Technical Baseline and underpinning Research and Development Guidance

Doc No: OPI01 – G01-TBuRD

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Summary

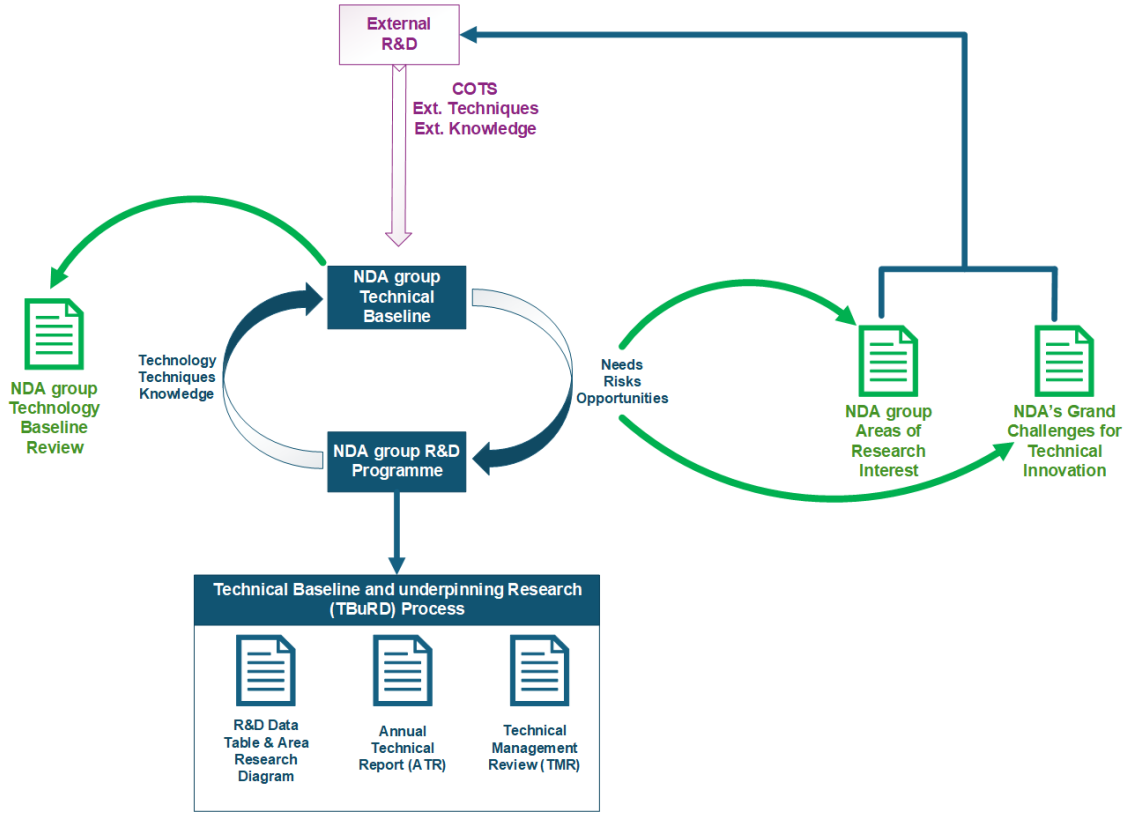

Figure 1 - Technical Baseline Documents and how they interact.

The Technical Baseline and underpinning Research & Development (TBuRD) process is how we track Research and Development (R&D) across the NDA group. It consists of the following key outputs:

- The **R&D Data Tables** which capture data on individual R&D activities across the NDA group.
- The **Area Research Diagrams (ARDs)** which provide a pictorial representation of the individual organisation's R&D portfolio.
- The **Annual Technical Reports (ATR)** which document key progress and successes across the NDA group with respect to R&D.
- The **Technical Management Reviews (TMR)** which capture the technical management processes and structures across the NDA group.

Together these documents allow progress of the NDA group's R&D portfolio to be assured; help raise visibility of planned and inflight R&D activities to foster collaboration and avoid duplication; and allow NDA to fulfil Government reporting requirements for R&D.

