



Management of Radioactive Waste & Materials Inventory Data

Research & Strategic Case (Gate 0)

June 2015



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Contents

Executive Summary	3
1. Introduction	4
2. Inventory Data Users.....	5
3. Current Situation	7
3.1 Management of Inventory Data	7
3.2 Reporting of Inventory Data: UK Inventory	8
3.3 Reporting of Inventory Data: Other.....	9
3.4 Sharing of Best Practice.....	9
3.5 Management & Delivery of the 2013 UK Inventory	10
4. Current Issues.....	11
4.1 The Role of the Inventory	11
4.2 The Role of Inventory Teams	11
4.3 Conflicting Inventory Data Sets	12
4.4 Transparency & Uncertainty.....	12
4.5 Information & Records Management.....	13
4.6 Opportunities to Streamline Inventory Data Reporting.....	13
4.7 Sharing Best Practice.....	13
4.8 International Inventory Management Practice	14
4.9 Communication	14
5. Strategic Objective	15
6. Case for Change.....	15
6.1 Address Identified Issues	15
6.2 Future Proofing Inventory Data Collection Systems	16
6.3 Appropriate Timing.....	16
7. Scope and Boundaries of the Proposed Change.....	17
8. Aspirational Outcome.....	17
9. Constraints to Strategy Development	20
10. Risks, Issues, Concerns, Key Assumptions.....	20
11. Conclusions.....	21
12. Proposed Forward Programme.....	22

Executive Summary

In the UK, radioactive wastes and materials are produced by a range of businesses and organisations across the energy, medical, industrial and defence sectors. These producers are responsible for managing and maintaining information about the nature and quantities of radioactive waste and materials that they control, also known as their inventory.

Across the Nuclear Decommissioning Authority (NDA) estate, the Site Licence Companies (SLCs) produce radioactive wastes and materials, and are responsible for managing and maintaining appropriate information about their inventories on behalf of the NDA.

Producers of radioactive wastes and materials contribute to a central, UK inventory data collection exercise once every three years. The UK Radioactive Waste & Materials Inventory (UK Inventory) provides a snapshot of radioactive wastes and materials that were in stock and were forecast to arise across the UK at a specific point in time, called the 'stock date'.

The latest UK Inventory was based on a stock date of 1st April 2013, and the outputs of this reporting exercise are publicly available via the UK inventory website¹. The next UK Inventory exercise would be based on a stock date of 1st April 2016, should the approach to management of the UK Inventory remain unchanged.

This paper aims to clarify the NDA's strategic objective for inventory work, review current inventory management arrangements and assess whether further work is required to ensure that a robust, sustainable and optimised strategy is in place.

The proposed strategic objective is to ensure that a single, approved waste and materials inventory data set is available when required to enable DECC and the UK to meet relevant international reporting requirements, to enable the NDA to develop strategy and deliver its mission, and to provide sufficient, accessible information suitable for use by our key stakeholders, including waste producers and the general public.

This Gate 0 paper has identified that there is a case for reviewing the current approach to inventory data compilation, management and communication to better meet the above strategic objective. The research has highlighted a number of issues to be addressed (see Section 4), and there is evidence to suggest that a review of the approach to inventory data compilation, management and communication would be beneficial.

The proposed strategy should remain flexible to accommodate site specific requirements and potential changes in the scope of the UK inventory exercise.

¹ NDA & DECC (2014), UK Radioactive Waste Inventory, www.nda.gov.uk/ukinventory

1. Introduction

In the UK, radioactive wastes and materials are produced by a range of businesses and organisations across the energy, medical, industrial and defence sectors. These producers are responsible for managing and maintaining information about the nature and quantities of radioactive waste and materials that they control, also known as their inventory.

Across the Nuclear Decommissioning Authority (NDA) estate, the Site Licence Companies (SLCs) produce radioactive wastes and materials, and are responsible for managing and maintaining appropriate information about their inventories on behalf of the NDA.

Producers of radioactive wastes and materials contribute to a central, UK inventory data collection exercise once every three years. The UK Radioactive Waste & Materials Inventory (UK Inventory) provides a snapshot of radioactive wastes and materials that were in stock and were forecast to arise across the UK at a specific point in time, called the 'stock date'.

The latest UK Inventory was based on a stock date of 1st April 2013, and the outputs of this reporting exercise are publicly available via the UK inventory website². The next UK Inventory exercise would be based on a stock date of 1st April 2016, should the approach to management of the UK Inventory remain unchanged.

