

Major Permit Review Application – Framework of Arrangements for the Demonstration of BAT

Purpose

The proposals in this application will lead to a simpler permit based on future discharge forecasts post reprocessing. Reductions in the number and scale of Site Limits can be justified alongside maintenance of discharge abatement and monitoring arrangements and through application of Best Available Techniques (BAT). There will be an increased emphasis on the framework of internal arrangements through which the application of BAT is demonstrated. The following provides a high level summary of the guidance, key deliverables, responsibilities and accountabilities, assurance and governance processes that form the boundaries within which SL demonstrates application of BAT for the most significant stages in the lifecycle of facilities. In addition to this paper, Sellafield Ltd has undertaken a review of the Compilation of Environment Agency Requirements (CEAR) document, which provides further detail on EA's expectation of how SL will comply with the conditions of the RSA Permit. In doing so, SL has ensured that the reporting, monitoring and sampling arrangements specified in the CEAR are aligned with the overarching requirement to demonstrate BAT.

Throughout this document reference will be made to the Sellafield Ltd Management System (SLMS). The SLMS provides guidance which enables the business to meet its compliance obligations, such as demonstration of BAT, in the form of practices and supporting practices as well as mapping out how the guidance documents align to the various compliance obligations. In addition, the SLMS contains the Charters of specified governance committees, which sets out the purpose and required membership of each committee. This mechanism ensures that the appropriate people from around the company have oversight, awareness and involvement in decision making as required.

The structure of this summary follows a typical project lifecycle, using the Sellafield Gated Process (SGP), as this encompasses all SL facilities and operations. The SGP sets out distinct phases of a project lifecycle and defined 'gates' between these phases. These gates are hold points, through which a project must pass before moving on to the next phase. Each of the gates has associated requirements in the form of specified deliverables and levels of maturity, which are reviewed through the governance arrangements and assurance/approvals processes set out below.

Site Strategy Evaluation

As a wholly owned subsidiary of the Nuclear Decommissioning Authority (NDA), Sellafield Ltd receives strategic direction which informs the development of the Corporate Strategy. Throughout the phase of 'Site Strategy Evaluation' the strategic and programmatic

requirements set by NDA, which are in turn informed by Government Policy, are translated into specifications for each programme area which define programme options, boundaries, tolerances and assumptions. This process is also influenced by legislative obligations, such as requirements relating to the application of BAT, and internal factors. All of which inform the development of the strategic baseline for programme areas.

Throughout this phase key roles are that of the Head of Corporate Planning and the Head of Strategy Development & Delivery for ensuring that external programmatic & strategic drivers and requirements are identified and addressed by the business through the initiation of suitable Programmes. Assurance of this phase is provided by the Site Strategy Assurance team, with the key governance forums being the Technology Review Board and the Strategic Governance Committee.

Programme Planning

The Head of Corporate Planning, supported by the Head of Strategy Development & Delivery, develops the programmatic specification; including the overall programme hierarchy, prioritisation and resource requirements & constraints for each programme area. The Programme Specification is developed using the strategic requirements and tolerances set out during Strategy Evaluation, alongside applicable regulatory and legislative commitments and obligations and the governing policies contained within the SLMS. Once this is in place the Programme Manager develops and maintains Programme definition through a Programme Management Plan and the processes and deliverables associated with Lifetime Planning. The Programme Assurance and Approvals Plan (PAAP) demonstrates appropriate assurance and control of the key programme steps, decisions and deliverables.

Studies Phase

Where a programme has identified the need for a study, a problem statement will have been defined which informs the development of a study brief. The study brief is the primary input to a Study and provides a clear bounding scope for the required work activities together with clear objectives, requirements, success criteria and working tolerances for the Study/Study Manager. The Brief also defines the formal Reviews and Approvals to be undertaken to provide assurance of the Study output. Prior to Study initiation the brief must be approved by the Head of Programme Delivery, and where threshold values require, endorsed by the Technical Review Board (TRB) in order to pass through the Programme Outline Approval Gate Requirements prior to commencement. The TRB are accountable for independent assurance of the scope and outcomes of Studies prior to initiation and shall endorse that the study inputs are suitably mature prior to initiation.

