UK Implementation of EFSA Protected Cropping Guidance:

Introduction:

This guidance note clarifies how the UK will implement the EFSA guidance on assessing environmental emissions from protected crops[1]

EFSA issued guidance detailing how to assess environmental exposure levels arising from protected cropping situations; this was based on research into the various forms of crop covers and greenhouses utilised across the EU. The EFSA guidance details the level of exposure assessment required for each type of crop cover. For any protected cropping system other than closed buildings, walk-in tunnels and permanent greenhouses, the EFSA guidance recommends performing an exposure assessment as per the standard open field situation. For walk-in tunnels and greenhouses, the EFSA guidance differentiates between soil bound and soil less systems. Assessment is then undertaken with FOCUS modelling based on new example scenarios parameterised for greenhouses or with the newly developed Greenhouse Emission Model (GEM) as part of a tiered assessment scheme. The EFSA guidance also acknowledges that additional scenarios may be developed over time. Although the guidance has been applicable since 1st December 2015, uncertainty remained over how to implement the guidance, example scenarios and new models for the range of application types expected across the EU. This is now clarified below.

For core interzonal and active substance assessments the UK will apply the EFSA guidance in full and present the assessment in the core dRR (or CP document for a.s.). This includes a zRMS evaluation of emission scenarios from the EFSA guidance, including those based on GEM and/or other suitable models or scenarios submitted in the core dRR (this approach has been agreed by Central Zone Member States). For an Article 33 assessment (following zonal); the UK will utilise the assessment by the zRMS as far as possible. If an area has not been addressed by the zRMS assessment, then the approaches outlined in this guidance note should be used to address any gaps.

For UK only assessments, the approach has been aligned with the EFSA guidance document as far as practicable to ensure our assessments follow latest guidance in line with the Regulation; it should be noted that where the UK approach is different to the EFSA GD, it is either a more conservative assessment, or in an area where the UK has already established that UK specific requirements are appropriate (*i.e*. surface water assessments). However a requirement to undertake full exposure modelling in line with the EFSA guidance would likely increase the regulatory burden, particularly for the horticultural industry where the use of EAMU approvals is common to support minor uses in protected situations. HSE has considered how to implement the guidance in a pragmatic and proportionate way that will not place an unnecessary burden on Applicants, whilst being aligned with the EFSA recommendations. In many cases it will be possible to simply refer to existing outdoor field uses using the risk envelope approach to address emissions from protected situations and no additional assessment will be required. Note that this guidance refers only to the use of the risk envelope approach to address environmental exposure. If the risk envelope approach is used to address other specialist areas, such as ecotoxicology, further consideration of the relevance of any risk envelope may be required. Detailed information on how to address the requirements in each environmental compartment is provided below.

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[1] *EFSA Guidance Document on clustering and ranking of emissions of active substances of plant protection products and transformation products of these active substances from protected crops (greenhouses and crops grown under cover) to relevant environmental compartments.*
EFSA Journal 2014; 12(3): 3615

UK Assessment:

The UK assessment should utilise existing crop and situation definitions and associated 'other specific restrictions' (OSRs), taken from HSE 'Crop Definitions' (November 2017) (see Table 1 and 2). The existing 'Protected' and 'Permanent Protection with Full Enclosure' UK crop qualifiers are broadly aligned with the EFSA guidance recommendations (Table 3). The only exception is that the current UK assessment requires a full outdoor assessment of all uses under walk-in tunnels, whereas the EFSA guidance includes walk-in tunnels alongside greenhouses when assessing exposure to groundwater and recommends specific FOCUS modelling to assess surface water exposure levels. For consistency with existing UK crop definitions, walk-in tunnels will remain under the 'protected' qualifier, accepting that this means a slightly higher level of assessment in line with outdoor methods for this specific use than would be recommended under the EFSA guidance approach.

Table 1: UK situation qualifiers (taken from HSE 'Crop Definitions', 2017).

Protected	*Any crop grown under a permanent or temporary cover. If covers are removed during the life of a crop, and not replaced later, then that crop is considered protected only while the covers are in place.* *It does not include structures that are not used primarily for growing crops, such as conservatories and interior landscapes*
Permanent protection with full enclosure	*Protected crop situations which provide full enclosure (including continuous top and side barriers down to below ground level) and which are present and maintained over a number of years.*

The UK assessment will now also strictly apply the relevant growing media qualifier, this allows assessment to distinguish between soil-bound systems (planted directly into soil), containerised crops and soil-less systems in line with the EFSA guidance (primarily rockwool) (see Table 2).

