SCOTTISH ENIVROMENT PROTECTION AGENCY

Addendum to the Letters of Agreement Covering the Disposal of Radioactive Liquid and Gaseous Waste from HMNB Clyde, Faslane

Decision Document
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SUMMARY

The long standing administrative arrangements between The Scottish Environment Protection Agency (SEPA) and the Ministry of Defence (MoD) for the disposal of liquid radioactive wastes from HM Naval Base Clyde, Faslane (the Base) require additional provisions to cover the disposal of general effluents and ballast /trim water from the Base.

General effluents are liquid wastes generated on-board submarines that are not directly associated with reactor plant and comprise of bilge, sewage and slop water. They contain significant quantities of non-radioactive pollutants such as oils, greases and biological material. Disposal has historically been made on the basis of these pollutants. Seawater used as ballast/trim to manage buoyancy of the submarine is also considered.

Recent testing has shown the presence of very low levels of tritium in these general effluents which prompted consideration for disposal as a radioactive effluent. SEPA reviewed the appropriate exemptions and guidance and advised MoD that they should apply for additional disposal routes to the Letter of Agreement for Faslane. These routes allow continuing use of current disposal routes.

This decision document explains the limitations and conditions added to the SEPA MoD arrangements for liquid radioactive waste disposal from Faslane. SEPA believes that these limitations and conditions will, if adhered to, effectively protect human health, the safety of the food chain and the environment generally.

MoD's request to add the additional disposal routes was made in July 2018 and it is appropriate to determine this application within the agreed RSA93 framework. The change has been dealt with as a minor variation.

1. INTRODUCTION

1.1 Purpose of the Document

In July 2018 MoD submitted an application to SEPA to add arrangements for the disposal of general effluents to the existing Faslane Letter of Agreement for the disposal of liquid and gaseous wastes (LOA93). The purpose of this document is to record Scottish Environment Protection Agency's (SEPA) considerations whilst determining this application and rationale for the limitations and conditions to be added to the LOA93

1.2 Radioactive Substances Regulation and its Application to MoD

Until 1 September 2018 the disposal of radioactive waste activities in Scotland was subject to the provisions of the Radioactive Substances Act 1993 (RSA93). On 1 September 2018 RSA93 was largely replaced by the Environmental Authorisations (Scotland) Regulations 2018 (EASR).MoD was largely exempt from the provisions of RSA93 and this exemption has been retained in Regulation 78(2) of EASR. .

However MoD policy states that:

"Where Defence has exemptions, derogations or dis-applications from HS&EP legislation, we maintain Departmental arrangements that produce outcomes that are, so far as reasonably practicable, at least as good as those required by UK legislation." (ref 1)

To cover the environmental aspects of relating to radioactive substances MoD and SEPA have agreed administrative arrangements, based on RSA93, that apply similar standards to those that would have applied had the exemption not been in place. These arrangements are detailed in the Agreement between the MoD and SEPA on Matters Relating to Radioactive Substances (ref 2). It is expected that these arrangements will be updated to reflect EASR. However, until such time as this happens and during the transitional period for EASR, SEPA will continue to use these existing RSA93 based arrangements.

At a site level disposal arrangements are detailed in Letters of Agreement (LOA). These LOA set out to limitations and conditions which were agreed to ensure that where the generation of radioactive waste cannot be avoided, it is disposed of in a safe and controlled manner, at appropriate times in accordance with Government policy.

1.3 HM Naval Base Clyde

HMNB Clyde comprises of two sites: the Faslane Naval Base and the Royal Naval Armaments Depot at Coulport.

Faslane is located on the North Eastern shore of the Gare Loch. It is the Royal Navy's principal submarine base and exists to support the operation of submarines and is the home port for the UK's nuclear deterrent and A Class submarines. Coulport is located on the Eastern Shore of Loch Long and is responsible for the storage and handling of weapons in support of the submarine programme.

