



National Audit Office



REPORT

Decommissioning Sellafield: managing risks from the nuclear legacy

Department for Energy Security & Net Zero,
Nuclear Decommissioning Authority

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HC 233

Key facts

3.3mn m³

estimate of the amount of radioactive waste that currently exists, or will be created as Sellafield is decommissioned

£136bn

forecast cost of decommissioning Sellafield (undiscounted, in 2023-24 prices)

2125

date the Nuclear Decommissioning Authority (NDA) expects all buildings at Sellafield to be demolished

£2.7 billion

Sellafield spending in 2023-24 (it earned £0.8 billion in income in the same year)

£170 million

annual financial savings from the decisions to operate the NDA's sites as subsidiaries (rather than contracting out their management)

£7.0 billion

total forecast cost of the nine major projects Sellafield currently has in progress

Green

rating from the Infrastructure and Projects Authority for two of Sellafield's largest current projects

Up to 13 years

delay retrieving all waste from four of Sellafield's oldest storage facilities, compared with the position when we last reported in 2018

546

number of boxes of waste Sellafield hopes to be retrieving each year from the Magnox Swarf Storage Silo by the mid-2030s (up from 23 boxes in 2023-24)

42%

proportion of Sellafield's most important assets that were in either 'Good' or 'Acceptable' condition in 2023-24

344

number of people recruited onto Sellafield's apprenticeship and graduate schemes in 2023-24; the NDA recruited a further 67 people onto its equivalent schemes

Summary

Background

1 Sellafield is the UK's most complex and challenging nuclear site with highly hazardous materials stored there from across the UK's nuclear industry. It also holds a legacy of contaminated buildings, untreated waste and ageing facilities. The government considers that some of these pose an 'intolerable' risk – meaning risk reduction must be the overriding factor in the decision-making of the public body in charge of Sellafield, the Nuclear Decommissioning Authority (NDA). These buildings and their contents will remain highly hazardous for many years: while workers at Sellafield have started retrieving and safely storing waste, the NDA expects full site remediation will take until 2125.

2 The NDA is an executive non-departmental public body, established in 2005 under the Energy Act 2004. It is currently responsible for operating, decommissioning and cleaning up 17 nuclear reactor and research sites in the UK and the government has arranged for it to take on seven more. Sellafield Ltd (Sellafield) is a wholly owned subsidiary of the NDA, responsible for the Sellafield site. The NDA is sponsored by the Department for Energy Security & Net Zero (DESNZ) and Scottish ministers. HM Treasury agrees funding settlements and approves major spending commitments. UK Government Investments (UKGI) oversees the NDA's governance and performance on behalf of DESNZ, while the Infrastructure and Projects Authority provides independent scrutiny and assurance to some major projects. The safety risks and environmental impacts associated with the NDA estate in England are regulated by the Office for Nuclear Regulation (ONR) and the Environment Agency.

3 Sellafield needs to complete a number of projects to ensure critical services can keep running, and enable the site to safely store and treat waste and to demolish obsolete facilities – at the same time as it carries out day-to-day operations. The cost is considerable: the NDA spent £2.7 billion at Sellafield in 2023-24 (Sellafield earned £0.8 billion in income in the same year). Sellafield depends on a highly skilled workforce and supply chain and is facing increasing competition from military and civil nuclear programmes for both. The government forecasts that the nuclear sector will need to double the current recruitment rate and recruit 40,000 more people by 2030.

4 Achieving value for money given these constraints requires effective risk and portfolio management: Sellafield needs to understand its estate's condition, how it could deteriorate over time, and the interdependencies between different parts of its complex portfolio. The very long timescales and unique nature of some of the hazards mean there is particularly high uncertainty about what will need to be built and when it will be needed. The NDA and Sellafield have been implementing a series of changes to their organisational structure to improve performance.

5 We have previously reported on the NDA's progress with reducing risk and hazard on the Sellafield site, and on the NDA's failed procurement and management of a contract to decommission 12 non-Sellafield sites. In 2012 and 2015 we reported significant delays and cost increases in Sellafield's major projects. In 2018, we found:

- an improving trend in project delivery at Sellafield, with smaller cost increases and delays than in 2015, but;
- governance and assurance around the NDA had not been optimised and there had been a reduction in clarity about the NDA's role following the decision to bring Sellafield into the NDA as a wholly owned subsidiary in April 2016; and
- slow progress with demonstrating how the NDA's current work leads to progress against its long-term mission.