A concise articulation of all studies phase activities is challenging due to the wide range of study types and the variability in requirements that the study might be required to fulfil. The following activities and deliverables are common and relevant to the overall demonstration of BAT for the Studies Phase, and are required by the SLMS.

The outline Requirements Specification is a key working document for a Study, alongside the Execution Plan and Risk Management Plan. The Study Manager and Study

Team produce the outline Requirements Specification, which states what the Business needs in terms of capability to meet the current gap defined within the Study Brief. The Outline Requirements Specification serves as a repository for outlined intent of the problem statement and conduct of the study. The generation of criteria that are used to downselect options to arrive at a single preferred “process scheme” is a crucially important step in the ability of the study to provide a transparent demonstration of BAT. SLMS guidance notes that Environmental Obligations are a key input to this process and may act as a constraint, and that the criteria shall support demonstration of the selected preferred scheme as being the Programme/Project Best Available Technique (BAT) Option in order to meet the requirements of the Initiate Project Delivery Gate (the point at which a Study becomes a Project).

Following investigation work, data gathering and characterisation of wastes and feeds Options are generated and evaluated in line with the selected options appraisal methodology (commonly the NDA Value Framework), using the previously defined downselect criteria. Following the documented selection of a preferred option, Study Output deliverables are produced, which include a statement of confidence demonstrating the solution is BAT. It should be noted that the outcome of a Study may result in the initiation of one or more Project(s), changes to an existing Programme or initiation of a new Programme, change to Site Strategy, the need for another Study, do nothing, hold or any combination of these options.

Initiate Project Delivery Gate (IPDG)

The purpose of the IPDG is to formally confirm (validate) that sufficient work has been undertaken in the Programme Planning and Studies stage to enable a project to be initiated with a clear business mandate and fully bounded scope and that will deliver the required Business Benefits, in compliance with relevant obligations and constraints (including Environmental Obligations). Validation is required to confirm that sufficient definition and planning has been completed to demonstrate that the chosen single process scheme is BAT. This validation is most commonly gained through the auspices of the Technology Review Board (TRB), whose charter confirms the accountability for assessing the appropriate consideration of BAT during the validation process. The expected level of maturity required with reference to BAT at IPDG and at subsequent gates is defined by the SLMS.

Design Engineering

If the Study outcome results in the requirement to initiate a Major Project, the accountability for the application and demonstration of BAT transfers from the Study Manager to the Project Engineering Manager, with the support of Responsible Engineers and identified environmental support.

Project Concept Stage to Detail Design

For the purpose of brevity, the key design engineering process that takes place between the gates of Initiate Project Deliver and Detail Design will be summarised as whole however it should be noted that there are three distinct phases, with a further two gates, through which

distinct processes contribute to the development of engineering maturity through a number of iterations e.g. HAZOP 0, HAZOP 1, HAZOP 2 etc. Additional arrangements that span the design engineering phase include Engineering Guides and Standards, which specify relevant technical requirements relating to specific processes or the production of required documents. Standards may originate from within the Sellafield Ltd organisation or from relevant national or international organisations. For example, there is an SL engineering standard which specifies requirements relating to the shielding of stainless steel vessels and pipes, and a guide which sets out the process for production of an Effluent Management Philosophy Document, the role of which is further discussed below.

The purpose of each stage within Project Delivery can be summarised as follows; during the project concept stage the single option is developed into a fit-for-purpose, cost effective scheme, which is validated at the Project Concept Review. In preliminary design, the engineering design is optimised to deliver the performance requirements per the functional specification and is validated at the Preliminary Design Review. For detail design, design is completed to a point where the project can allow engineering procurement to be completed and to begin major procurement, manufacture, and construction activities. The Detail Design Gate is a sanction and validation gate, as well as an NDA hold point, and allows the final design to be reviewed internally and by the NDA if required.

