

Non-Technical Summary

The purpose of this document is to record SEPA's considerations and rationale which underpins SEPA's decision in respect of the application from DSRL for an Authorisation under RSA93 for disposal of solid low level radioactive waste at the LLWF adjacent to Dounreay Site, Caithness, KW14 7TZ.

Dounreay Site Restoration Limited (DSRL) applied to the Scottish Environment Protection Agency (SEPA) in 2008, and resubmitted with a substantially revised application in 2010, for authorisation for the disposal of solid radioactive low level waste in a series of near surface concrete vaults to the east of the Dounreay nuclear site. SEPA is now minded to grant this Authorisation subject to a Schedule of Conditions and Limitations.

Under Section 13 of the Radioactive Substances Act 1993 (RSA93) SEPA is made solely responsible for authorising the disposal of radioactive waste.

SEPA considers the near surface disposal of the radioactive waste requires a bespoke Authorisation, which combines the regulatory controls appropriate for both the radioactive and the hazardous properties of the waste.

SEPA is required to carry out its regulatory duties in accordance with legislation taking account of government policy. In determining this application SEPA has reviewed how DSRL have applied the principles of sustainable development, the UK Low Level Waste Policy, Radioactive Waste Management Policy, the UK Strategy for Radioactive Waste Discharges and the application of Best Practicable Means.

The "Near Surface Disposal Facilities on Land for Radioactive Wastes – Guidance on Requirements for Authorisation" ("the GRA") sets out the framework within which near surface disposal facilities will be regulated. It explains the requirements that SEPA expects DSRL to fulfil when it applies for an Authorisation to develop and operate the proposed facility, and explains SEPA's regulatory process that leads to a decision on whether to authorise the disposal.

The basis for the GRA is the Fundamental Protection Objective. This is intended to ensure that all disposals of solid radioactive waste to facilities on land are made in a way that protects the health and interests of people and the integrity of the environment, at the time of disposal and in the future, whilst inspiring public confidence and taking account of costs.

The Fundamental Protection Objective is achieved by the application of the 5 Principles and the 14 Requirements described in the GRA. Although the GRA is non-mandatory, the term 'Requirement' is used to emphasise items that are particularly important from SEPA's perspective, and SEPA's strong expectation is that these will be met by DSRL.

The five principles are summarised as:

1. Level of protection against radiological hazards. Radiological risks associated with the disposal, both at the time of disposal and in the future, should be consistent with the national standard at the time of disposal.
2. Optimisation. Radiological risks associated with the disposal shall be as low as reasonably achievable under the circumstances prevailing at the time,

- taking account of economic and societal factors, radiological risks to other living organisms and any non-radiological hazards.
3. Level of protection against non-radiological hazards. The level of protection of people and the environment from the non-radiological hazards associated with the disposal, both at the time of disposal and in the future, should be consistent with the national standard at the time of disposal for wastes that present non-radiological hazards.
 4. Reliance on human action. Disposal should be made so that unreasonable reliance on human action to protect people and the environment against radiological and non-radiological hazards is avoided both at the time of disposal and in the future.
 5. Openness and inclusivity. For any disposal the relevant agency shall establish ways of informing any interested party and the public about regulatory goals, processes and issues and consult in an open and inclusive way.

The Principles are underpinned by the fourteen Requirements which, if fulfilled proportionately to the hazard presented by the waste, should ensure that the principles are applied properly. These are discussed further below.

Requirement 1: Process by agreement.

DSRL has engaged actively with SEPA in developing their Environmental Safety Case. There has been a number of iterations leading to Environmental Safety Case 2010 (ESC 2010), which have been discussed in technical meetings and reviewed by SEPA. Whilst the engagement has not provided regulatory certainty, it has ensured that sufficient attention has been focussed on the regulatory requirements at the early stages of DSRL's work.

Requirement 2: Dialogue with potential host communities and others.

Throughout the development of their Environmental Safety Case DSRL has engaged widely with the public and other stakeholders. This has included the local community, Dounreay Stakeholder Group, Scottish Government, the Highland Council and other bodies. DSRL has used a range of media in its engagement including meetings, letters, DSRL website and a public walk-in centre.

Requirement 3: Environmental Safety Case.

DSRL has prepared ESC 2010 in support of its application, under RSA 93, to dispose of solid radioactive waste. This provides and substantiates a set of claims concerning the environmental safety of their planned disposal. SEPA has reviewed ESC 2010 and its previous iterations and is satisfied that, for this stage of the facility development, it demonstrates consistency with the Principles and Requirements set out in the Near-surface Disposal Facilities on Land for Solid Radioactive Wastes Guidance on Requirements for Authorisation (GRA). ESC 2010 demonstrates that the health of members of the public and the environment are protected. There will be future iterations of the ESC as DSRL proceeds through the operational and closure stages of their facility. SEPA's draft Authorisation includes a Condition that DSRL maintain an Environmental Safety Case.

