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Proposal to use RP122 values in the new RSA/EO regime: Comparison with current regime

At the Scottish sites meeting yesterday, SEPA and Scottish Government took an action to compile questions seeking information from sites on the impact of the on-going Exemption Order (EO) Review. For clarity whilst this is called the EO Review, the process has widened out to include the review of Sections 1, 2 and Schedule 1 of the Radioactive Substances Act 1993 (these define what is radioactive material and waste). The proposed changes therefore fundamental to the categorisation of radioactive substances under the Act.

The paper summarises SEPAs understanding of the current status of the EO Review Included in this paper are questions which we would like sites to respond to. The basis of the questions is to compile information on the difference in waste volumes between sentencing waste under the current regime and the proposals in the EO Review.

As discussed yesterday, significant changes have been made to the EO following the first 12 week consultation period which started in June 2009. Thus, a shorter follow-up consultation is proposed later this year. We hope that the responses to the questions in this paper will inform the consultation, and we would also encourage sites to be fully involved in the consultation to influence the outcome of the EO Review.

Background

As part of the EO review it has been proposed to use of RP122[1] values in order to create an "exclusion regime" that is risk based, i.e. all activity limits have been set to satisfy a 10 μSv dose criterion. This exclusion regime will effectively replace the current exemption orders that have been used for "clearance" e.g. Substances of Low Activity (SoLA) and the Phosphatic Substances Exemption Order (PSRE EO). This is given effect through changes to the definition of radioactive material in the Act with a completely revised Schedule 1 which gives threshold values below which substances will not be considered to be radioactive. It is important to note that substances 'cleared' under SoLA were still technically 'radioactive' as defined by the Act, but just don't require permitting.

Examining the values contained in RP122 and comparing them with the current regime, particularly SoLA, reveals that it is useful to group the radionuclides listed into RP122 into 3 categories. Figure 1 on page 4 illustrates these categories and how they are incorporated into the current EO proposals and the current regime.

Category 1. Those radionuclides that have an RP122 value of 0.01 Bg g^{-1}. There are 7 radionuclides that fall within this category, all of which belong to

[1] RP 122 Practical Use of the Concepts of Clearance and Exemption EC document that gives guidance on General Clearance levels for practices

the natural decay series. These radionuclides are addressed in the current regime by Schedule 1 to RSA 93 and the PSRE EO. This category is not considered further in this paper as it is assumed that different exclusion values will be selected and work is on-going to determine these values.

Category 2. **Those radionuclides that have an RP122 value of 0.1 Bq g^{-1}**. There are 55 artificial radionuclides that fall into this category. Under the current regime these radionuclides can be disposed of (unconditionally) under SoLA up to concentrations of 0.4 Bq g^{-1}. Therefore, the current EO proposals extend the regulatory regime for these radionuclides.

Table 1 lists the 55 artificial radionuclides that fall within this category. The majority of these radionuclides are long lived alpha emitters or high energy beta/gamma emitters.

Table 1

Na-22	Zr-95+	La-140	Np-237+	Cm-244
Sc-46	Nb-94	Eu-152	Pu-236	Cm-245
Sc-48	Tc-96	Eu-154	Pu-238	Cm-246
V-48	Ag-108m	Tb-160	Pu-239	Cm-247+
Mn-52	Ag-110m	Ta-182	Pu-240	Cm-248
Mn-54	Sb-124	Ir-190	Pu-242	Cf-249
Fe-59	Te-132+	Ir-192	Pu-244+	Cf-250
Co-56	I-129	Bi-206	Am-241	Cf-251
Co-58	Cs-134	Bi-207	Am-242m+	Cf-252
Co-60	Cs-136	Th-229+	Am-243+	Cf-254
Br-82	Ba-140	U-232+	Cm-243	Es-254+

Category 3. **Those radionuclides that have an RP122 value of 1 Bq g^{-1} or above** There are approximately 123 artificial radionuclides that fall into this category. Under the current regime, an authorisation is required to dispose of these radionuclides if their concentration exceeds 0.4 Bq g^{-1}. Therefore, the fact that the RO review proposes a "relaxation" in the activity limits for these radionuclides should lead to decreased regulation for these radionuclides. Also included in the EO proposal is the concept that the "clearance" values apply when the waste is disposed of rather than at the time substances become waste. The result is that waste may be decay stored until it meets clearance levels, if this is practicable.