Table 2: UK growing media qualifiers (taken from HSE 'Crop Definitions', 2017).

Grown in organic media	Only crops grown in organic media, such as soil or compost, either in containers or on impervious surfaces. Not to be used on crops grown in artificial media such as rockwool or hydroponic systems.
Grown in Soil	Only for use on crops planted directly into the ground.
Grown in synthetic rooting media	Only on crops grown in artificial media such as rockwool or perlite. Not to be used on crops grown in soil or organic media.

*Note that the 'grown in soil' qualifier relates to crops planted directly into the ground of the greenhouse; in the UK only a small number of minor crops are grown this way and so this is unlikely to be required often.

Table 3: EFSA and UK equivalent structures.

Structure/system	
EFSA categories	**UK definition**
Closed building	Not relevant*
Low net shelter	**Protected** (any crop grown under a permanent or temporary cover). *Note the UK conservatively assumes that any of these structures could be non-permanent to differentiate from the category below.*
Low plastic shelter	
Low net tunnel	
Low plastic tunnel	
High net shelter	
High plastic shelter	
Shade house	
Walk in tunnel	
Greenhouse**	**Permanent protection with full enclosure.** Additional relevant qualifier(s) must also be specified from the following: **Grown in organic media** *(generally containerised or slab grown crops).* **Grown in synthetic rooting media** *(rockwool blocks and similar systems, many glasshouse crops grown this way).* **Grown in soil** *(i.e. planted directly into the ground, generally only some minor organic crops are grown this way).*

*The EFSA guidance considered that emissions from closed buildings were not relevant for any environmental compartment. If uses in closed building situations were assessed during substance approval stage, Applicants are advised to refer to the EFSA conclusion for further information on how to assess these as part of a product authorisation application.

**the term greenhouse also covers use in glasshouses

HSE has reviewed and tested the EFSA scenarios in relation to UK uses. The approach to assessing emissions from different protected cropping situations is considered for each environmental compartment in turn below:

SOIL

The EFSA guidance details that non-permanent structures should be assessed as per outdoor field uses. For permanent structures (e.g. greenhouses), the guidance states that only persistent substances (DT90> 1 year) should be assessed, and this will take the form of an open field assessment (considering potential for soil accumulation). For walk in tunnels, an open field assessment is required for soil (note that the potential for extended application timings should be considered). Note: the longest DT_{90} used in the PECsoil assessment detailed in the EFSA conclusion will be used to trigger further assessment of exposure in permanent structures.

The current UK approach is the same for non-permanent protection (*i.e*. a standard PECsoil calculation is required), walk-in tunnels or polytunnels are also assessed as per an outdoor use; however for greenhouse uses, the UK only currently undertakes a 'disposal of growing media' assessment. To harmonise the UK soil assessment with the EFSA guidance will require little additional resource.

Therefore soil exposure assessment in the UK will be as follows:

Table 4: UK soil exposure assessment.

Structure/system	UK Qualifier	Soil
Low net shelter Low plastic shelter Low net tunnel Low plastic tunnel High net shelter High plastic shelter Shade house Walk in tunnel	**Protected**	Standard PECsoil calculation (as per outdoor field use), the potential for extended season application timings should be considered. *Note: Drip applications to soil require an outdoor assessment, calculated based on the g/ha application rate.*
Greenhouse	**Permanent protection with full enclosure (grown in organic media)**	If an outdoor field use is available at the same rates/timings then this can be considered to form a suitable risk envelope for this use. If no risk envelope is in place then an additional 'Disposal of growing media' assessment is required, *i.e*. standard PECsoil calculations based on residue quantities (see Appendix I for an example). The relevant crop qualifier **'grown in organic media'** must also be specified (both on the Notice of Approval (NA) and the label) with the relevant associated OSR of **'Only crops grown in organic media, such as soil or compost, either in containers or on impervious surfaces. Not to be used on crops grown in artificial media such as rockwool.'**
	Permanent protection with full enclosure (grown in synthetic rooting media)	No assessment required. The following relevant crop qualifier and OSR must also be specified (both on the NA and the label): **'Grown in synthetic rooting media'** with the associated OSR of **'Only on crops grown in artificial media such as rockwool or perlite. Not to be used on crops grown in soil or organic media'.**
	Permanent protection with full enclosure (grown in soil)*	If an outdoor field use is available at the same rates/timings then this can be considered to form a suitable risk envelope for this use. If no risk envelope is in place then a full assessment is only required for persistent substances (DT90 > 1 year); if this is the case then an outdoor field PECsoil calculation is required. The relevant crop qualifier '**grown in soil'** must also be specified (both on the NA and the label) with the relevant associated OSR of **'Only for use on crops planted directly into the ground.'**