The R&D that these documents capture informs the implementation of technology and technical approaches to deliver the NDA mission which is summarised within the **NDA group Technology Baseline Review (TBR).**

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1 - Introduction

This document outlines the agreed requirements between the different parts of the NDA group to record and share their R&D portfolios and associated technical management arrangements. TBuRD is a requirement through the NDA IPC guidance IPCM01- G08 - Sanction - V1.

What is TBuRD process and its purpose?

The TBuRD process, through the work of a varied and skilled technical community of experts, provides the NDA group with visibility of planned or inflight R&D activities. These R&D activities ensure the various missions across the group are technically underpinned by generating technical knowledge, and deliverable by providing technology and technical approaches that deliver the desired outcomes. The TBuRD process also provides a method for the group to share knowledge, expertise and plan the right activities at the right time while avoiding duplication.

Our Approach

To accommodate the groupwide approach, a focus on simple data fields and a clear understanding of the R&D activities being undertaken is the central theme of the TBuRD. This focus aims to enhance the following:

- TBuRD acting as the sole source of truth for R&D and relevant technical innovation i.e., Innovation linked to or derived from R&D being recorded in the TBuRD.
- Enabling information sharing across NDA group technical communities or anyone within the NDA group who interacts with R&D or innovation.
- Acting as a data source to further enable cross-group collaboration and planning including gap and opportunity analysis.
- Tracking progress of R&D and relevant innovation to support technical assurance.
- A reliable data source to enable reporting of R&D activity and spend to relevant government departments or other stakeholders.

Technology Baseline Review

The information within the TBuRD submissions is used to update the NDA Technology Baseline Review (TBR) (Previously called NDA Technical Baseline Report [1]), which provides a high-level overview of the current technology landscape across the NDA group. It outlines the current baseline technologies deployed across the NDA estate and identifies future baseline capabilities which will be required to deliver the NDA's mission. This quinquennial summary is published on the NDA website to provide external stakeholders with a better understanding of the technical challenges that the NDA group face, how they are being addressed, and technology opportunities to collaborate.

2 - Process overview

The TBuRD consists of four information pillars (Figure 2):