The original driver behind compilation of the UK Inventory was the requirement for Government to meet its international reporting obligations; the UK is obliged to submit information on radioactive wastes and materials to the European Union and the International Atomic Energy Agency (IAEA) on a three yearly basis. DECC is ultimately responsible for ensuring that a suitable UK Inventory data set is available to enable these international reporting obligations to be met.

In addition to these reporting requirements, there is recognition of the value of inventory data in informing national radioactive waste and materials management planning, supporting cross-industry working and aiding stakeholder engagement.

This paper aims to clarify the NDA's strategic objective for inventory work, review current inventory management arrangements and assess whether further work is required to ensure that a robust, sustainable and optimised strategy is in place.

It is recognised that although this strategy can only be applied to NDA estate SLCs, any resultant changes that impact the delivery of the UK inventory could affect non-NDA estate waste and materials producers. The strategy development work will be shared with non-NDA estate SLCs via the National Inventory Forum (NIF)³. It is anticipated that the NIF would form the main implementation route for the proposed strategy.

² NDA & DECC (2014), UK Radioactive Waste Inventory, www.nda.gov.uk/ukinventory

³ The National Inventory Forum (NIF) was established in 2014 to provide ongoing support to contributors to the UK Inventory exercise. The NIF provides a forum for sharing best practice in the field of radioactive waste (and materials) inventory data compilation, management and communication

2. Inventory Data Users

Information about radioactive wastes and materials is central to a range of decision making processes across the UK nuclear industry. Some examples of how inventory data is used by different stakeholders are outlined below. The list is not intended to be comprehensive and instead provides an indication of how data may be used by stakeholders in future, which may influence the development of this strategy.

Producers of radioactive wastes and materials use inventory data to:

- Inform approaches to site operations and decommissioning activities (including environmental, health, safety and security management);
- Enable the selection and consignment of wastes to specific disposal routes;
- Optimise waste management operations;
- Set targets, which form the basis of contractual agreements;
- Aid communications with key stakeholders, including members of the public;
- Demonstrate compliance with local procedures and regulatory requirements;
- Identify opportunities for research and development;
- Enable reporting obligations to be met;

The NDA uses inventory data to:

- Inform strategy development and waste management planning;
- Underpin business cases;
- Set targets, which form the basis of contractual agreements;
- Aid financial planning;
- Identify opportunities for estate wide research and development;
- Aid communications with key stakeholders, including members of the public;
- Assist the Department of Energy & Climate Change (DECC) in meeting its international reporting obligations, with respect to radioactive wastes and materials;

Government uses inventory data to:

- Inform strategy and policy development;
- Aid communications with key stakeholders, including members of the public;
- Ensure that the UK is able to meet international reporting obligations, with respect to radioactive waste and materials management;

Regulators use inventory data to:

- Inform assessments of permit and licence applications;
- Monitor compliance with regulations and statutory duties;
- Monitor adherence to permit and licence conditions;



Management of Radioactive Waste & Materials Inventory Data Research & Strategic Case (Gate 0) June 2015

- Assist in the provision of regulatory guidance;
- Aid communications with key stakeholders;
- Check data and packaging assumptions against disposal system safety cases;

RWM Ltd uses inventory data to:

- Produce the Derived Inventory, which is an estimate to those wastes likely to be disposed in a Geological Disposal Facility (GDF);
- Underpin safety cases for waste package and disposal facility design;
- Verify content of Letter of Compliance (LoC) applications;
- Identify opportunities for research and development;
- Aid communications with key stakeholders, including members of the public;

LLWR Ltd uses inventory data to:

- Inform product, facility and service design, development and delivery;
- Underpin safety cases;
- Check consignments against site Waste Acceptance Criteria (WAC);
- Check adherence to permit and licence conditions and demonstrate compliance;
- Aid long term planning for the management of wastes;
- Aid communications with key stakeholders;

The **supply chain** uses inventory data to:

- Underpin safety cases and permit applications for waste package and disposal facility design;
- Check adherence to permit and licence conditions and demonstrate compliance;
- Inform product, facility and service design, development and delivery;
- Inform investment decisions.

Inventory data is also used by a range of other stakeholders, such as academics and research establishments, non-governmental organisations, consultancies and members of the public.

For some of these uses, the accuracy and underpinning of inventory data is particularly important. Examples include demonstrating compliance (environmental, health, safety and security) and making business critical decisions based on available inventory data. Due to the level of reliance upon the inventory data sets for such purposes, it is important that inventories managed by data providers are:

- Regularly maintained and monitored;
- Based on the latest, best available data; and
- Provide transparency regarding data provenance, uncertainties and assumptions used.