MoD has contracted out a number of the operations at HMNB Clyde however MoD remains in control of both sites through the Naval Base Commander and therefore the RSA93 section 42 exemption continues to apply.

The application submitted covers Faslane. There are currently two LOA's covering radioactive waste disposals from Faslane. One covers the disposal of solid waste off-site, the other the discharge of liquid and gaseous wastes from the site to the local environment. It is the latter, dated June 1993, which is the subject of this application and is referred to as LOA93 in this document.

LOA93 was issued in June 1993 by SEPA's predecessor body, HM Industrial Pollution Inspectorate and it has remained unchanged since this time. A supporting letter detailing implementation of LOA93 was issued at the same time. Copies of LOA93 and the supporting implementation letter are included in appendix 1.

1.4 Details of the Application

The application made by MoD in July 2018 is given in appendix 2 and requests the addition of conditions to LOA93 to cover the disposal of general effluents containing very low levels of tritium to routes that allow the non- radioactive properties of the effluents to be appropriately managed. The application was made following discussion with SEPA regarding how best to capture these disposals under arrangements between MoD and SEPA for radioactive substances.

General effluents are liquid wastes which are produced on-board submarines as part of normal operations that are not directly associated with the reactor plant. They comprise of bilge arisings, grey water (slop) and sewage. These effluents contain a mixture of non-radioactive contaminates including oils, salts and greases as well as human by-products. These effluents continue to be generated whilst the submarine is berthed and production cannot be stopped without detriment to the submarine programme. These wastes are disposed of on the basis of the non-radioactive contaminants. However, very low levels of tritium have recently been detected in these effluents.

The application also indicates that ballast and trim water has been found to contain trace amounts of tritium. Ballast and trim water is sea water that is pumped into and out of closed tanks on the submarine to provide necessary buoyancy and manoeuvrability. This is not done frequently whilst alongside at Clyde.

Table 1 provides summarises details on general effluents and ballast and trim water.

Table 1: Details of General Effluents and Ballast and Trim Water

Type of Effluent	**Submarine Bilge Systems**	**Slop and Sewage**	**Ballast and Trim***
Types of non-radioactive pollutant	Oils, marine diesel, detergents, anti-freeze, biological matter, fine particulate and firefighting foams	Detergents, salts and organic matter	Seawater
Typical volumes discharged per year	5000m^3	4000m^3	33m^3
Current Disposal Routes	To the oil fuel depot (OFD) in	Directly to a contractor for	Direct to sea

	Garelochead for onward disposal to a contractor or through the OFD treatment process which discharges water to the Gare Loch. And Directly to a contractor for off-site disposal to the environment	appropriate treatment and disposal And The Faslane sewage treatment works	
Highest levels of Tritium found to date	0.28Bq/ml	<1Bq/ml	0.13 q/ml

*These figures are based on work done at Devonport.

The application notes that the levels of tritium found in the general effluents and ballast and trim water are consistent with those in the RSA93 exemption order, the Radioactive Substances Exemption (Scotland) Order 2011 (2011EO). Although the levels of activity are similar, the exemption cannot be applied where an authorisation, or in this case a LOA, is in place for liquid waste. As is indicated in the application the associated Government Guidance (Ref 3) for the 2011EO suggests that where such situations arise regulators should include the exemption conditions in the authorisation. The guidance also states that it is suitable to do this without further assessment of the dose as a generic assessment has already been carried out.

In addition to the information regarding general effluents from Faslane the application also contains reference to general effluents of a similar nature that arise at HMNB Clyde Coulport. It is noted that they are currently exempt under the 2011EO by virtue of the fact the agreements in place only cover gaseous and solid disposals.

1 Determination

In determining applications SEPA considers the information presented against a wide range of factors. These factors and the process SEPA followed are discussed in the following sections.

2.1 SEPA Process

SEPA has internal procedures for determining applications for RSA93 Authorisations and variations to existing Authorisations which take into account the requirements of the RSA93. For applications and variations relating to civil nuclear sites the determination procedure can involve a multi stage consultation. The complexity of the consultation is dependent on the significance of the proposed changes.

