Baseload order book. A second tranche is designated for reprocessing OR storage.. The tranches are shown in **Appendix 6 Figure 1** [15]

If THORP meets its currently scheduled 2018 closure date 'with all contracts completed', the plant will have reprocessed a total of 9500 tonnes of spent fuel over 25 years of operation[16] at an average annual rate of 380 tonnes per year (or 420 tonnes per year if the plant's extended closure from 2005 is taken into account) – just one-third of design specification.

Whilst THORP's underperformance can be blamed on a litany of technical problems, accidents and unplanned closures, the most significant risk to meeting targets is the current 'lack of evaporative capacity' to process the liquid high level wastes (HLW) produced by both THORP and B205. The problems associated with Sellafield's HLW Evaporators are described in the **Appendix 3** below.

The target of 424 tonnes set for THORP for 2013/14 is already under threat with only 105 tonnes being reprocessed in the first 6 months of the financial year[17]-

Appendix 3

Evaporation and Evaporator D.

Age-related and other weaknesses within the site's suite of three Evaporators (A,B & C) have played a part in limiting THORP and B205's progress in the past and, in some cases, have resulted in a complete cessation of reprocessing at THORP as demanded by the then Nuclear Installations Inspectorate (NII – now ONR). This because of the occasions when, with one or two of the three Evaporators being out of action, priority use of the remaining Evaporator C has been allocated to Magnox reprocessing for safety and hazard reduction reasons.

The unreliability of Evaporators A, B & C resulted in a new (fourth) Evaporator (D) being ordered by BNFL who warned that ' ***if additional evaporative capacity is not provided then it may not be possible to ….complete existing reprocessing contracts for commitments already made***[18] (emphasis added). Until such times as Evaporator D actually comes 'on-line', reprocessing therefore remains[19] wholly dependent on the limited reliability of existing Evaporators.

A simplified plan of the existing Evaporators **(see Appendix 6 Figure 2)** shows that THORP is configured for the use of Evaporator C only whereas B205 Magnox is configured for all three. The ageing Evaporators A & B (commissioned in 1970 and 1985 respectively) have suffered frequent closure resulting from problems with the corrosion of internal cooling coils, leaving Evaporator C's capacity to be shared between reprocessing plant - the lion's share prioritised for B205. Evaporator C is itself subject to periodic outages for internal camera investigation (as required by ONR) following its extended outage in 2009 to examine the remnant thickness of its own internal cooling coils.

The liquid High Level Wastes produced by reprocessing are transferred to the Evaporators for 'volume reduction by evaporation' before being consigned to the Highly Active Storage Tanks (HASTS) where, after a period of cooling, the waste is vitrified in the Waste Vitrification Plant (WVP) and then, as vitrified product, moved into storage prior to overseas return or final disposal in the UK.

Evaporator D

Originally planned to come on-line in 2010, Evaporator D's start-up date is now scheduled for 2016 in the Plan which advises that ***'until this project is complete, reprocessing throughput will be limited by the capacity of existing evaporators'***[20].

Whilst recent Government reports have highlighted the poor project management and significant overspend by the NDA on the Evaporator D project[21], they fail to credit that the original rationale for the Evaporator – to support the completion of existing reprocessing contracts – has largely been nullified by the delays to the project. For even if Evaporator D does come on line in 2016 it will benefit THORP reprocessing for a period of little over 12 months and even less – if at all – should Magnox reprocessing be completed to schedule by 2016/17.

The later than planned arrival of the last of eleven Evaporator modules at Sellafield in late September 2013 suggests that further delays are possible as does the investigation announced by ONR in May into a written complaint relating to the quality of some manufactured components[22].

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Appendix 4

Magnox Reprocessing

The reprocessing of Magnox spent fuel in B205 commenced in 1964. The plant was designed to reprocess 1500 tonnes per year and early day operations saw throughputs in excess of 1000 tonnes per year achieved routinely. By the 1990's annual throughput rates had fallen to the high hundreds of tonnes, and by year 2000 to under 500 tonnes.

Scrutinised in detail under BNFL's Stakeholder Dialogue process in 2000, BNFL was adamant that, with B205's then projected closure in 2012, the plant would achieve an annual throughput rate of 1000 tonnes or more. This much challenged optimism in B205's ability was clearly misplaced as can be seen from the annual throughputs achieved since 2000 - only meeting the 1000 tonne level on two occasions as shown in **Table 1.** From the NDA's projections in **Table 3** this level is clearly no longer considered realistic.