3. Current Situation

3.1 Management of Inventory Data

Across the UK, producers are independently responsible for managing and maintaining information about the nature and quantities of radioactive wastes and materials that they control. As a result, producers have adopted various different approaches and tools for collecting and maintaining this information.

For the NDA estate, there is no central strategy for the management of inventory data at present; it is currently the responsibility of each SLC to determine the most appropriate inventory management solution for their sites. This has resulted in the development of a range of approaches to inventory data management and the procurement of various waste tracking tools tailored to meet each SLCs specific requirements. The maturity of inventory management arrangements is also variable, with some SLCs operating more established and well integrated inventory management systems than others.

In autumn 2014, the NDA commissioned work to establish in more detail the inventory management arrangements being employed across the NDA SLC sites⁴. The purpose of this work was to identify examples of good practice that could be shared across the estate to improve inventory management arrangements.

The project identified that some SLCs have invested in bespoke inventory management systems, notably Magnox (who have procured a software package called eMWaste) and Dounreay Sites Restoration Ltd (who have developed a software package called Dounreay Management System, including the Inventory Management System). The Low Level Waste Repository Ltd (LLWR) is currently in the process of procuring a suitable inventory management system. Sellafield does not have a centralised waste tracking system and inventory data is managed on a project by project basis. RSRL does not have a centralised waste tracking system and instead uses spreadsheets which are updated on a monthly basis; RSRL is likely to adopt the Magnox eMWaste tracking tool under the recent change of Parent Body Organisation (PBO).

For the NDA estate, the absence of a central strategy has led to a lack of clarity about what is expected of NDA SLCs in terms of inventory management. This has resulted in the development of a number of issues which need to be resolved (these are discussed in further detail in Section 4).

The NDA does not have visibility of non-NDA estate inventory management arrangements at this point in time. However, it is understood that many of the non-NDA estate waste and materials producers are faced with issues similar to those identified in Section 4.

⁴ LLWR (2015), NDA Estate, Summary of Inventory Arrangements & Procedures, NWP-REP-072

3.2 Reporting of Inventory Data: UK Inventory

At a national level, producers of radioactive wastes and materials contribute to a central UK inventory data collection exercise once every three years. The UK inventory is a snapshot of radioactive wastes and materials that were in stock and were forecast to arise across the UK at a specific point in time, called the 'stock date'.

The latest UK inventory snapshot was based on a stock date of 1st April 2013, and the outputs of this reporting exercise are publicly available via the UK inventory website⁵. The next UK Inventory exercise would be based on a stock date of 1st April 2016, should the approach to management of the UK Inventory remain unchanged.

The original driver behind compilation of the UK inventory was Government's international reporting obligations; the UK is required to submit information on radioactive wastes and materials to the European Union and the International Atomic Energy Agency (IAEA) on a three yearly basis. These reporting obligations continue; however, there is increasing recognition of the value of the UK inventory exercise in providing data to inform national waste and materials management planning, to support cross-industry working and to aid stakeholder engagement.

The NDA is currently responsible for managing the compilation and presentation of the national inventory data set on behalf of DECC. The costs for delivery of the national inventory have previously been split equally between DECC and the NDA.

The UK inventory currently includes information about radioactive wastes and materials produced by a range of businesses and organisations across the energy, medical, industrial and defence sectors. The UK inventory specifically excludes:

- Liquid and gaseous wastes that are authorised to be discharged into the environment that contain very low levels of radioactivity. These wastes are closely monitored and can only be released if they meet strict conditions and limitations;
- Wastes from small user sites, such as hospitals and universities, which have very low levels of radioactivity and can be safely disposed of through incineration or landfill;
- Certain radioactive materials which are not subject to nuclear safeguards. All nuclear materials in the UK (uranium, plutonium and thorium) are subject to international safeguards except where they are excluded for national security reasons or have been assigned to meet defence requirements. Nuclear materials may also be exempt where they are used for non-nuclear purposes which incorporate nuclear materials that are in practice irrecoverable. These exempt materials are not included in the UK inventory;
- Radioactive sources which are subject to the Environmental Permitting (England and Wales) Regulations 2010 (EPR 10) in England and Wales, and the Radioactive

⁵ NDA & DECC (2014), UK Radioactive Waste Inventory, www.nda.gov.uk/ukinventory

Substances Act 1993 (RSA 93) in Scotland and Northern Ireland (however, redundant sources in existing small user waste streams are reported);

- Naturally occurring radioactive materials (NORM); these are wastes which typically accumulate as scale on pipework during the extraction of oil and gas, and have raised levels of naturally occurring radioactivity; and
- Radioactive substances which are exempt from being permitted, such as those substances used within smoke detectors.