The changes applied for are the addition of routes consistent with those in the 2011EO, seek to implement advice given in Government Guidance (ref 3).

Consequently SEPA considered that this would constitute a minor change and decided that it was appropriate to follow the same process as would be followed for a civil site making an application for a minor variation to an existing Authorisation. This

process requires that the SEPA determination process is followed by consultation with Food Standards Scotland (FSS), Office of Nuclear Regulation (ONR) and finally Scottish Ministers (SM) on the changes SEPA is minded to make. In addition for MoD sites it is SEPA practice to consult Defence Nuclear Safety Regulator (DNSR).

2.2 Application of RSA93, the associated Exemptions and Government Guidance

As discussed in section 1.2 it is appropriate to determine the application under the RSA93 framework. Both the general effluents and ballast and trim water would be within the scope of RSA93, had it applied to MoD, as the effluents do not meet the non- radioactive criteria to be considered a relevant liquid and because there are no de-minimus values for aqueous liquids containing artificial radionuclides.

The general effluents were then assessed in respect the provisions of the 2011EO. The most appropriate exemption covers the disposal of high quantities of low concentration aqueous radioactive waste to the environment as described in Articles 15 and 16 of the 2011EO. The exemption allows aqueous wastes with concentrations of no greater than 1Bq/ml to be disposed of to a relevant sewer or sea to a maximum annual total of 10 GBq. There are a number of attached conditions most notably Article 15(2) which states that the exemption does not apply in respect of premises for which an authorisation under section 13 is held for the disposal of aqueous radioactive waste.

The Government Guidance (ref 3) which accompanied the 2011EO explained the reason for Article 15(2) as ensuring that all liquid discharges from a site, which were likely to be interconnected, are considered as a whole. Paragraph 3.171 of the Guidance also states that where operators wished they could apply for those waste streams which would otherwise be exempt to be added to the permit. As the routes had been subject to generic assessment it was not necessary for the operator to carry out any further dose assessment. These wastes would then be subject to the conditions set out in the permit. Therefore it would be appropriate to include conditions in the LOA93 that are consistent with those in the 2011EO.

Waste minimisation is also a condition of this exemption. It requires persons generating the waste to take all practicable measures available to minimise the quantity of radionuclides generated as waste. LOA93 already has a condition which requires the use of best practical means (BPM) to reduce the quantity of liquid radioactive waste. MoD has included a section in the application on BPM (section 5) which states BPM is achieved through applicable waste strategies, initiatives such as having push operation rather than free flowing taps and good maintenance and operation of equipment.

Tritium is not readily removed from water and treating either the general effluents or the ballast/trim via on-site Radioactive Effluent Disposal Facility (REDF), used to treat other radioactive effluents would only generate additional radioactive waste in the form of blocked filters and ion exchange columns and therefore not represent BPM and waste minimisation goals.

2.3 Disposal Routes and Impacts

The disposal routes currently used for general effluents are to sewer (via contractor or directly to the Faslane sewage treatment works) or to the sea via the processes at the OFD. These final disposal points are consistent with those in the 2011EO.

Ballast and trim water is returned directly to sea.

LOA93 currently allows the disposal of 1TBq of tritium in liquid radioactive waste from Faslane directly to the Gareloch. Average annual discharge to the Gare Loch from Faslane for the last 10 years has been 36 GBq with a maximum of 72GBq. As the predicted discharges are expected to be below the 10GBq limit specified in 2011EO this level can easily be accommodated within the current site limit.