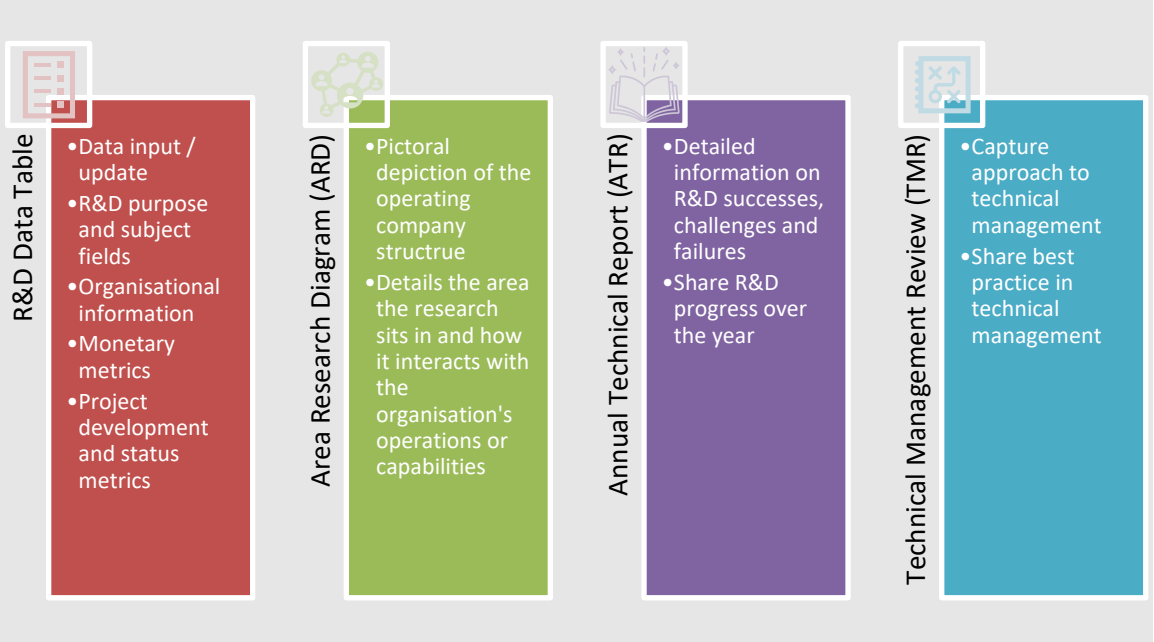

Figure 2 - TBuRD Process Information Pillars

The process operates on an annual cycle focusing on the periodic update and review of R&D portfolio data. Live maintenance of the R&D portfolio data is encouraged to prevent any end of year resourcing / level of effort issues. The use of the tools and templates provided is required to create a standardised approach across the group. This helps ongoing data collection and sharing efforts, removing data compatibility issues and rework.

Figure 3 shows the annual cycle of activities for the information pillars of the TBuRD process.