3.3 Reporting of Inventory Data: Other

In the NDA estate, SLCs are also required to provide inventory data in support of the annual Waste Inventory Form (WIF) exercise. This exercise aims to review waste streams that would historically have been disposed of at the Low Level Waste Repository (LLWR) and identify opportunities to apply the waste hierarchy. The outputs of the WIF aim to:

- Assist the NDA in developing Low Level Waste (LLW) strategy and identifying potential barriers to sustainable waste management;
- Assist LLWR in developing appropriate services for their customers and providing data to inform their environmental safety case development; and
- Encourage SLCs to identify alternative management options for their waste streams, which may in turn lead to cost reductions.

At present, non-NDA estate SLCs are able to participate in the WIF exercise on a voluntary basis.

Waste producers may also be required to report their inventory data (or portions of their inventory data) on an ad-hoc basis for a range of essential purposes. In the NDA estate, for example, there may be requirements for SLCs to submit their latest inventory data for specific waste types to underpin NDA business cases or to inform contractual agreements.

Across all waste and materials producers, regulators may require access to the latest inventory data sets to assess compliance.

All producers of radioactive wastes and materials must be in the best position possible to make available their latest, underpinned inventory data sets in an efficient manner to meet such reporting requirements.

3.4 Sharing of Best Practice

In 2014, the NDA established the National Inventory Forum (NIF), which brings together all of the inventory leads from the NDA and non-NDA estate waste and materials producers. The NIF meets three times each year, with the primary objectives of:

- Improving the efficiency of data collection for the UK inventory exercise and related programmes of work;



Management of Radioactive Waste & Materials Inventory Data Research & Strategic Case (Gate 0) June 2015

- Understanding stakeholder needs;
- Identifying areas of improvement, prioritise improvement activities and support implementation;
- Establishing and maintaining a community and forum for sharing best practice in the field of radioactive waste and materials inventory data compilation, management and communication.

This community will be fundamental in supporting the development and delivery of this strategy.

3.5 Management & Delivery of the 2013 UK Inventory

For context, the following bullet points summarise the arrangements that were in place for delivery of the latest UK Inventory:

- Production of the 2013 UK Inventory was jointly funded by DECC and the NDA.
- A contractor was appointed through an existing NDA framework to undertake the required UK Inventory data collection and reporting tasks. The successful contractor was AMEC; however, the bulk of the work was sub-contracted to Pöyry Energy.
- The NDA managed the procurement process and day to day management of the contract.
- DECC was responsible for providing overall client direction and input into contract management activities, as appropriate.
- A separate contract was let for a full update of the UK Inventory website, including redesign and content development. This work was delivered through the NDA's Digital Services Framework by Forepoint Ltd. The work was jointly funded by DECC and the NDA.

4. Current Issues

A number of key issues with the existing approach to managing radioactive waste and materials inventory data have been identified. These are summarised below.

4.1 The Role of the Inventory

It is important that producers have a good understanding of the inventory of wastes and materials that they will need to manage (both stock and forecast arisings), as the nature and quantity of the arisings can have a significant influence on plans for management, including handling, treatment, conditioning, packaging, storage, transport and disposal.

Work to understand and forecast the inventory for management should begin prior to operational or decommissioning activities being undertaken. There should then be a consistent flow of information to enable tracking of the 'raw' waste and material arising through to end use or disposal.

This transparency and traceability can support producers in planning waste and material management routes, optimising operations and demonstrating their ability to control and manage arisings effectively. As a result, inventory data management should have a central role in producer operations.

The strategy should place greater emphasis on the central role of the inventory and its importance in underpinning and influencing operations on site, rather than being solely a product of periodic reporting exercises.

4.2 The Role of Inventory Teams

The previous emphasis on the UK Inventory reporting cycle has tended to encourage producers to focus resources on inventory improvements around the three yearly national inventory submission deadlines.

Inventories continually evolve as new wastes and materials are created, managed and disposed, and as forecasts are adjusted due to alterations in operational plans, due to commercial, policy or funding changes, or when improved characterisation data becomes available. It can also take time to plan and implement inventory improvement measures in conjunction with other teams across the site/s. As a result, it is important that inventory teams have sufficient, sustained resource to manage these issues in between national inventory reporting cycles.

The proposed strategy should also encourage stakeholders to make better use of the site inventory teams. At present, many stakeholders utilise their informal networks and contacts at sites to obtain the latest inventory data, rather than channelling requests through the central inventory teams. This can lead to instances of multiple, conflicting inventory data sets being used and a lack of transparency regarding data sources.