As discussed above, the Government guidance (ref 3) states that where operators apply to have the exempt routes for low concentration high volume liquid wastes added to their authorisations there is no need to submit a supporting radiological impact assessment as the impacts for these waste streams had been considered in generic assessments and shown to be below relevant dose thresholds. Notwithstanding this SEPA has carried out a highly conservative assessment for these new routes at the exempt levels to the relevant sewers and sea. The assessment is summarised in Appendix 3. Even taking this pessimistic approach the calculated doses to members of the public and sewage treatment workers are significantly below the 10 mircoSieverts per year, the level which was used as a criteria for exemption. The assessment also included consideration of non-human species which satisfies SEPA duties under the Conservation (Natural Habitats & Conservation) Regulations 1994, which implement Council Directive 92/34/EC (the Habitats Directive), Council Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive) and the Nature Conservation (Scotland) Act 2004 in relation to biodiversity. The results for non-human species were well below the screening dose rate of 10 µGy h^{-1} below which there would not be a deleterious effect on designated sites. . Therefore SEPA is content that there is no significant radiological impact from the disposal of general effluents or ballast and trim waters via the various routes currently used.

SEPA carries out environmental monitoring programmes around all nuclear sites . The information is used in the calculation of retrospective doses and the results are published annually in Radioactivity in Food and the Environment reports (Ref 4). The doses calculated from all sources of radiation at Faslane are very small. The programme includes a seawater sample from Carnban Boatyard, which is just south of the Base, and no elevated levels of tritium have been seen in these samples. This work supports the predictions of the dose assessments.

2.4 Approach taken in other parts of the UK

A similar situation with general effluents and ballast and trim water exists at the Devonport Dockyard. The Environment Agency has opted to take a position that allows the site operator to manage the effluents in a manner consistent with conventional waste management as it would apply had there been no tritium present. This position is conditional but does allow the site operator to treat and dispose of general effluents containing up to 100Bq/ml in this manner. Ref 5. SEPA considered this approach but decided to change the LOA93.

2.5 Human Rights

SEPA considers that its regulatory processes for determining a RSA93 authorisation, including the various stages of consultation, are consistent with its duties under the Human Rights Act 1998. These processes have been copied for the determination of

these Letters of Approval and therefore SEPA considers that it has met its duties under the Human Rights Act 1998

2.6 Other Aspects of Policy and Legislation

In determining civil nuclear applications SEPA considers wider aspects of policy such as justification, impacts on other European countries and discharge strategies. For defence sites and where the changes are minor and do not involve an overall increase in limits this is not necessary.

3. Proposed Addendum to LOA93

As already discussed it is the intention to add limitations and conditions which closely reflect those in the 2011EO to the LOA93 and which would allow for the continued disposal of general effluents and ballast/trim water.

The proposed addendum to the LOA93 is given in appendix 3. The essential components are discussed below.

1. Paragraphs 2-4 provide definitions for general effluents, ballast and trim water and a relevant sewer. The latter is taken from the 2011EO.

2. Paragraph 5 identifies the agreed disposal routes for general effluents These are restricted to the sea and to a relevant sewer which is consistent with those identified in 2011EO.The Government guidance (ref 3) notes that provided the disposer is satisfied that the disposal route meets with the definition of a "relevant sewer" on first use of the exemption provisions it can be assumed that these conditions will continue to be met unless information is received to indicate otherwise. These routes are taken to mean the final point where the effluent enters the environment. Disposal to sewer can be to any sewer provided it meets the definition of a relevant sewer. In cases where MOD use contractors for the treatment or disposal of this aqueous waste then MOD will need to demonstrate that they are "in control" of the contractor and ensure that the relevant conditions of the LOA are complied with.

3. Paragraph 5 also requires that disposals must also be made in accordance with legislation relating to the non-radioactive properties.

4. The 2011EO for low concentration high volume effluents permits the use of only a relevant sewer or sea in any one year. It was considered unnecessary to include this restriction as the tritium limits for both pathways are the same (other radionuclides have more restrictive values for sewer disposal), there is no significant radiological hazard for using either route and bringing the exemption conditions and limitations into the LOA93 ensure that all disposals to the environment are accounted for in one document. Also it is not practical as both sewer and sea routes may be used in any one year.