Scope

6 This report examines progress since we last reported in 2018 and, in particular, the extent to which the NDA and Sellafield have improved on the issues we have previously identified. It covers the following.

- **Governance and oversight of nuclear decommissioning:** The extent to which the NDA's reforms since 2018 are securing benefits and improving governance and oversight of decommissioning risks (Part One).
- **Progress to date in managing risks from the nuclear legacy:** How well Sellafield has performed since 2018 on managing risks from the nuclear legacy and what more it needs to do (Part Two).
- **Understanding future risks and planning:** Sellafield's ability to assess and understand current and emerging decommissioning risks and to put in place short- and long- term plans to address these (Part Three).

Since DESNZ and the NDA have been aware of the particular challenges and issues at Sellafield for many years, we would expect Sellafield to be making significant progress in addressing the risks from the nuclear legacy. We therefore paid particular attention to this area in drawing our conclusions.

Key findings

Governance and oversight

7 Since we reported in 2018 the NDA has continued to re-organise itself to address significant procurement, contractual and delivery problems. From its creation in 2005, the NDA had used a model of contracting out sites for the private sector to manage and decommission over long periods. Costs and delays at Sellafield had escalated substantially over time under this model, which was not suitable for the level of uncertainty involved. The NDA has abandoned this approach, initially for Sellafield in 2016 and from 2018 for other sites. Much of the NDA's focus from 2018 to 2023 has been on transferring non-Sellafield sites into subsidiaries, creating a simplified group structure, and introducing ways of working to take advantage of new opportunities for greater collaboration between the NDA's subsidiaries (paragraphs 1.3 to 1.6, and Figures 1 to 3).

8 The NDA's new organisational structure and approach has secured a range of financial and non-financial benefits to date, with the possibility of further benefits. Across the group, the new model currently involves recurring savings of around £170 million per year, due to the discontinuation of fees to site contractors and the NDA no longer having to pay for indemnities against certain risks. The NDA also believes a further £8.2 million of annual savings have been achieved by cross-group approaches such as shared software licenses or a joint printing contract. It plans to take an increasingly group-wide approach in other areas, including supply chain management and provision of IT services, which it expects will lead to savings and improved capabilities for the group. It has placed particular emphasis on sharing people, skills and operational knowledge across different elements of the group, such as sharing knowledge of specialist decontamination and decommissioning challenges between Sellafield and Dounreay. The NDA co-ordinated 137 secondments to other sites or external organisations in 2023-24, up from 19 in 2020-21 (paragraph 1.6).

9 Sellafield's new leadership team has more to do to improve accountability for performance improvement within the organisation. There have been a number of indications of a problematic performance culture at Sellafield in recent years, as well as tensions between Sellafield, ONR, and the NDA. In 2023, Sellafield paid out £2.1 million more than it should have done under a staff bonus scheme – without resolving concerns expressed by members of the Sellafield Board and the NDA. The ONR also wrote to the NDA about Sellafield's performance, expressing a clear view that the NDA should do more to offer their support and hold Sellafield to account. Since 2023, several key members of the Sellafield leadership team – including the chief executive – have left the organisation. There are some signs that the culture is now starting to improve – with staff survey results improving and Sellafield's senior management demonstrating an increasing willingness to confront problems (paragraphs 1.7 to 1.13).

10 Sellafield, the NDA, DESNZ and HM Treasury have not simplified the process for approving business cases since we last reported. It is taking slightly longer – 8.6 months on average – for the largest business cases to pass through the approvals system than it did in 2018. This is likely to make delivery of some projects more challenging, and would cause particular problems where the project needs to be completed by a tight deadline. DESNZ has previously recognised the need for “more radical thinking to streamline the process”, but this has not happened. However, the NDA and Sellafield do now have more mature assurance functions capable of providing better challenge and support to decision-makers (paragraphs 1.15 to 1.19 and Figure 4).

Progress to date in managing risks from the nuclear legacy

11 There is no overall measurement of progress towards full decommissioning. Sellafield currently sets a number of annual targets as well as longer-term “key decommissioning milestones” – some of which will not be achieved for decades. Sellafield’s good performance against short-term targets is not consistent with the longer-term milestones, which are becoming increasingly challenging. It does not currently have an effective way of linking these to clearly communicate how current and future day-to-day performance contributes towards the overarching mission (paragraph 2.2).