Aggregation rule

Note that the new clearance proposals require that the activity concentrations of individual radionuclides are aggregated. Thus, if waste contains a mixture of radionuclides, the aggregation rule must be used. The basis of this rule is that, for each radionuclide, the measured concentration is divided by the clearance level. A sum is then calculated for each waste. If that sum is less than unity, waste is exempt.

SEPA Comment on the Likely Impact on the Nuclear Industry – Waste containing Category 2 radionuclides

For Category 2 radionuclides, SEPA considers that the volume of non exempt waste containing these radionuclides will increase, i.e. it may increase the volume of wastes already sentenced for storage at DSRL and those wastes that will require disposal in the future. However, we do not anticipate that this Category will impact on those wastes already disposed of unless the intention is to retrieve these wastes in the future.

Note that the implications of the aggregation rule are that if waste only contains Category 2 radionuclides the clearance level would be 0.1 Bq/g **total** activity. If waste contains a mixture of Category 2 and 3 radionuclides, whether or not the new proposals increase or decrease regulation will vary on case by case basis and depend on the ratios of the radionuclides in that waste.

Exemption for Solid Radioactive Wastes

The proposals for exempting solid wastes remain largely unchanged from those consulted on in the summer. In essence this equivalent to the Low Volume VLLW category in the 2007 LLW Policy, approximately 50m3 of waste per year to dustbin. There are now proposals for a more relaxed regime for Naturally Occurring Radioactive Material (NORM) wastes but these have yet to be finalised.

It is worth noting that there is no direct replacement proposed for SoLA and therefore disposal of solid waste from the nuclear industry will largely have to be authorised unless it is excluded under the criteria discussed above.

SEPA Comment on the Likely Impact on the Nuclear Industry – Waste containing only Category 3 waste

There should be a significant reduction in the burden experienced by industry that disposes of waste that contains only radionuclides in Category 3. Substances that would have previously required to be disposed of as LLW (e.g. by controlled burial) will no longer be subject to any regulation at all, e.g. waste containing only tritium will not be subject to regulation if the concentration is less than 100 Bq/g (the RP 122 limit as compared to current limit of 0.4 Bq/g)

Summary

It is SEPAs view that the EO proposals will result in a decrease in the regulatory burden for sites in the future because the overall volumes of waste requiring authorisation are likely to decrease. The basis for our view is that only a small additional volume of waste will need to be authorised because they contain radionuclides exceeding Category 2 limits (or mixtures of waste containing Category 2 radionuclides), which will be outweighed by the larger volume of waste that can be sentenced as exempt due to the large number of less restrictive clearance values. The EO Review consider that this is a key benefit of adopting a risk based approach but there is little data available to validate this assumption. Therefore, the information we are asking from sites is needed to substantiate this assertion.

Thus, we would like the sites to provide responses to the following questions:

Current position

1. How much waste has been sentenced as exempt waste using SoLA and sent off site for disposal over the last 3 years?

2. How much waste is currently sentenced as exempt (<0.4 Bq/g) and stored on-site without final disposal?

3. How much waste do you expect to produce in the lifetime of the site using SoLA as the means to exempt waste (ie total activity below 0.4Bq/g). We presume this information is already available in the waste inventory or, for NDA sites, in the Lifetime Plan