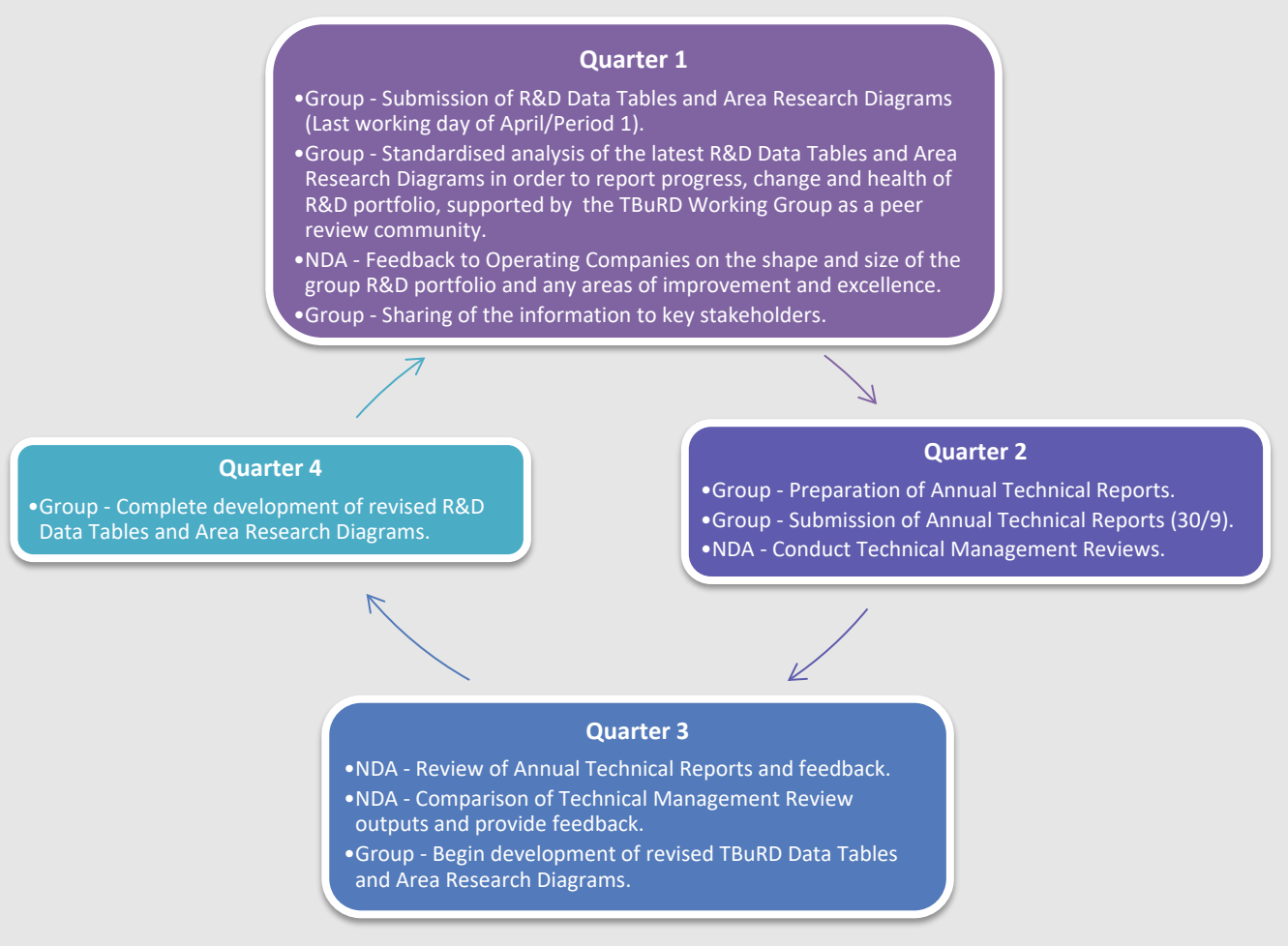

Figure 3 – Annual TBuRD Cycle

3 - Requirements of the TBuRD process

The requirements of the process are detailed in the following sections of the document to account for the four information pillars.

3.1 - R&D definition

The NDA group will use the Organisation for Economic Co-operation and Development (OECD) Frascati Manual definition of R&D [2]. This defines R&D as comprising creative and systematic work undertaken in order to increase the stock of knowledge and to devise new applications of available knowledge. The activity must be novel, creative, uncertain, systematic, transferable and/or reproducible. This definition is the recognised standard across Government, industry and academia for defining, collating and reporting R&D activities across any organisation.

> *"The internationally recognised methodology for collecting and using R&D statistics, the OECD's Frascati Manual is an essential tool for statisticians and science and innovation policy makers worldwide. It includes definitions of basic concepts, data collection guidelines, and classifications for compiling R&D statistics" - OECD*

This standard defines a broad range of R&D topics and methods (e.g., basic research, applied research, experimental development). The benefit of using this standard is that it is a robust approach and aligns TBuRD with Government expectations around R&D reporting.

It is a broad definition of R&D, allowing the inclusion of activities not previously captured in TBuRD. This creates a richer data set and further opportunity for idea sharing and collaboration e.g., the inclusion of digital or human-based R&D resulting in new business processes or ways of working.

3.2 - R&D Data Table

The R&D Data Table covers twenty-two data fields. All parts of NDA group have the ability to add additional data fields into the R&D Data Table submission (e.g., to add extra context or organisation specific information) or propose new data fields for future TBuRD process updates.

Category	Field Name	Description	Data type
Organisation	Organisational Reference (Agreed with NDA)	Further clarity on the Organisation unit or area e.g., Value stream, business unit or programme area.	Predefined Dropdown List*
	Site	Defines the geographical site and operating company.	Predefined Dropdown List*
	R&D ID	R&D item ID code (Defined by operating company or NDA).	Free text / Autogenerated
Description	Title	The title of the R&D activity.	Free Text
	Why do the R&D? What R&D will you do?	A description of the reason the R&D has been proposed or the challenge statement the R&D is aiming to solve. e.g. Understanding the chemical properties of Waste Stream X, developing technology to decontaminate Building A.	Free Text
	What will the R&D deliver? Key Outputs and Benefits when work is complete	The key outputs and benefits that will be available when the R&D is complete. e.g. Technical report and successful demonstration of new technology. New cheaper approach to decommissioning available.	Free Text
	Technical Keywords	To support analysis of the NDA group R&D portfolio.	Automatically generated by Excel
Categorisation	Strategic Theme (4 driving and 1 enabler)	Alignment with the NDA group's 4 strategic themes, or critical enablers.	Predefined Dropdown List*
	Strategic Outcomes (47 from NDA)	Alignment to one of the 47 NDA defined strategic outcomes in order to highlight the direct link / golden thread from R&D to the NDA group mission.	Predefined Dropdown List*
	Main area of current R&D	Describes the type of R&D to support analysis of the NDA group R&D portfolio e.g., is it looking at basic research, applied research, development, or demonstration.	Predefined Dropdown List*