12 Sellafield is taking action to address deficiencies in its management of major projects, which have suffered from cost and time overruns. Sellafield has a number of major projects which are critical to delivering its long term mission, for example to demolish obsolete facilities, or safely store and treat waste. In 2018 we reported that Sellafield was struggling to deliver its major projects to time and budget. It currently has nine major projects over £100 million in value, which are expected to cost £7.0 billion in total. The four major projects which were in progress in 2018 are now expected to cost £1.15 billion more and be delivered much later than forecast. However, most projects which started more recently (with one notable exception discussed in paragraph 14) are currently expected to be completed in line with assumptions in their business cases – though are still several years away from being completed. The Infrastructure and Projects Authority (IPA) has given two of these projects ‘Green’ ratings (a relatively rare rating) for each of the last two years. Sellafield is increasingly applying a new, more collaborative approach to project delivery which it and IPA believe is leading to better outcomes (paragraphs 2.3 to 2.10 and Figures 5 and 6).

13 Sellafield has demonstrated that it can remove safely the most hazardous waste, but is not progressing quickly enough to meet its plans. Sellafield has to empty waste from ageing facilities which pose an ‘intolerable’ risk, and store it in buildings which meet modern standards. The risk these facilities pose is illustrated by the Magnox Swarf Storage Silo, which is leaking 2,100 litres of contaminated water each day. This could continue until at least the late 2040s (Sellafield and its regulators believe that current leakage rates pose a low risk to workers and the public). As of December 2023, it has started removing waste from all four of its ‘legacy ponds and silos.’ However, it has made less progress than it expected to, in part because of the impact of the COVID-19 pandemic. Sellafield’s milestones for substantially emptying three of the ‘legacy ponds and silos’ are 6 to 13 years later than its 2018 estimate of when it would achieve this. Sellafield has plans to increase significantly the pace of retrievals over the next decade. There is a risk that facilities to treat the waste will reach the end of their useful lives before all the waste is retrieved. Sellafield has made better progress addressing the risks associated with the plutonium it stores and believes these risks will continue to decline until 2060, in line with the NDA’s strategy (paragraphs 2.11 to 2.16 and Figures 8 and 9).

14 Sellafield recognised in late 2023 that it did not have a coherent plan to sustain vital sample analysis capabilities. These scientific tests are essential, for example to enable safe removal and treatment of waste from ageing facilities, and to store plutonium safely. The existing testing facility is over 70 years old and in extremely poor condition, but Sellafield paused work on a project to refurbish another building (which had been expected to replace it) in 2024 (7.5 years after it started, after it had spent around £265 million) due to increasing concerns about the condition of the buildings and the delay it was likely to cause to another major project. Sellafield is now developing an alternative approach – and expects to decide whether it should cancel the original project in December 2024 (paragraphs 2.17 to 2.21).

15 Sellafield still has to address known cyber security issues. The ONR formally expressed concerns about the adequacy of Sellafield’s approach to cyber security in 2021. Earlier this year it prosecuted Sellafield under the Nuclear Industry Security Regulations 2003 for three cyber security breaches which took place between 2019 and 2023. Sellafield pleaded guilty in June 2024 to all three offences and has been fined £332,500. A plan to address these issues was agreed between the regulator and Sellafield in 2023 (paragraphs 2.22 and 2.23).

Understanding future risks and planning

16 Increases in Sellafield’s forecast cost of decommissioning demonstrate that it is still identifying new risks and the cost of addressing these. In 2018, we reported that the Sellafield provision (the forecast future cost of decommissioning after adjusting for inflation) had stabilised after a period of substantial increases. Over time the provision should be expected to decrease as progress towards the final objective is made. However the Sellafield provision was £136 billion in March 2024, 18.8% higher than it was in March 2019 (after adjusting for inflation). This is largely down to further increases in the cost of future work – and the time it is expected to take – and more realistic assumptions about future efficiency savings. The largest increase occurred in 2021, the last time Sellafield carried out a comprehensive review of its future plans: it is currently carrying out a similarly detailed review (paragraphs 3.3 to 3.7).