Requirement 4: Environmental safety culture and management system.

ESC 2010 describes DSRL's environmental safety culture and management systems. DSRL already hold three Authorisations under RSA 93 for the Dounreay Nuclear Licensed Site. The management systems associated with these

Authorisations are routinely inspected by SEPA. DSRL propose to use its current management systems as a basis from which to develop the management systems for the disposal facility. SEPA's draft Authorisation contains Conditions requiring management systems and provision of a management plan.

Requirement 5: Dose constraints during the period of authorisation.

DSRL state that there will be no direct discharges to the environment during the period of Authorisation of the facility. With the exception of sky shine, which is the scatter of radiation from the facility in the atmosphere, there will be no doses to the public. DSRL has prepared an assessment of the potential doses arising from sky shine and assessed the doses as trivial in comparison to doses from background radiation.

SEPA's draft Authorisation includes a Condition requiring DSRL to undertake environmental monitoring to demonstrate compliance with the Authorisation and assumptions of the Environmental Safety Case.

Requirement 6: Risk guidance level after the period of authorisation.

DSRL has used international best practice to model the performance of the facility after the period of authorisation, when the facilities have been closed and following a period of institutional control, to show consistency with the risk guidance level as discussed in the GRA.

This type of modelling is known as a performance assessment (PA). The PA forms a key component of DSRL's safety case and they have engaged frequently with SEPA during its development. SEPA is of the view that DSRL's approach to the development of the PA has been transparent and systematic. DSRL have had their PA methodology peer reviewed and SEPA have commissioned its own review by independent experts. SEPA's review concluded that the DSRL's approach was compliant with regulatory requirements and international standards.

DSRL's assessment considered a scenario where the disposal facility remained undisturbed after its closure as well as scenarios where the facility is disturbed at some point in the future. Disturbances to the facility considered include the effects of climate change and sea level rises, coastal erosion, glaciation and ground rupture following an earthquake. The effects of inadvertent human intrusion are considered under Requirement 7.

The results of the PA are described by DSRL as being illustrative of potential consequences and are intended to aid understanding and demonstrate safety. The results of the PA are discussed in ESC 2010. For the undisturbed scenario none of the iterations of the PA have shown calculated doses in excess of the dose equivalent to the risk guidance level over the timescale of assessment. Peak doses occur after tens of thousands of years and fall beyond 50,000 years. A crofter family living and farming on the facility is considered to be the most exposed group. None of the disturbed scenarios result in a dose to the crofter, or any other group, that exceeds the dose equivalent to the risk guidance level in the GRA.

The PA will be refined to reflect further characterisation of the site, ongoing facility design and optimisation studies. This will be reflected in future iterations of the Environmental Safety Case.

Requirement 7: Human intrusion after the period of authorisation.

DSRL has assessed the impacts of inadvertent human intrusion in a manner consistent with the GRA. DSRL has considered a scenario where the top few metres of the facility are excavated for redevelopment as a residential area, leisure development, road building or the like. The excavated material is then mixed with soil and used for agricultural purposes to support crofting. DSRL is confident that this scenario would result in higher potential doses to the site user than any other use of land after redevelopment. Despite the conservative assumptions used in the assessment, the calculated annual doses are below the dose guidance level for prolonged exposure given in the GRA.

The potential impact of extracting contaminated groundwater through a well or borehole has also been considered. The assumptions used by DSRL are conservative and the approach is transparent. Drinking water from a well or borehole just downstream of the facility has been assessed as not resulting in an exposure to the public that exceeds either the risk guidance level or the dose guidance level for prolonged exposure given in the GRA.

Requirement 8: Optimisation.

Optimisation is a fundamental concept in the GRA where it is considered both as a Principle and a Requirement. ESC 2010 discusses optimisation primarily in the context of decision making relating to facility design as this has been the central focus of DSRL's studies to date. Initial facility designs are based on international best practice with design options being analysed in terms of their implications for the environmental safety case.

SEPA has discussed optimisation extensively with DSRL during technical meetings and reviewed the optimisation papers prepared to date. DSRL will continue to undertake optimisation studies during the lifecycle of the facility as a key component of the maintenance of the ESC.

Requirement 9: Environmental radioactivity.