	Main topic of R&D	Describes the main topic of the R&D to support analysis of the NDA group R&D portfolio.	Predefined Dropdown List*
	Skills Required	Describes the main skill set of the R&D activity to support analysis of the NDA group's required R&D capability.	Predefined Dropdown List*
	Current TRL	The current Technology Readiness Level (TRL).	Predefined Dropdown List*
	Target TRL	The target TRL at the end of this R&D activity.	Predefined Dropdown List*
	Need / Risk / Opp	Need – Without this R&D activity the mission cannot be delivered. Risk – Without this R&D activity there is a risk that delivery of the mission will be negatively impacted Opportunity – This R&D activity is looking to improve upon the current baseline approach	Predefined Dropdown List*
Estimated R&D Costs (£k)	Scope of costs	Declaration of whether costs arising are internal, external, or a mixture of both.	Predefined Dropdown List*
	Current Year Cost (£k)	Complete cost for the R&D activity for the completed financial year. e.g. for April 2026's submission this would be FY25/26.	Financial value £k
	Next Year Cost (£k)	Estimated cost for the R&D activity for the next financial year. e.g. for April 2026's submission this would be FY26/27.	Financial value £k
	Outyears Cost (£k)	Estimated cost for the R&D activity for all years after the next financial year. e.g for April 2026's submission this would be every year from FY27/28 (inclusive) onwards.	Financial value £k
Delivery /Deployment	Start Date (actual, or predicted for future tasks)	When the R&D task started, or for future projects the predicted start date	Full Date - DD/MM/YYYY
	End Date	The predicted end date for the task, where a task is complete this is the actual completion date.	Full Date - DD/MM/YYYY

	(predicted, or actual if complete)		
	Project Status	The task's status at the time of compiling the submission.	Predefined Dropdown List*

**For all predefined dropdown lists the full list of categories / selection options can be found in the template*

A blank R&D Data Table template is provided [3]. The template contains a full list of categories / selection options for the data fields. Unless otherwise agreed with NDA, the template should be used as the basis of the R&D Data Table submission.

It is required that all R&D activities which were marked as completed or deleted in the previous year's submission are removed from the new submission tab and placed in a separate tab. This will allow the submission to be easier to analyse but still allow an ongoing record of tasks as they are completed or deleted.

The use of a technology or innovation management system to manage the R&D portfolio and accommodate the R&D Data Table submission can be beneficial depending upon the scale and complexity of the R&D portfolio. If one is used, the relevant TBuRD Working Group member should discuss with NDA their approach and whether alternative methods to the template for submitting the required information are possible.

Pre-submission checks

The R&D Data Table should be checked before submission. Common errors seen in previous submissions include: duplicate rows, empty data fields and wrong units (e.g. £ rather than £k). Where there are major errors or omissions a resubmission will be required.

R&D Data Table analysis

The full set of NDA group R&D Data Tables will be collated and analysed. This process aims to error check the R&D Data Tables, develop standardised analysis and reporting and use automated processes and templates to reduce manual effort. This process will happen in Quarter 1 of the Financial Year as part of the overall TBuRD cycle. The TBuRD Working Group will act as a peer check group for the analysis. The output of this analysis will be shared with key stakeholders and help the NDA group investigate opportunities for collaboration on R&D and avoid duplication.

Key milestones

- Submission of R&D Data Tables (End of P1 in the next financial year - the last working day in April)
- Analysis of R&D Data Tables (End of Q1, 30/6)
- Feedback on R&D Data Table submissions (End of Q1, 30/6)

3.3 - Area Research Diagrams

Area Research Diagrams (ARDs) have replaced the Process Wiring Diagrams (PWDs) from the previous TBuRD process. As such, PWDs are no longer a requirement and can be removed from ongoing TBuRD submissions unless their use locally is still applicable in which case, they should be submitted at the same time as the ARDs.