Key processes relevant to the demonstration of BAT which occur throughout Design Engineering are Hazard and Operability (HAZOP) Studies and Multi and Single Discipline Design Review's (MDDR's and SDDR's). The HAZOP process aims to provide an indication of potential hazards. A structured key word approach is applied in order to identify the hazards which will be used to develop the project Hazard Management Strategies (HMS). Design reviews are an important activity in assisting projects to develop design engineering quality and in assuring that design maturity is appropriate to progress through the relevant stages of the SGP. This process aims to avoid rework by providing timely advice and assurance. In the context of BAT the Design Reviews are an opportunity to objectively review the project progress and deliverables, ensuring that the demonstration of BAT is appropriate to the scale and complexity of the project with a clear plan to deliver the requisite Gate Maturity Requirements.

Additional documented deliverables are likely to be produced to substantiate specific aspects of project delivery and will inform the overall demonstration of BAT; one such example being an Effluent Management Philosophy Document (EMPD). The purpose of an EMPD is to give an overview of the approach to effluent routing including and where appropriate, treatment, for projects where the risks posed by effluent warrant the specific production of the document as opposed to coverage through the Process Description. Initially (early stages) the EMPD establishes the key high level guiding principles specific to the design/project under consideration which provide a framework for decision making on effluent management.

The EMPD provides the detail and basis on which environmental impact assessments can be undertaken and captures pertinent points from those assessments which inform decisions on effluent management. In later stages, when the design is more mature, the

EMPD changes its emphasis to the summary of key information and decisions taken on effluent management. Documents such as the EMPD are likely to be collated into an Environment Case, which brings together the various processes, activities and deliverables that form the BAT demonstration. An Environment Case for a project ensures that environmental aspects, associated legal requirements (including application of BAT) and other obligations are appropriately identified, mitigated and managed over the remaining life-cycle. The level of detail and complexity of the Environment Case is dependent on the nature, size and sensitivity of the engineering project.

Detail Design Gate

The purpose of the Detail Design Gate is to validate that the established performance baseline is maintained and that engineering definition is sufficiently mature to allow the major procurement, manufacture and construction to begin with confidence. The specific requirements relating to BAT state that systems, structures and components contributing to environmental protection must have fully defined and verified performance requirements and requires that the design of the facility can be demonstrated to be BAT and compliant with environmental requirements.

Sellafield Project Execution Reviews (SPER) are a key method in the assurance that requisite Gate Maturity Requirements have been met. A SPER can take place at any of the 'Gates', however they are mandatory at the IPD and DD Gates. Through a SPER the required deliverables are reviewed by a SQEP Environmental Reviewer to ensure that the Maturity Levels have been met.

Operations

Following the Construction and Active Commissioning of the Facility, through which systems have been proven to deliver the required Environmental functionality operational performance & maintainability, and to be robust against foreseeable failure, the facility moves into the Operational Phase of the lifecycle. At this point the accountability for demonstration of BAT and the Environmental Compliance of the Facility transfers to the Duty Holder, with responsibilities held by the Environment, Health and Safety (EHS) Manager, and nominated Environmental Specialists and/or Advisors.

Throughout the operational life of the facility the key deliverable in the demonstration of BAT is the Environment Case (EC). The principle steps in the definition, production and maintenance of an Environment Case are set out below:

- Identification of significant environmental impacts, which therefore require control.
- Identification of controls required for environmental protection and compliance, which demonstrate the application of BAT. Such controls can take the form of equipment ('Environmental Equipment') or procedural controls ('Environmental Procedural Controls').
- Identification of Environmental Equipment (EE) or Environmental Procedural Controls (EPC) which fulfil the required control function.
- Tracking and close out of Recommendations for Improvement.

The Environment Case process, set out in the SLMS, requires that any environmental assessment work shall be carried out by a Suitably Qualified and Experience Person (SQEP) for Environment Cases. Personnel are identified by the local Environmental Health & Safety (EH&S) Manager. The guidance states that the Duty Holder (Head of Operations or equivalent, e.g. Project Manager) is accountable for implementation of the Environment Case, including ensuring that recommendations are appropriately implemented.

The Environment Case is reviewed periodically to ensure a satisfactory demonstration of the application of BAT is maintained. Triggers for an EC review include; changes in operations/status i.e. moving to Post Operational Clean Out (POCO) or into Care and Maintenance, changes in throughput, changes in facility scope or purpose, major safety case review, changes to abatement, new effluent routes or effluent management regimes, changes in permitting legislation or Permit Variations. It should be noted that as the facility moves into POCO it is the Facility Head of POCO that is responsible for the delivery of an adequate Environment Case for POCO.