*Note that the 'grown in soil' qualifier relates to crops planted directly into the ground; in the UK only a small number of minor crops are grown this way and so this is unlikely to be required often.

Note: Surrogate crops are acceptable as an outdoor risk envelope as long as the effective application rate considering soil loadings are comparable or more conservative.

GROUND WATER

The EFSA guidance summarises that non-permanent structures should be assessed as field uses. The UK approach is harmonised with this, although only the four UK relevant scenarios (Chateaudun, Hamburg, Okehampton and Kremsmünster, plus MACRO Chateaudun), require assessment for a UK only application.

For permanent greenhouse structures (including walk-in tunnels), the EFSA guidance considers that for soil-less crops leaching is not relevant and no assessment is required. For soil-bound crops the EFSA guidance recommends assessment using a revised leaching scenario. The EFSA guidance document links to an example scenario for use with FOCUS PEARL and PELMO; this is a modified version of the Piacenza scenario, the plant cropping parameters have been modified to allow for a longer growing season. In addition, an associated climate file (Pistoia), has been parameterised to reflect greenhouse temperatures and with the amount of precipitation increased to allow for irrigation water volumes, this is based on data derived in Italy. The modified scenarios were untested and the guidance does warn that 'it is unknown' whether this scenario represents realistic worst-case conditions'.

Although these climate file temperatures and humidity will be different to those arising in the UK, they will likely have a degree of relevance to UK greenhouse conditions. Currently there are no other scenarios available for use to assess greenhouse uses, therefore testing to assess the results from use of the modified scenario and climate file has been undertaken. Based on the results the UK has concluded that a standard outdoor field assessment provides an acceptable risk envelope for a greenhouse use (assuming that rates and timings are the same or more conservative); with no further evaluation being required.

For soil-bound crops, if no outdoor field assessment at the same rates and timings has been undertaken then a specific greenhouse assessment using the Piacenza scenario in combination with the modified 'tomato' crop parameters and the 'Pistoia' climate file should be undertaken as a first tier approach. The tomato modified parameters (as detailed in Appendix A of the EFSA guidance), should be utilised whatever the crop; Applicants may provide a higher tier refinement if acceptable justification is provided. Applicants are advised to discuss any refinements with HSE prior to making a regulatory submission.

This approach will be applied to UK assessments in line with the approach proposed for PECsoil calculation; *i.e.* the relevant crop qualifiers need to be specified to differentiate between soil-bound and soil-less systems.

Table 5: Proposed UK groundwater exposure assessment.

Structure/system	UK Qualifier	Groundwater
Low net shelter Low plastic shelter Low net tunnel Low plastic tunnel High net shelter High plastic shelter Shade house Walk in tunnel*	**Protected**	Standard outdoor field PECgw calculation (non-standard application types such as drip application require consideration on a case by case basis). *Note: Drip applications to soil require an outdoor assessment).*
Greenhouse	**Permanent protection with full enclosure (grown in organic media)**	If an outdoor field use is available at the same rates/timings then this can be considered to form a suitable risk envelope for this use. If no risk envelope is in place then an additional 'Disposal of growing media' assessment is required, *i.e.* standard UK specific FOCUS groundwater modelling based on residue quantities potentially available for leaching. The relevant crop qualifier **'grown in organic media'** must also be specified (both on the NA and the label) with the relevant associated OSR of **'Only crops grown in organic media, such as soil or compost, either in containers or on impervious surfaces. Not to be used on crops grown in artificial media such as rockwool.'**
	Permanent protection with full enclosure (grown in synthetic rooting media)	No assessment required. The following relevant crop qualifier and OSR must also be specified (both on the NA and the label): **'Grown in synthetic rooting media'** with the associated OSR of **'Only on crops grown in artificial media such as rockwool or perlite. Not to be used on crops grown in soil or organic media'.**
	Permanent protection with full enclosure (grown in soil)**	If an outdoor field use is available at the same rates/timings then this can be considered to form a suitable risk envelope for this use. If there is no risk envelope evaluation then a specific greenhouse evaluation in line with Appendix A of the EFSA Protected Cropping Guidance. This uses the Piacenza scenario with modified crop parameters for 'tomato' (use irrespective of the crop being assessed), along with the 'Pistoia' climate file (this simulates water inputs from irrigation). The relevant crop qualifier '**grown in soil'** must also be specified (both on the NA and the label) with the relevant associated OSR of **'Only for use on crops planted directly into the ground.'**