Management of Radioactive Waste & Materials Inventory Data Research & Strategic Case (Gate 0) June 2015

The inventory teams should be supported in their central role and provided with sufficient resource to manage inventory improvement measures on an ongoing basis. The proposed approach should encourage stakeholders to utilise the central inventory teams as their primary source of inventory data.

4.3 Conflicting Inventory Data Sets

The UK inventory is a snapshot of radioactive wastes and materials that were in stock and were forecast to arise across the UK at a specific point in time, called the 'stock date'. In between the three yearly UK inventory reporting cycles, it is inevitable that inventory data will change, as wastes and materials are managed through normal operations and forecasting scenarios are updated. Producers will ultimately hold the most up to date inventory data sets for their site/s.

As inventory data is continually being updated, this can give rise to conflicting data sets being used in the public domain and create uncertainty over inventory data provenance. Conflicting data sets can also arise when stakeholders use their informal networks to obtain inventory data from site staff, rather than channelling requests through central inventory teams.

Conflicting inventory information can introduce difficulties, particularly where reliance on the data is more crucial, for example, when demonstrating compliance (environmental, health, safety and security), making business critical decisions based on inventory data and engaging with stakeholders.

It is essential that producers maintain a single, approved inventory data set, from which data can be extracted to support internal and external inventory analysis when required. Data providers should consider how to best manage and communicate inventory data changes to provide transparency and demonstrate underpinning. Stakeholders should be encouraged to channel inventory data requests through the central inventory teams rather than using informal networks to obtain information; this would help to reinforce the central role of the inventory at sites.

4.4 Transparency & Uncertainty

There are opportunities to improve the communication of data underpinning and uncertainties associated with radioactive waste and material inventories.

Broadly speaking, there is a good degree of confidence in estimates of future waste arisings from operations in the short term, and uncertainty tends to increase the further that waste arisings are projected into the future. The greatest uncertainties tend to rest with legacy waste streams and with future waste arisings from decommissioning and site clean-up, including contaminated land. Beyond these general statements, it is difficult for internal and external stakeholders to understand how the nature and quantities of radioactive wastes and materials have been assessed.

This strategy should aim to encourage producers to maintain sufficient records (such as methodology reports) detailing the underpinning assumptions used to assess the nature and

quantity of radioactive wastes and materials. These records should also acknowledge the degree of uncertainty in the estimates. This will help to ensure that inventory data users are suitably informed regarding the risks associated with basing business decisions on the inventory data. It will also aid producers in prioritising areas for improving their inventory data.

4.5 Information & Records Management

With respect to information and knowledge management, the NDA strategy⁶ is *to ensure that the NDA, the SLCs and our subsidiaries are compliant with relevant legislation and regulations, follow good practice and maintain a fit for purpose infrastructure for information and knowledge management.*

Inventory data is an information asset which needs to be managed appropriately in order to aid future generations. There is a need to ensure that clear expectations for long-term, effective information and records management are communicated to producers of radioactive waste and materials, particularly to NDA SLCs who fall under the NDA Strategy.

There is a requirement for this strategy to interface effectively with the NDA's Information Governance Strategy.

4.6 Opportunities to Streamline Inventory Data Reporting

There are opportunities to improve the efficiency of data collection and minimise the reporting requirements on SLCs by combining formal inventory data collection exercises. At present, NDA SLCs are required to submit inventory data to the UK inventory exercise (every three years) and provide inventory data on an annual basis for the Waste Inventory Form (WIF) (see Section 3 for further information on the WIF process).

There are opportunities to streamline this data collection process by combining the UK Inventory and WIF data collection exercises. This would also enable waste diversion opportunity data for non-NDA estate contributors to be captured on a three yearly basis; this would aid the planning and provision of waste services to meet both NDA and non-NDA estate customer needs.

4.7 Sharing Best Practice

The current approach to inventory management does not encourage collaborative working or the sharing of best practice across producers. This strategy should seek opportunities for improving the identification and sharing of best practice in inventory compilation, management and communication amongst radioactive waste and materials producers.

⁶ NDA (2011), NDA Strategy Effective from April 2011, <http://www.nda.gov.uk/publication/nda-strategy-effective-from-april-2011/>

4.8 International Inventory Management Practice

In June 2014, the NDA National Waste Inventory Manager attended the IAEA Technical Meeting of the Joint Working Group on Spent Fuel and Radioactive Waste (TM-47952)⁷ on behalf of DECC. Based on informal discussions with representatives during the week, the UK appears to be a world leader in inventory management. Although there is still significant scope for improving the UK inventory, the UK has one of the most well-established and comprehensive inventories, in terms of data collected about stock (physical, chemical and radiological characteristics) and forecast waste arisings.