The reprocessing of Magnox spent fuel is governed by sequential Magnox Operating Programmes (MOP), the most recent published by the NDA in 2009 as MOP 9. This version provides three potential levels (bounding scenarios) of future annual throughput for dealing with the 3400 tonnes now awaiting reprocessing – an upper bound of 740 tonnes per year, a lower bound of 450 tonnes per year and a 'very low rate' bound of 250 tonnes per year[23]. These rates result in a projected closure of B205 in March 2017, March 2018 and December 2028 respectively. From this it can be calculated that in order to reach plant closure closure in 2016/17, the NDA has utilised MOP 9's upper bound of 740 tonnes per year – rather than opting for the lower bound of 450 tonnes which far more accurately mirrors the plant's recent performance and capability **(**see **Appendix 6 Figure 3)**.

One major implication of what amounts to a 'moveable feast' of closure dates is that any continuation of Magnox reprocessing after the plant's 2016/17 closure date further jeopardises the prospect of the UK meeting its commitments to the radioactive discharge targets set by OSPAR in 1998[24]. These targets required the ***'progressive and substantial reduction***' in radioactive discharges with the aim of ensuring that concentrations of radioactivity in the marine environment, compared to historic levels, should be ***'close to zero by 2020'***.

The relevance of B205's closure in respect of meeting this 2020 target was highlighted by BNFL in 2000 when the plant's 2012 closure was described as being an important factor in ensuring that the 2020 target set by OSPAR would be met - affording sufficient time after 2012 for concentrations of radioactivity in the Marine environment to reduce to close to zero. Clearly, the current flexibility of B205's closure as projected in MOP 9 - with an extension to Magnox reprocessing to 2020 or beyond - is likely to put paid to any hope of meeting the target. Further, contrary to BNFL's commitment in 2000 to meet the close to zero target, the NDA has taken a more cavalier approach to the possibility of missing the target, with the view that ***'then we need to move to a contingency plan – i.e. agree not to meet OSPAR deadline*** **(emphasis added)** ***or put in place a different strategy***[25].

Given the acknowledged correlation between reprocessing rates and level of radioactive discharge to sea, the NDA's'flat-lined' annual targets for B205 of around 650 tonnes indicate that there can be no progressive and substantial reductions in sea discharge as required by OSPAR. Indeed, the failure to meet throughput targets in the next two to three years means that more spent fuel has to be reprocessed annually over the final years in the run-up to plant closure, with an ensuing increase in radioactive discharges rather than the reduction required by OSPAR.

Of the NDA's target of 664 tonnes for the current financial year 2013/14, just 223 tonnes have been reprocessed during the first 6 months of the financial year, and the annual target officially reduced from 664 to 600 tonnes [26].

Appendix 5

The Vitrification Plant (WVP) and process.

WVP was commissioned in 1990 with two production lines (Lines 1 & 2), each projected to produce 300 canisters of 'vitirified product' per year. A third production line (Line 3) was subsequently added when production in the original Lines had fallen well below their annual production targets.

The vitrification process converts the liquid High Level Wastes produced by Sellafield's reprocessing operations. Under a legally binding series of Specifications issued by the Office for Nuclear Regulation (ONR) – the latest in July 2011[27] - the volume of these wastes must be kept within a specified limit and reduced to a 'steady state' level from 2015 onwards. The crucial role played by the Waste Vitrification Plant in making this reduction has a further benefit to Sellafield in **'that vitrified waste is preferable to spent and / or legacy fuel residing for longer than necessary in ponds'[28].**

The process of vitrification involves the transfer of the liquid HLW from the HLW storage tanks (HASTS – Highly Active Storage Tanks) to WVP where it is further evaporated at high temperature in a rotating calciner to form a granular powder to which glass particles are added. The mixture is then transferred to a melter crucible where, at high temperature, a chemical reaction binds the waste into the glass. This vitrified product is poured into containers (canisters) which are then moved into the product store.