*The EFSA guidance includes walk-in tunnels alongside greenhouses when assessing exposure to groundwater. For consistency with existing UK crop definitions, walk-in tunnels will remain under the 'protected' qualifier, accepting that this means a slightly higher level of assessment in line with outdoor methods for this specific use than would be recommended under the EFSA guidance approach.

**Note that the 'grown in soil' qualifier relates to crops planted directly into the ground; in the UK only a small number of minor crops are grown this way and so this is unlikely to be required often.

Note: Surrogate crops are acceptable as an outdoor risk envelope as long as the effective application rate and timings are comparable, *i.e.* time of year is comparable or more conservative.

SURFACE WATER

The EFSA guidance summarises that non-permanent structures should be assessed as field uses. The current UK approach is harmonised with this, although it utilises a PECsw calculation based on the Rautmann spray drift % deposition values and UK specific drainage assessment methods instead of FOCUSsw modelling.

For permanent greenhouse structures, the EFSA guidance considers that for soil-bound crops an assessment of surface water exposure via drainage should be undertaken as detailed in Appendix B of the guidance. A specific greenhouse evaluation in line with Appendix B of the EFSA Protected Cropping Guidance (note that use of the GEM model is now considered more appropriate to model this situation); this scenario is for use with PEARL and was tested by the UK. The standard UK $PEC_{sw,\ drainflow}$ calculation was also undertaken for comparison. Results from the UK calculations were significantly higher than those derived using the PEARL modelling. For walk-in tunnels the EFSA guidance recommends using the standard FOCUSsw drainage scenarios.

Based on this comparison, an outdoor field derived UK drainflow assessment at the same/similar application rate (Tier I or an acceptable higher tier assessment) provides an acceptable risk envelope for a proposed greenhouse use on soil-bound crops and for walk-in tunnels. Additionally, it is also considered that the standard UK $PEC_{sw,\ drainflow}$ calculation can be used as a Tier I exposure assessment for greenhouse uses; if the risk assessment passes using this simple calculation then there is no further requirement to undertake more complex modelling. At Tier II the GEM model parameterised for soil bound crops can be used.

For soil-less crops in a permanent greenhouse structure, the EFSA guidance recommends the use of the GEM model for soil-less cropping systems. This is an EU validated model specifically parameterised for greenhouse assessment. The guidance gives an example scenario for a soil-less rose crop with a PECsw value calculated for the discharge of recirculation water to a ditch. Testing of the GEM model was undertaken and the resulting PECsw was noted to be very high because default values of 1000 days were utilised for input parameters such as the greenhouse floor DT_{50}; a plant uptake factor of 0 was also used. This means that the model effectively simulated that all of the applied pesticide moved from the greenhouse into the drainage and recirculation water, this is considered overly conservative, not reflective of UK practice and not easy for Applicants to refine via submission of standard data.

For the UK it is considered that application to soil-less greenhouse crops will result in minimal surface water exposure during application; any dilute pesticide waste that requires disposal must be disposed of in line with the advice detailed in the 'Code of Practice for Using Plant Protection Products (Section 5: Disposing of Pesticide Waste). The following text should be specified on the label so that users are aware of the requirement to adhere to this code:

The use of this product in recirculating water systems in a greenhouse may result in dilute pesticide waste that requires disposal. All dilute pesticide waste must be disposed of safely and legally to protect humans, wildlife and the environment, especially groundwater and surface water. Pesticide disposal advice is detailed in the 'Code of Practice for Using Plant Protection Products (Section 5: Disposing of Pesticide Waste).

http://www.hse.gov.uk/pesticides/topics/using-pesticides/codes-of-practice/code-of-practice-for-using-plant-protection-products.htm

Table 6: Proposed UK surface water exposure assessment.