For comparison, France has a similarly mature national inventory data reporting exercise; however, the national inventory 'snapshot' is collected more frequently (on an annual basis), with public reports produced every three years. The last public inventory report in France was based on a stock date of 31 Dec 2010 and was published 18 months later in August 2012 (the last UK inventory was published approximately 10 months after the stock date). The published French inventory reports present more limited waste forecast data, for 2020 and 2030 only.

This strategy should consider international best practice in inventory data management, compilation and communication.

4.9 Communication

The effective communication of inventory data is fundamental to this strategy. It is important that we are in a position to provide sufficient, accessible information about the inventory to our key stakeholders, both internally and externally (key inventory data users are identified in Section 2). It is particularly important that UK inventory information is accessible to waste producers to aid the optimisation of their operations, and to the general public for transparency.

In 2013/14, the UK Inventory website was subject to a comprehensive review and refresh. Key user requirements were obtained and the website was redesigned accordingly⁸. The website now provides a valuable platform for disseminating the UK inventory reporting outputs and has an important role in providing contextual information about both the inventory and radioactive waste in the UK.

This strategy should consider options for continuing to improve the communication of inventory data, as required.

⁷ The purpose of the meeting was to launch work on a two year "Status and Trends Project" aimed at analysing and reporting on the current status and trends in radioactive waste and spent fuel management, including providing information on current and expected future inventories and facilities for the long-term management of these materials. The meeting was well attended with representatives from 21 countries and 4 international organisations. The majority of the representatives were involved in the production of national inventory data sets.

⁸ NDA & DECC (2015), UK Radioactive Waste Inventory, <http://www.nda.gov.uk/ukinventory/>

5. Strategic Objective

The objective of this strategy is to ensure that a single, approved waste and materials inventory data set is available when required:

- to enable DECC and the UK to meet relevant international reporting requirements;
- to enable the NDA to develop strategy and deliver its mission; and
- to provide sufficient, accessible information suitable for use by our key stakeholders, including waste producers and the general public.

6. Case for Change

There is a need to review the current approach to management of UK radioactive waste and materials inventory data considering the above objective. The following sections set out the case for change.

6.1 Address Identified Issues

There is a requirement to review the approach to inventory data management to address the range of longstanding issues identified in Section 4. It is anticipated that addressing these issues would:

- Reposition inventory data as central to business operations, rather than being perceived as a reporting exercise;
- Assist inventory teams in their roles, through raising the profile of the inventory, encouraging utilisation of the inventory teams and through collaborative working;
- Improve the efficiency of inventory data compilation, management and communication, ensuring that sufficient records are maintained to demonstrate good practice in information management;
- Improve the availability of inventory data, from a single, approved data source;
- Reduce the instances of multiple, conflicting inventory data sets, which create problems when demonstrating compliance and making business-critical decisions;
- Improve stakeholder understanding of the inventory data sets, through improved transparency regarding data sources, assumptions and uncertainties;
- Enable inventory data to be more easily assessed by producers, which will assist producers in the identification and prioritisation of inventory improvement measures;
- Encourage joint-working and collaboration between waste producers to share best practice and to tackle common issues relating to inventory compilation, management and communication;
- Minimise reporting requirements on industry, through streamlining of inventory data reporting exercises.

6.2 Future Proofing Inventory Data Collection Systems

The national inventory data requirements evolve with each inventory cycle to ensure that baseline international reporting obligations are adhered to and that key stakeholder needs can be met. The scope of the national inventory must demonstrate alignment with the proposed strategic objective, and the strategy for managing inventory data must remain flexible to allow future changes in scope to be accommodated.

Examples of potential scope changes which may affect the UK inventory in future include:

- Changes to UK regulations and development of new strategies (for example, adjustment of non-hazardous pollutant data requirements in response to the Groundwater Directive, potential inclusion of information on NORM waste arisings);
- Inclusion of data on wastes and materials likely to arise from Nuclear New Build (NNB).

The proposed approach should ensure that appropriate consideration is given to the potential costs that would be incurred in order to implement such changes and the likely benefits that would be realised from the proposed scope change. Where it is deemed that scope changes are required, the totality of the work package must be accommodated; for example, the proposed approach should allow sufficient time for stakeholder engagement and testing of data collection tools.

The scope for the 2016 inventory exercise is currently under review.