Production Lines 1 & 2 produced their first canisters of vitrified product in 1990/01. Line 3, which had been projected to produce 250 canisters per year, produced its first vitrified product in 2002/03. To date, Lines 1, 2 & 3 combined have failed to reach the production rate originally projected for Lines 1 & 2 – the highest rate of 482 canisters being achieved in 2005/06 and with an average rate since Line 3 began operating of 305 canisters.

Suffering from a range of malfunctions, accidents and extended outages of Lines for repair and/or modification, WVP's underperformance has been widely criticised by ONR in respect of its inability on occasions to make the expected inroads to the stocks of HLW in line with the requirements of ONR Specification. That WVP has recently managed to keep pace with the volumes of liquid HLW produced by reprocessing reflects poor reprocessing performance rather than any marked improvement in the process of vitrification itself.

The unit of canisters used in **Table 1** was routinely used as the unit of production for WVP until 2010 when it was changed to 'tonnes of Uranium' (teU) – a reference to the amount of uranium in the unprocessed fuel from which the HLW was derived. This was considered by Sellafield Ltd and ONR as being a more accurate means of quantifying the volume of waste actually vitrified. A broad conversion factor of between 8 to 10 tonnes of uranium being equivalent to 1 canister of vitirified product is used from 2009/20 onwards in **Table 1**..

The NDA's target for WVP for the current financial year 2013/14 is set at 2545 teU (346 canisters) appears to be routinely over optimistic and to have taken no account of the plant's performance over the last three years in which an average of 155 canisters have been produced – just 45% of this year's target.

Appendix 6

Figure 1

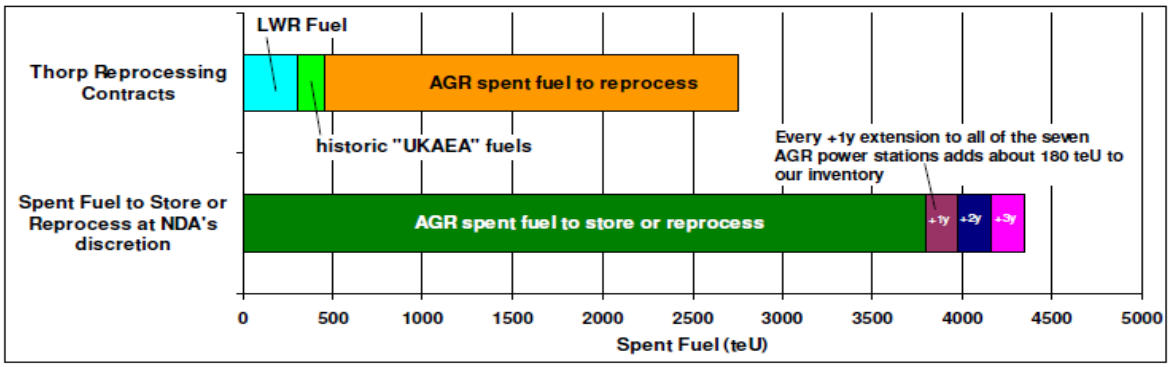

Figure 2

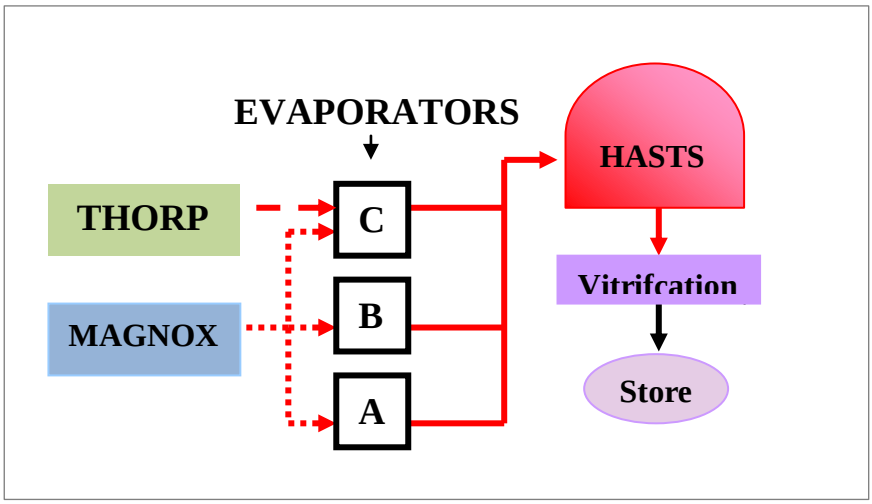

Figure 3

	Reprocessing Rate	Completion of Reprocessing
MOP 8 Revision 2	–	March 2016
MOP 9 – Upper Bound of Performance Range	740 tU/year	March 2017
MOP 9 – Lower Bound of Performance Range	450 tU/year	December 2020
MOP 9 – Very Low Rate	250 tU/year	~2028