The ARDs should show visually how the organisation's R&D aligns to the organisation's mission and structure (e.g., geographical structure by site or plant, business structure by operating unit).

The number and design of the ARDs will be different to accommodate the different missions and levels of progress across the NDA group. The general design should be agreed with the NDA Technical Baseline Manager in advance of submission.

An example ARD is provided (Figure 4) which shows a geographical representation of the group member's R&D associated with each area of its business. This revision is intended to create a groupwide focus for R&D being developed, with the end goal of improving opportunities for sharing of information and collaboration.

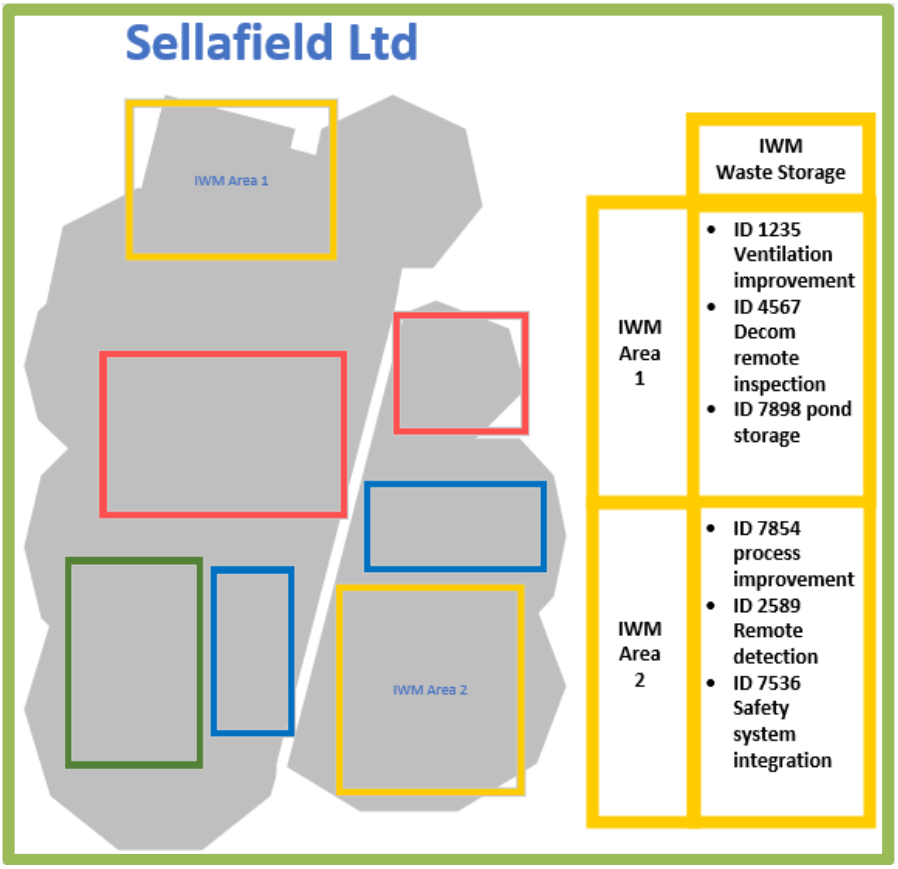

Figure 4 – Example of an ARD.

Key milestones

- Agreement of generic design of ARDs (Q3/Q4)

- Submission of ARDs (End of P1 in the next financial year - the last working day in April)
- Submission of PWDs, if still applicable (End of P1 in the next financial year - the last working day in April)
- Feedback on ARDs / PWDs submissions (End of Q1, 30/6)

3.4 - Annual Technical Report

The Annual Technical Report (ATR) allows the NDA group to share specific R&D information and to celebrate the work of the community. It is not a requirement to publish the ATR beyond the NDA group, however if an operating company wishes to make it suitable for external publication this is acceptable. The ATR is made up of two main sections:

R&D Key Progress, Successes and Challenges

This section should focus on in-year R&D successes, where TRLs have increased, new technical knowledge has been gained, opportunities are being realised or risks mitigated. This section should also provide details of any significant R&D challenges, where TRLs have decreased, opportunities have been missed or R&D programmes are behind schedule. This is to support learning from experience being captured. This section should also set out and explain the key R&D successes and challenges expected in the coming year.