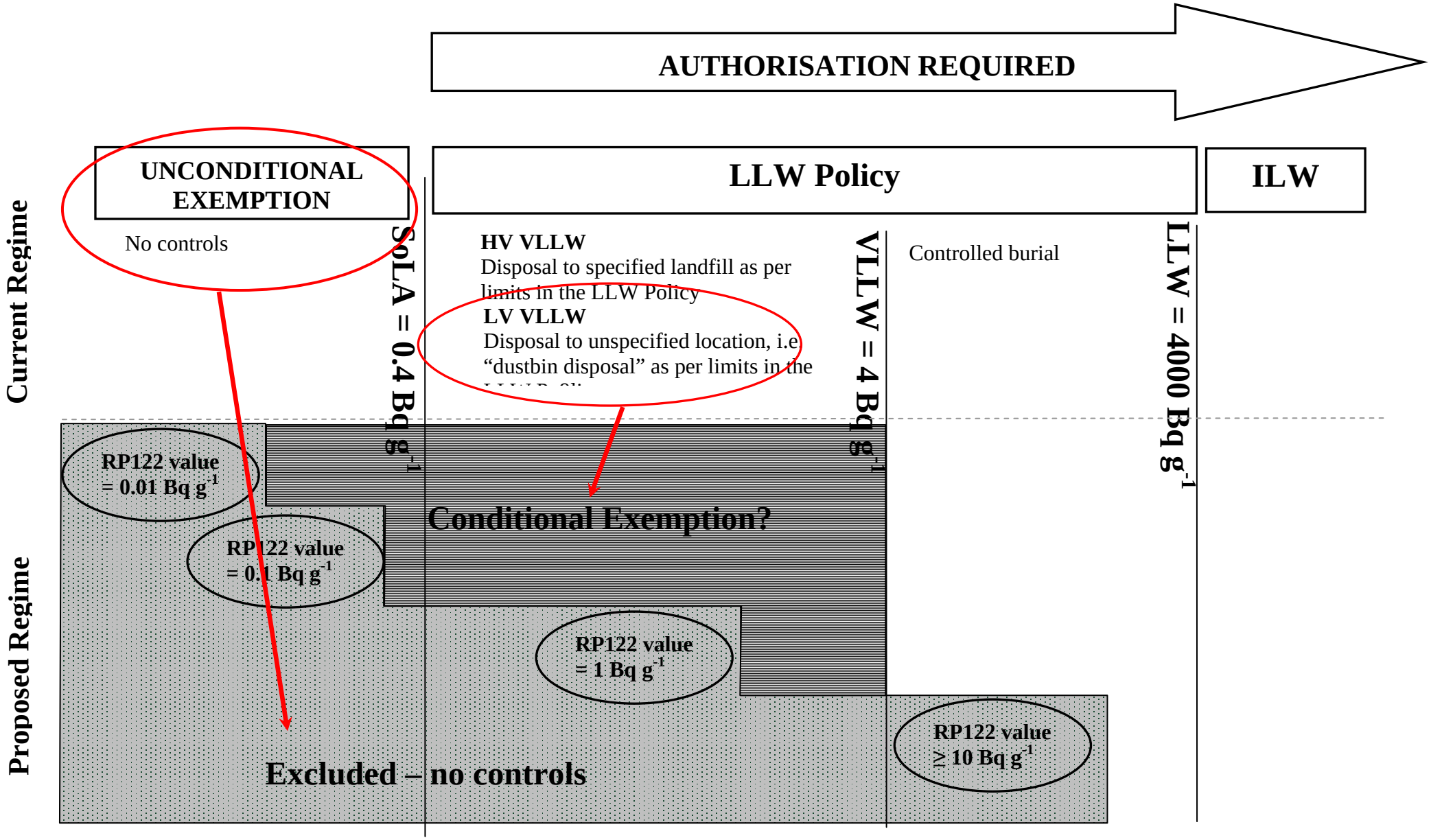
Proposed position

4. For each of the three types of waste referred to in the above questions, please estimate the effect (either increase or decrease) on the volume of radioactive waste if the RP122 clearance values were adopted.

5. We would also request commentary on how the current monitoring techniques and practices have influenced this estimate. e.g. just because waste is consigned as < 0.4 Bq/g it does not automatically follow that it is >0.1 Bq/g. Therefore, does monitoring data exist which would allow categorisation of waste to satisfy a 0.1 Bq/g clearance value or is monitoring only done to confirm that waste is less than 0.4 Bq/g

6. In summary can you estimate what effect the EO proposals would have on your estimated waste inventory and resultant disposal requirements? Is it an increase or decrease?

Note, the above questions are formulated on the basis that as we believe looking at historical data may provide more revealing data that estimating future arisings.


AUTHORISATION REQUIRED
UNCONDITIONAL EXEMPTION
No controls
LLW Policy
ILW
HV VLLW
Disposal to specified landfill as per limits in the LLW Policy
LV VLLW
Disposal to unspecified location, i.e "dustbin disposal" as per limits in the
Controlled burial
Current Regime
Proposed Regime
SoLA = 0.4 Bq g-1
VLLW = 4 Bq g-1
LLW = 4000 Bq g-1
RP122 value = 0.01 Bq g-1
RP122 value = 0.1 Bq g-1
Conditional Exemption?
RP122 value = 1 Bq g-1
RP122 value ≥ 10 Bq g-1
Excluded – no controls