The SLMS puts in place arrangements which ensure that operational facilities interact with a number of governance committees through designated SQEP personnel, to ensure that operations, and the resultant discharges, are being managed in accordance with BAT. Relevant committees are the Control Working Parties for Liquid, Solid and Gaseous Effluent, the Environmental Performance Committee and the Environmental Governance Group.

In addition to Management System arrangements, Sellafield Ltd has a network of technical experts who provide advice and guidance through 'Centres of Expertise (CoE)'. Each CoE has a nominated Lead who coordinates activities; which typically involves identifying focus areas in related to the area of specialism, providing advice and guidance to the business and external engagement with academia. Many CoE's may contribute to demonstrating BAT for a given process, facility or method of operation throughout the lifecycle but those with particular relevance to BAT are Effluents, Decommissioning Technologies, Environmental Management and Waste and Facility Characterisation.

SL also has a specialist maintenance function known as the Ventilation Technical Support Group (VTSG), which plays a key role in ensuring aerial effluent abatement systems are maintained and operated in accordance with BAT. VTSG provide support to operating plants and decommissioning projects as well as design and commissioning support. In addition VTSG provide annual stack flow tests, annual HEPA filter efficiency aerosol challenge (DOP) tests and 2 yearly SF6 testing to ensure aerial abatement systems are operating in accordance with BAT. VTSG also support stack inspections and audits, provide tending for flows and HEPA filter performance and provide an emergency support function.

Decommissioning and Termination

The Decommissioning Plan and Programme for site is the Sellafield Ltd Baseline Plan with near term activities being defined within the Corporate and Operating Plans. The Baseline Plan aligns to the strategic principles of the NDA Site Decommissioning & Remediation Strategy via the Strategy framework, which outlines the value streams and critical enablers used to deliver the site's overall strategy.

The Decommissioning Plan is articulated at high level within the Site Master Schedule, which details all the activities carried out on the Sellafield site and provides an executive level summary schedule of the overall Programme phases and key stages of work over the whole site, as well as identifying the significant work streams within each Programme and displaying key site milestones whilst demonstrating the sites critical paths.

The arrangements for Decommissioning are governed by the SLMS, which sets out the underlying principles along with more detailed guidance and requirements relating to the production of documentation planning for the facility approach to decommissioning. In order to satisfactorily demonstrate application of BAT, planning for decommissioning begins during the facility Design phase, and develops detail throughout the lifecycle of the facility with progressively greater certainty being provided until clearly defined end states are achieved. This planning is documented through a Facility Decommissioning Plan, which provides an overview of the decommissioning activities on a specific plant including, retrieval, treatment, packaging, storage and disposal of waste from completion of post operational clean-out up to a defined end-point.

Overarching Arrangements

Of the numerous arrangements which span the entire SL Gated Process the following are particularly pertinent to the assurance of the application and demonstration of BAT.

The Environmental Permit (RSR) requires SL to *'manage and operate the activities in consultation with such suitable Radioactive Waste Advisers as are necessary for the purpose of advising the operator as to compliance with this permit'*. SL has adopted Corporate Arrangements under which a group of individuals collectively provide the Radioactive Waste Advisor function and are known as a Corporate Radioactive Waste Advisor (CRWA). The CRWA provides advice to the Environmental Permit (RSR) holder on radioactive waste management and environmental radiation protection with regards to compliance with the permit. The scope of advice that a CRWA will be expected to give includes advice against legislation and permit requirements, including the application of Best Available Techniques (BAT).

Further to the 'stage specific' assurance processes set out earlier, such as Strategic Assurance, SPER's, Design Reviews etc, SL has an internal regulator, NIO (Nuclear Independent Oversight). NIO provides an ongoing perspective of performance across the SL facilities, functions and in the corporate organisation. This relates to both compliance and, where directed, to standards of relevant good practice that go beyond compliance. In addition, NIO provides independent scrutiny of project performance and readiness to proceed past agreed regulatory hold points.