6.3 Appropriate Timing

It is timely to develop a strategy for the management of radioactive waste and materials data, because:

- A range of longstanding issues with inventory data compilation, management and communication have been identified, which need to be addressed. These issues have particular bearing on NDA and non-NDA estate projects where reliance upon inventory data is fundamental, for example, when demonstrating compliance and when making business-critical decisions;
- NDA and non-NDA estate producers, as well as the NDA, DECC and regulators are currently actively engaged through the recently established NIF. It is essential that the extensive experience and expertise demonstrated by individuals within this forum is put to best use by influencing the development of an appropriate strategy for managing inventory data;
- Many NDA sites are moving closer to periods of quiescence; it is essential that inventory data and supporting records are sufficiently well managed and future-proofed to aid future generations, and to provide the data required when reporting resources may become more limited in future;
- Data requirements for the national inventory are currently being reviewed and the contract for the 2016 national inventory reporting exercise is due to be placed in

summer 2015. It is timely to consider how the approach to inventory management could be enhanced to accommodate such changes in the scope of reporting requirements;

- The NDA is currently reviewing its information governance arrangements and is in a stronger position to provide guidance to sites on effective information management practices.

7. Scope and Boundaries of the Proposed Change

The focus of this work is to ensure that a single, approved waste and materials inventory data set is available when required to enable DECC and the UK to meet relevant international reporting requirements, to enable the NDA to develop strategy and deliver its mission, and to provide sufficient, accessible information suitable for use by our key stakeholders, including waste producers and the general public.

It is recognised that the development and implementation of this strategy will affect both NDA and non-NDA estate waste and materials producers. As a result, engagement with the National Inventory Forum members throughout the process will be essential.

8. Aspirational Outcome

The proposed solution should deliver the benefits outlined in the table below, where practicable. The strategy (and supporting tactics) must drive appropriate behaviours from producers and key stakeholders to ensure that the strategic objective can be met and proposed benefits can be realised.

Requirement	Proposed Benefits
Reposition inventory data from a formal, periodic reporting requirement to a key contributor to business operations.	Reduce instances of multiple, conflicting inventory data sets arising. Aid decision making and the demonstration of compliance.
Recognise the significance of inventory data management in the optimisation of waste producer operations.	Improved efficiencies in the management of radioactive wastes and materials, through the availability of sufficient and appropriate inventory data.
Ensure that sites allocate appropriate resources to enable the efficient collection, collation and reporting of inventory data and associated improvement activities.	Ensuring sufficient resource is allocated to inventory management and improvement activities is essential for maximising the value of the data set and allowing opportunities for optimising waste producer operations to be identified.

Management of Radioactive Waste & Materials Inventory Data Research & Strategic Case (Gate 0) June 2015

Requirement	Proposed Benefits
Drive stakeholder and site behaviours to assist inventory teams in their roles.	Reduce instances of multiple, conflicting inventory data sets arising through stakeholder use of informal networks. Improve the efficiency and accuracy of inventory data reporting through central management of inventory data via inventory teams.
Require radioactive waste and materials producers to maintain a single, approved inventory data set.	Reduce instances of multiple, conflicting inventory data sets arising. Aid sites in demonstrating compliance. Improve the efficiency of data reporting.
Encourage producers to adopt good practice in information management for their inventory data records.	Ensure that information is available to meet reporting requirements. Deliver efficiency improvements in inventory management (staff understand where inventory data is kept, how to access it, how to update it, etc.). Ensure that sufficient records are maintained to inform future users. Ensure that accountabilities are clear.
Improve the availability of inventory data.	Ensure that key stakeholders have access to a single approved data source in a timely manner. Reduce instances of multiple, conflicting inventory data sets arising.
Enable sufficient inventory data to be collected to ensure that international reporting obligations can be met.	Ensure that the UK can meet its international reporting obligations and maintain UK reputation and relationships at international level.
Simplify the collection and processing of data relating to radioactive waste and materials.	Improve efficiencies and reduce costs associated with data provider training and data collection.
Provide improved transparency on data sources, assumptions and uncertainties.	Demonstrate that the inventory is suitably underpinned. Enable sites to identify and prioritise areas where further work may be required to improve inventory data. Improve stakeholder understanding of inventory data sets and resultant underpinning for decision making processes.
Encourage regular updates of inventory data sets.	Reduce instances of multiple, conflicting inventory data sets arising. Aid decision making and the demonstration of compliance.
Encourage joint-working and collaboration between waste producers.	Raise awareness of best practice and encourage improvements in the compilation, management and communication of inventory data.