17 Sellafield still faces a great deal of uncertainty about what it needs to do, and by when, but it is making increasing use of new tools to plan and prioritise better. Some of this uncertainty comes from Sellafield’s own lack of data on asset condition: it is not clear how long key assets will need to remain operational for, or whether they are likely to last long enough. Other factors are outside of Sellafield’s control, for example decisions over when and whether a Geological Disposal Facility will be available to store waste from Sellafield permanently. The site for this has not been chosen yet, and the opening date has already moved from 2040 to the 2050s at the earliest. Sellafield will need to build more stores and manage waste on site for longer as a result. Sellafield is making better use of its ‘Risk Based Management Framework’ to identify where its current plan may not achieve the desired results. Its most recent assessment identified six such areas, and has focused senior management’s attention on finding solutions. It has also developed a better understanding of how it will use land on the highly congested site for its new construction projects (paragraphs 2.21, 3.8 to 3.18).

18 Sellafield is developing a new approach to workforce planning to address issues which have affected its operation of the site in recent years. In 2021 it agreed with HM Treasury that, by 2031, it would reduce the number of people it employed by 2,500. This is a bigger reduction than could have been achieved by existing change programmes (intended to make the site more efficient). Sellafield did not develop a workforce plan that demonstrated it was on course to achieve this commitment, or that it could be achieved without negative consequences for the site. Its safety assurance team expressed serious concerns about the workforce's diminishing capability in 2022. It was increasingly common for staff shortages to result in buildings being shut down (with safety consequences), and fewer maintenance tasks were being carried out (contributing to deteriorating asset condition). Staff shortages are also affecting Sellafield's ability to carry out operational processes. In late 2023, Sellafield decided to prioritise addressing the capability of its workforce to deliver its 'mission' above achieving its commitments to HM Treasury, and is now developing a new approach to planning. Sellafield recruited 344 people onto its apprenticeship and graduate schemes in 2023-24, with the NDA recruiting a further 67 people to its equivalent schemes (paragraphs 2.14, 3.15 and 3.19 to 3.23).

Conclusion on value for money

19 It is now 20 years since the NDA was set up to manage the UK's nuclear legacy, and eight years since it brought the Sellafield site back under its direct control. However, Sellafield is still in the early stages of delivering its mission of cleaning up the Sellafield site, which it expects to take until 2125. This is an exceptionally challenging mission: Sellafield needs to build new facilities to treat and store different types of nuclear waste, while continuing to maintain ageing facilities and their supporting infrastructure until they can be emptied of waste and decommissioned.

20 Sellafield has made progress since we last reported in 2018. It has demonstrated that it is possible to retrieve the most hazardous waste from four of its oldest stores and store it in a way which meets modern safety standards, and the reorganisation of the NDA is bringing benefits. Increasingly, Sellafield is able to draw on expertise from elsewhere in the NDA group and it is taking action to improve performance on major projects. There are also some recent signs that Sellafield is more willing to confront and resolve difficult issues.

21 In spite of these improvements, we cannot yet say that the NDA and Sellafield are achieving value for money – by which we mean outcomes commensurate with the considerable expenditure on the site. Large projects are still being delivered later than planned and at higher cost. Sellafield has made slower progress in reducing site risks than it would have liked and must now significantly accelerate the pace at which it is retrieving waste from its oldest storage facilities. Simultaneously, it needs to address the deteriorating condition of key assets and develop credible plans for maintaining the analytical capabilities the site depends upon and improving (and sustaining) its workforce’s capability. It still lacks a comprehensive measure to assess progress in reducing risk. If it underperforms, the cost of completing its mission will increase considerably, and ‘intolerable’ safety risks will persist for longer.

Recommendations

Sellafield should:

- a** develop an approach that demonstrates to stakeholders that effective progress is being made towards decommissioning the site. This should cover enabling activities and include progress to date at Sellafield, while also supporting future funding choices and Spending Review decisions; and
- b** carry out an assessment of the culture across the site and develop suitable metrics to assess and monitor whether all areas of the site and its leadership are positively contributing to creating a high performing public sector organisation.

The Nuclear Decommissioning Authority, with its group subsidiaries, should:

- c** develop measures to assess the operational effectiveness of its sites. In particular, it should monitor whether Sellafield is maintaining the capability needed to continue to operate safely and deliver progress with the mission.

The Nuclear Decommissioning Authority, DESNZ and HM Treasury should:

- d** consider what information and evidence from the NDA group would be needed to be able to demonstrate the value of longer-term settlements. In this context, the NDA should explore whether longer-term budgets for Sellafield are feasible.