5. Paragraph 6 places an annual limit on the disposal of general effluents. In setting these limits SEPA opted to use those in the 2011EO for low concentration high volume liquids containing tritium. There is a separate exemption for wastes containing human excreta which may have been

appropriate for slop and sewage waste. However, the overall volumes and activities are such that there is sufficient scope within the low concentration high volume exemption for the proposed disposals. MoD may consider the requirement for increased concentrations in the Nuclear Support Hub application.

6. Paragraph 7 ensures that the limits on the disposal of general effluents are to be considered as a sub limit to the existing LOA93 limit for tritium disposal.

7. Paragraph 8 requires records to be kept in respect of the volume, activity and disposal route used for general effluents.

8. Paragraph 9 allows the continued practice of releasing ballast and trim water to sea. There are no other further limitations specified for this activity.

9. Paragraph 10 and 11 insert general conditions requiring notification regarding disposals not in agreement with the LOA93 and the addendum and allowing SEPA to request further information if required. These are standard requirements of other RSA93 authorisations.

4. SEPA Discussion and Conclusions

MoD is currently generating and disposing of general effluents which contain very low levels of tritium. They also returning to sea, ballast and trim water containing very low levels of tritium. These effluents are not suitable for disposal via the currently agreed routes in the LOA93. However they do not fully comply with exemption or exclusion conditions so suitable disposal routes require to be added to LOA93.

SEPA has considered this situation with respect to the requirements of the RSA93, the associated exemption orders, relevant Government guidance, the approach taken in England for waste generated at Devonport and the Agreement between MoD and SEPA on matters relating to radioactive substances. SEPA concluded that the greatest environmental protection can be achieved by using disposal routes which adequately treat the non-radioactive properties, as is currently done. The current disposal routes used are consistent with those in the 2011EO. However these routes are not included in the LOA93 therefore would require to be added. This approach is consistent with the Government guidance (Ref 3). MoD applied to have the routes added.

For the reasons set out in this document SEPA has decided that it is appropriate to add conditions and limitations that closely reflect the exemption for disposals of low concentration high volume liquids in the 2011EO to the existing LOA93. The concentrations, total activities and the disposal routes provided in the 2011EO are considered adequate for the effluents as they have been described by MoD. SEPA concludes that these limitations and conditions will, if adhered to, effectively protect human health, safety of the food chain and the environment generally.

As this process implemented Government guidance (Ref 3) on exemption orders SEPA followed its standard procedures for determining minor variations to RSA93 authorisations for civil nuclear sites. This procedure is relatively short and involves only limited consultation. Should MoD wish to go beyond the proposed limitations and conditions in the future it is likely that SEPA would subject it to a more lengthy determination following the procedure for standard variations.

Pending the responses from the consultation on these conclusions and decision, SEPA proposes to issue the addendum to the LOA93 as presented in appendix 3.

5. Consultation Responses

In line with SEPA procedures FSS, DNSR, ONR and Scottish Government were consulted. No objections were raised. DNSR noted the reference to ballast and trim water and whilst content with the approach for the addendum raised the possibility of managing these discharges through the DNSR FAC 03 as a direct discharge from a submarine. This could be considered during the determination of the application for a new letter of agreement to cover the nuclear support hub. Copies of the responses are given in appendix 4.

6. Final Decision

SEPA decided to issue an addendum to the current letter of agreement as described above and as presented to the consultees.

7. References

1. MOD policy : Health, Safety and Environment Protection in Defence: Policy statement by the Secretary of State for Defence. 20 June 2018.
2. SEPA MoD Agreement on Matters relating to Radioactive Substances, September 2017
3. Guidance on the Scope of and exemptions from the radioactive substances legislation in the UK, Guidance Document September 2011, Version 1.0. DEFRA, Welsh Government, Department of the Environment, Scottish Government and Department of Energy and Climate Change
4. Radioactivity in Food and the Environment
5. EA Statement of approach

Appendix 1: MoD Application for Addendum
Appendix 2: Dose Assessment
Appendix 3: Draft Addendum to LOA93
Appendix 4: Comments from FSS, DNSR, ONR and Scottish Government.