**Management of Radioactive Waste & Materials Inventory Data
Research & Strategic Case (Gate 0)
June 2015**

Requirement	Proposed Benefits
Provide high level information to assist the supply chain in waste management service and facility planning.	Support the provision of sufficient product, facility and service design, development and delivery, for the management of radioactive wastes and materials.
Provide a sustainable solution, capable of being adapted to accommodate future data requirements and reporting needs.	Minimise, as far as practicable, the risk of future costs associated with replacing obsolete technology or management systems, developing bolt-ons or similar.
Avoid unnecessary or disproportionate reporting requirements and streamline reporting exercises where appropriate.	To ensure effective use of data provider time and resources.
Adequately protect sensitive information.	To ensure compliance with security policies.
Allow waste producers the ability to access and manipulate inventory data collected in the UK inventory reporting exercise, not just for their own sites.	Ensure that, where possible, data collection exercises have the potential to benefit both data providers and data requesters.

9. Constraints to Strategy Development

There are few constraints to the development of this strategy; those that have been identified include:

- The NDA has limited influence over non-NDA producers; the strategy must encourage knowledge sharing and collaborative working to enable benefits of this strategy to be shared with non-NDA estate producers;
- There is an aspiration to agree the strategy for managing radioactive waste and materials inventory data in advance of the 2016 national inventory reporting exercise. This imposes time constraints, but these constraints are not anticipated to be a significant barrier to development of the strategy;
- Data requirements for the national inventory are ultimately set by DECC. The NDA must ensure that the strategy for managing radioactive waste and materials inventory data is sufficient to enable changes in reporting requirements to be accommodated.

10. Risks, Issues, Concerns, Key Assumptions

Failure to develop and implement an appropriate strategy for the management of radioactive waste and materials inventory data will result in an inability to address the majority of the issues identified in Section 4. These issues create challenges across the industry in terms of decision making and demonstrating compliance, and results in the inefficient use of producer resources.

The risks associated with the development of a new strategy in this area include:

- Use of internal and external stakeholder time in developing, reviewing and selecting credible and preferred options;
- The potential selection of an inventory data management option that is significantly different to current practice, resulting in additional costs (e.g. software development and delivery, system integration and data provider training); this risk must be balanced against the proposed benefits of the new approach and will be fully assessed through the Strategy Management System.

Overall, it is considered that the development of this strategy is low risk.

11. Conclusions

This paper aimed to clarify the NDA's strategic objective for inventory work, review current inventory management arrangements and assess whether further work is required to ensure that a robust, sustainable and optimised strategy is in place.

The proposed strategic objective is to ensure that a single, approved waste and materials inventory data set is available when required to enable DECC and the UK to meet relevant international reporting requirements, to enable the NDA to develop strategy and deliver its mission, and to provide sufficient, accessible information suitable for use by our key stakeholders, including waste producers and the general public.

This Gate 0 paper has identified that there is a case for reviewing the current approach to inventory data compilation, management and communication to better meet the above strategic objective. The research has highlighted a number of issues to be addressed (see Section 4):

- The Role of the Inventory
- The Role of Inventory Teams
- Conflicting Inventory Data Sets
- Transparency & Uncertainty
- Information & Records Management
- Opportunities to Streamline Inventory Data Reporting
- Sharing Best Practice
- International Inventory Management Practice

There is evidence to suggest that a review of the approach to inventory data compilation, management and communication would be beneficial, in particular to identify whether there are opportunities to address the above issues.

The proposed strategy should remain flexible to accommodate site specific requirements and potential changes in the scope of the UK inventory exercise.

**Management of Radioactive Waste & Materials Inventory Data
Research & Strategic Case (Gate 0)
June 2015**

12. Proposed Forward Programme

	2015											2016				
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Strategy for the Management of Radioactive Waste & Materials Inventory Data (Summary)																
A2410 4.2 Finalise Gate 0 Paper																
A2420 4.2 Take Gate 0 Paper to SAF																
A2430 4.2 Update Paper based on SAF Feedback																
A2440 4.2 Publish Gate 0 Paper																
A2450 4.3 Draft Gate A Paper																
A2460 4.3 Gain Feedback from Key Internal Stakeholders																
A2470 4.3 Update Draft Paper																
A2480 4.3 Gain Feedback from Key External Stakeholders																
A2490 4.3 Update Draft Paper																
A2500 4.3 Take Gate A Paper to SAF																
A2510 4.3 Update paper based on SAF Feedback																
A2520 4.3 Publish Gate A Paper																
Provisional Programme for 2016 UK Inventory (Summary)																
Agree contract approach with DECC																
Development of contract technical specification																
Contract technical specification for tender																
Tender submissions due																
Tender evaluations and contract award																
Project commencement																
Stock date (1 April 2016)																

The proposed forward programme for development of this strategy has been scheduled taking into account the proposed delivery of the 2016 UK inventory reporting exercise. All timings are subject to change.