DSRL has undertaken a series of assessments to investigate the affects of the facility on the accessible environment. These considered the impact of releases of the radioactivity from the facility, as derived from the PA, on non-human biota. In all instances the assessments show that the impact will be negligible to organisms in the marine, freshwater and terrestrial environments.

Requirement 10: Protection against non-radiological hazards.

The GRA recognise that the wastes to be disposed to a facility may be harmful because of their non-radioactive hazardous properties. ESC 2010 discusses the hazardous waste component of the inventory to be disposed in the facility. DSRL argue that the level of engineering of the vaults is considered to provide long-term protection of the environment that is no less stringent than that provided by national standards for disposing of hazardous waste. SEPA has imposed stringent waste acceptance criteria to control the disposal of waste to the facility.

SEPA's draft Authorisation includes Conditions that DSRL will demonstrate that this level of protection is met.

Requirement 11: Site investigation.

DSRL has undertaken an extensive programme of site investigation to inform their Environmental Safety Case and to support their facility design and construction. This work is ongoing and DSRL is currently on their third phase of characterisation. The characterisation has been discussed at technical meetings with SEPA and amended to reflect the outcome of these discussions. SEPA is satisfied that the scope of the characterisation meets adequately the requirements of the GRA and has been approached in a manner that is proportionate to the hazard presented by the waste.

Requirement 12: Use of site and facility design, construction, operation and closure.

DSRL's approach to the use of the site and to the facility design, construction, operation and closure has to be proportionate to the hazard presented by the waste. This has been the focus of discussions between SEPA and DSRL at a number of technical meetings. ESC 2010 describes DSRL's ongoing design process and the individual design components of the facility along with their function.

DSRL is finalising the detailed design of the facility and preparing the associated excavations. This area of work is ongoing and this is recognised in the Forward Programme discussed in ESC 2010

SEPA's draft Authorisation has Conditions to ensure that the facility is designed, constructed and operated in accordance with the assumptions made in the Environmental Safety Case.

Requirement 13: Waste acceptance criteria.

DSRL will hold Authorisations for both the consignor, Dounreay Licensed Site, and the recipient, low level waste disposal facility. It is SEPA's view that robust waste acceptance criteria (WAC) are needed to manage the disposal of waste and demonstrate consistency with the Environmental Safety Case.

Following the review of ESC 2010, SEPA has defined WAC as part of the Limitations and Conditions in the draft Authorisation. These limit the activities of radionuclides to be disposed to the facility to those recorded in the Dounreay Radioactive Waste Inventory 2009 as shown in ESC 2010.

Requirement 14: Monitoring.

DSRL has developed a Monitoring Plan to fulfil the requirement to monitor for changes caused by the construction, operation and closure of the facility. The approach has been reasoned and transparent. Included in the objectives of the Plan is monitoring in support of the operational and long-term safety case.

SEPA's draft Authorisation includes a Condition that DSRL prepare, maintain and implement a management plan that includes environmental monitoring of the facility to demonstrate compliance with the Authorisation and assumptions of the Environmental Safety Case.

Other Considerations

SEPA is required to further the conservation of biodiversity when exercising its regulatory functions and to identify any significant biodiversity interests that may be

affected. No significant biodiversity interests were identified as being affected by the disposal of radioactive waste to this facility.

The provisions of the European Convention on Human Rights incorporated in Scots law must be considered by SEPA in respect of its decision making process, and any potential or actual breach of a convention right identified and considered in that decision making process. No breach of any convention rights have been identified in relation to this authorisation activity.

SEPA's Decision

SEPA has determined DSRL's application for an Authorisation, under RSA 93, for disposal of solid low level radioactive waste. DSRL's application is supported by the latest iteration of their Environmental Safety Case (ESC 2010) which provides and substantiates a set of claims concerning the environmental safety of the planned disposal. SEPA has reviewed ESC 2010 and supporting documentation against the requirements and guidance in the GRA.

SEPA is satisfied that ESC 2010 meets the requirements, and therefore the principles, set out in the GRA to the extent possible at this stage of the facility development. It is accepted that as DSRL move on from the detailed design and construction stages of the facility, future iterations of the Environmental Safety Case will be produced. It is SEPA's expectation that these future iterations will reflect DSRL's enhanced characterisation of the site, the optimisation of the facility design and waste inventory and the further development of operational procedures.

DSRL's application for an Authorisation and accompanying Environmental Safety Case also addresses the determination considerations outlined in Section 5.

SEPA is minded to grant an Authorisation for the low level waste facilities proposed by DSRL. SEPA considers the near surface disposal of the radioactive waste requires a bespoke Authorisation which includes regulatory controls intended to ensure that DSRL design, construct, operate and close the facility in a manner consistent with the Environmental Safety Case.