Structure/system	UK Qualifier	Surface water
Low net shelter Low plastic shelter Low net tunnel Low plastic tunnel High net shelter High plastic shelter Shade house Walk in tunnel	**Protected**	Standard outdoor field PECsw calculations (drift and drainflow if relevant to the crop); any necessary risk mitigation measures (e.g. buffer zones), will still need to be applied. *Note: Drip applications to soil require an outdoor assessment of drainflow exposure if relevant).*
Greenhouse	**Permanent protection with full enclosure (grown in organic media)**	If an outdoor field use is available at the same rates/timings then this can be considered to form a suitable risk envelope for this use. If no risk envelope is in place then an additional 'Disposal of growing media' assessment is required, *i.e.* a standard UK drainflow assessment, based on residue quantities potentially available for surface water exposure via drainage. The relevant crop qualifier **'grown in organic media'** must also be specified (both on the NA and the label) with the relevant associated OSR of **'Only crops grown in organic media, such as soil or compost, either in containers or on impervious surfaces. Not to be used on crops grown in artificial media such as rockwool.'**
	Permanent protection with full enclosure (grown in synthetic rooting media)	No surface water assessment required, any dilute pesticide waste that requires disposal must be disposed of in line with the advice detailed in the 'Code of Practice for Using Plant Protection Products (Section 5: Disposing of Pesticide Waste). The following text should be specified on the label so that users are aware of the requirement to adhere to this code: ***The use of this product in recirculating water systems in a greenhouse may result in dilute pesticide waste that requires disposal. All dilute pesticide waste must be disposed of safely and legally to protect humans, wildlife and the environment, especially groundwater and surface water. Pesticide disposal advice is detailed in the 'Code of Practice for Using Plant Protection Products (Section 5: Disposing of Pesticide Waste).*** The following relevant crop qualifier and OSR must also be specified (both on the NA and the label): **'Grown in synthetic rooting media'** with the associated OSR of **'Only on crops grown in artificial media such as rockwool or perlite. Not to be used on crops grown in soil or organic media'.**
	Permanent protection with full enclosure (grown in soil)	If an outdoor field derived UK drainflow assessment (Tier I or higher tier), at the same/similar soil loading is available then this can be considered to form a suitable risk envelope for surface water exposure arising from greenhouse use. If there is no risk envelope then the following approach should be taken: *Tier I:*

		The standard UK $PEC_{sw,\ drainflow}$ calculation can be used as a Tier I exposure assessment for glass house uses; if the risk assessment passes using this simple calculation then there is no requirement to undertake more complex modelling. *Tier II:* If the Tier I calculation fails, then a specific greenhouse evaluation in line with Appendix B of the EFSA Protected Cropping Guidance (note that use of the GEM model is now considered more appropriate to model this situation). The relevant crop qualifier '**grown in soil'** must also be specified (both on the NA and the label) with the relevant associated OSR of **'Only for use on crops planted directly into the ground.'**

*The EFSA guidance includes requires specific FOCUS modelling for walk-in tunnels when assessing exposure to surface water. For consistency with existing UK crop definitions, walk-in tunnels will remain under the 'protected' qualifier.
**Note that the 'grown in soil' qualifier relates to crops planted directly into the ground; in the UK only a small number of minor crops are grown this way and so this is unlikely to be required often.
Note: Surrogate crops are acceptable as an outdoor risk envelope as long as the effective application rate and timings are comparable, *i.e.* time of year is comparable or more conservative.

AIR

The guidance identifies the driving force of emissions to air from greenhouses to be ventilation and volatilisation processes. Calculated levels from high tech and multi span greenhouses indicate levels may be as high or higher than for open field. However, the guidance states that no current models are available to cover these emissions, and until these are developed the approach to an open-field assessment should be used. There is no UK specific assessment for the air compartment so the active substance approval or core assessment can be used as a risk envelope with no further UK consideration required.