References

[1] CORE (Cumbrians Opposed to a Radioactive Environment) has campaigned since its inception in 1980 on Sellafield's Commercial Operations (with a focus on reprocessing and MOX fuel production), nuclear waste management, environmental discharges, nuclear materials transport and radiation & health issues.

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[12] NDA Sellafield Performance Mid-Year Update 2012/13 Financial Year, November 2012 http://www.wcssg.co.uk/documentstore/Sellafield%20Plan%20Appendix%20Mid%20Year%20Update.pdf

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[13] Sellafield Ltd presentation to West Cumbria Sites Stakeholder Group (WCSSG), 7th May 2013, Page 14 http://www.wcssg.co.uk/documentstore/MD%20WCSSG%20report.pdf

[14] 2012 Appendix to the Plan, Sellafield Performance – Mid year update 2012/13, Page 5 http://www.wcssg.co.uk/documentstore/Sellafield%20Plan%20Appendix%20Mid%20Year%20Update.pdf

[15] NDA. Oxide Fuels, Preferred Option. June 2012, Appendix A Page 13. http://www.nda.gov.uk/documents/upload/Oxide-Fuels-Preferred-Options-June-2012.pdf

[16] NDA Oxide Fuel Strategy. Information and update to WCSSG, 23/7/13/. Graph., Page 7. http://www.wcssg.co.uk/documentstore/Oxide%20Fuels%20Update%20for%20WCSSG_SFMNMWG%20NDA.pdf

[17] Sellafield Ltd to WCSSG Spent Fuel Sub Group, 23rd July 2013. http://www.wcssg.co.uk/documentstore/SFM%20update%20to%20WCSSG%20sub-Group%2023%20July%202013.pdf

[18] BNFL Planning Application for Evaporator D.

[19] ONR Quarterly Site Report (1st January – 31st March 2013) to WCSSG, 7th May 2013, Page 7
http://www.wcssg.co.uk/documentstore/WCSSG%20ONR%20report.pdf

[20] The Sellafield Plan 2011. HAL Workstream (page 70), Enablers Page 6.
http://www.sellafieldsites.com/wp-content/uploads/2012/08/Sellafield_Plan.pdf

[21] NAO Report Nuclear Decommissioning Authority – Managing risk reduction at Sellafield. 7th November 2012, Figure 12 Page 33.
http://www.nao.org.uk/wp-content/uploads/2012/11/n1213630.pdf

[22] ONR Quarterly site report for Sellafield, Calder Hall and Windscale West Cumbria Sites Stakeholder Group 1 January – 31 March 2013, 7th May 2013, Page 7
http://www.wcssg.co.uk/documentstore/WCSSG%20ONR%20report.pdf

[23] NDA. Magnox Operating Plan (MOP 9) 2012, Table 2.1 page 3
http://www.nda.gov.uk/documents/upload/The-Magnox-Operating-Programme-MOP9.pdf

[24] The OSPAR (Oslo-Paris) Convention deals with marine pollution in the North East Atlantic and North Sea. Member states are; Belgium, Denmark, Finland France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the European Commission

[25] NDA 10th National Stakeholder Group meeting, 17/18th March 2010, para 4.3, page 35.
http://www.nda.gov.uk/documents/upload/10th-National-Stakeholder-Group-Meeting-Report-March-2010.pdf

[26] Sellafield Ltd to WCSSG Spent Fuel Sub Group, 22nd October 2013.
http://www.wcssg.co.uk/documentstore/(SFM&NM)%20October%202013%20Update%20-%20SL%20update.pdf

[27] ONR HAL Stocks Specification No 793. www.hse.gov.uk/nuclear/**halstock-sellafield**-par.pdf

[28] Ibid Para 48 Page 24.

This CORE report to PAC is authored by Martin Forwood who was appointed as CORE's Campaign Coordinator in 1989.