Summary of Potential Opportunities and Challenges

In addition to the successes and challenges in the previous section, the ATR should include new opportunities or challenges. The aim of this section is to encourage the early sharing of information and foster cross-group collaboration on R&D.

A standardised template for the ATRs has been developed [4]. This has been developed to make it easier to transfer knowledge across the NDA group.

Key Milestones

- Submission of ATRs (End of Q2, 30/9)
- Feedback on ATRs (End of Q3, 31/12)

3.5 - Technical Management Review

The Technical Management Review (TMR) is required to capture in a simple manner the technical management and governance arrangements for each NDA operating company. A summary note (i.e., less than ten pages) of the review will be generated in partnership with the NDA Technical Baseline Manager of the organisation's technical management arrangements referencing internal processes. This review should be conducted every two years or as agreed with the NDA Technical Baseline Manager. The previous Technical Management Summary topics listed below should be used as guidance for the assurance review.

This change of approach to have an active assurance review process will allow the NDA to understand the technical management arrangements in more detail and help identify good practice. It will also allow understanding from a people and resource point of view.

Technical management summary topics.

R&D Strategy
What is the organisation's approach to ensuring that the delivery of the organisation's mission is technically underpinned by sufficient and appropriate R&D?

Identification
How are technology needs identified?
How are technical risks identified?
How are technology opportunities identified?
How are internal ideas accessed?
How are external ideas accessed?

Selection
How are technologies selected amongst alternatives?
What criteria are used to select technology?
How is the overall technical portfolio managed?
How is the balance between near-term and long-term objectives managed?

Acquisition
How is the Make-Collaborate-Buy decision made?
How is R&D contracted? Who are the significant R&D contractors?
Are there any significant R&D collaborations?

Project Management
What project management tools and techniques are used to manage technical projects?
How is a gated process for project progression implemented?
How are R&D spends coded into the organisation's lifetime plan?
How is progress of technical projects monitored?

Technical Assurance
How are technical projects assured?
How are the outputs of technical projects assured?
How are Technology Readiness Levels applied?

Skills Planning and Maintenance
What is the organisation's approach to protection of key technical skills?

What is the organisation's approach to protection of technical information?

Dissemination
How is technical information disseminated internally?
How is technical information disseminated externally?

Review
How is the impact of the technical programme measured?
What Key Performance Indicators (KPIs) are used to measure performance of the organisation's technical programme?
How is continuous improvement in technology management implemented?

Organisation structure
Who are the key individuals involved in the management of the organisation's technical programme? What are their roles and responsibilities? Please provide organogram. What are the key governance boards associated with the management of the organisation's technical programme?

Key milestones

- Biennial TMRs complete by end of Q2
- Feedback on TMRs (End of Q3, 31/12)

References

[1] “Nuclear Decommissioning Authority: Technical Baseline (2016),” 2016. [Online]. Available: https://www.gov.uk/government/publications/nuclear-decommissioning-authority-rd-technical-baseline. [Accessed 28 October 2025].

[2] OECD, “Frascati Manual 2015 - Guidelines for Collecting and Reporting Data on Research and Experimental Development,” 8 October 2015. [Online]. Available: https://www.oecd.org/en/publications/frascati-manual-2015_9789264239012-en.html. [Accessed 28 October 2025].

[3] Nuclear Decommissioning Authority, “OPI01-F01-TBuRD - Data Template v1 Oct 2025,” October 2025. [Online]. [Accessed 28 October 2025].

[4] Nuclear Decommissioning Authority, “OPI01 - F02-TBuRD - ATR TEMPLATE v1 Sept 2023,” November 2023. [Online]. [Accessed 28 October 2025].