<table>
<tr><th>Structure/system</th><th>UK Qualifier</th><th>Soil</th><th>Groundwater</th><th>Surface Water</th></tr>
<tr><td>Low net shelter
Low plastic shelter
Low net tunnel
Low plastic tunnel
High net shelter
High plastic shelter
Shade house
Walk in tunnel</td><td>Protected</td><td colspan="3">Standard UK PEC calculations (as per outdoor field use), any necessary risk mitigation measures (e.g. buffer zones), will still need to be stipulated.</td></tr>
<tr><td rowspan="3">Greenhouse</td><td rowspan="2">Permanent protection with full enclosure (grown in organic media)

The relevant crop qualifier ‘grown in organic media’ must also be specified (both on the Notice of Approval (NA) and the label) with the relevant associated OSR of ’Only crops grown in organic media, such as soil or compost, either in containers or on impervious surfaces. Not to be used on crops grown in artificial media such as rockwool.’</td><td colspan="3">If an outdoor field use is available at the same rates/timings then this can be considered to form a suitable risk envelope for all compartments.</td></tr>
<tr><td>If no risk envelope is in place then an additional ‘Disposal of growing media’ assessment is required, i.e. standard PECsoil calculations based on residue quantities.</td><td>If no risk envelope is in place then an additional ‘Disposal of growing media’ assessment is required, i.e. standard FOCUS groundwater modelling based on residue quantities potentially available for leaching.</td><td>If no risk envelope is in place then an additional ‘Disposal of growing media’ assessment is required, i.e. a standard UK drainflow assessment, based on residue quantities potentially available for surface water exposure via drainage.</td></tr>
<tr><td rowspan="2">Permanent protection with full enclosure (grown in soil)

The relevant crop qualifier ‘grown in soil’ must also be specified (both on the NA and the label) with the relevant associated OSR of

‘Only for use on crops planted directly into the ground.’</td><td colspan="2">If an outdoor field use is available at the same rates/timings then this can be considered to form a suitable risk envelope.</td><td>If an outdoor field derived UK drainflow assessment (Tier I or higher tier), at the same/similar soil loading is available then this can be considered to form a suitable risk envelope for surface water exposure arising from greenhouse use.</td></tr>
<tr><td>If no risk envelope is in place then a full assessment if DT90 > 1 year; outdoor field PECsoil calculation is then required.</td><td>If there is no risk envelope evaluation then a specific greenhouse evaluation in line with Appendix A of the EFSA Protected Cropping Guidance. This uses the Piacenza scenario with modified crop parameters for ‘tomato’ (use irrespective of the crop being assessed), along with the ‘Pistoia’ climate file (this simulates water inputs from irrigation).</td><td>If there is no risk envelope then the following approach should be taken:
Tier I:
The standard UK $PEC_{sw,\ drainflow}$ calculation can be used as a Tier I exposure assessment for glass house uses; if the risk assessment passes using this simple calculation then there is no requirement to undertake more complex modelling.

Tier II:
If the Tier I calculation fails, then a specific greenhouse evaluation in line with Appendix B of the EFSA Protected Cropping Guidance (note that use of the GEM model is now considered more appropriate to model this situation).</td></tr>
<tr><td>Permanent protection with full enclosure (grown in synthetic rooting media)

The following relevant crop qualifier and OSR must also be specified (both on the NA and the label):
‘Grown in synthetic rooting media’ with the associated OSR of ‘Only on crops grown in artificial media such as rockwool or perlite. Not to be used on crops grown in soil or organic media’.</td><td colspan="3">No assessment required.

Any dilute pesticide waste that requires disposal must be disposed of in line with the advice detailed in the ‘Code of Practice for Using Plant Protection Products (Section 5: Disposing of Pesticide Waste).

The following text should be specified on the label so that users are aware of the requirement to adhere to this code:

<u>The use of this product in recirculating water systems in a greenhouse may result in dilute pesticide waste that requires disposal. All dilute pesticide waste must be disposed of safely and legally to protect humans, wildlife and the environment, especially groundwater and surface water. Pesticide disposal advice is detailed in the ‘Code of Practice for Using Plant Protection Products (Section 5: Disposing of Pesticide Waste).</u></td></tr>
</table>

**Note that the ‘grown in soil’ qualifier relates to crops planted directly into the ground; in the UK only a small number of minor crops are grown this way and so this is unlikely to be required often.

Note: Surrogate crops are acceptable as an outdoor risk envelope as long as the effective application rate and timings are comparable, *i.e.* time of year is comparable or more conservative.

APPENDIX I: example calculation of disposal of growing media.

Structure/system	UK Qualifier	Soil
Permanent greenhouse	**Permanent protection with full enclosure (grown in organic media)**	If an outdoor field use is available at the same rates/timings then this can be considered to form a suitable risk envelope for this use. If no risk envelope is in place then an additional 'Disposal of growing media' assessment is required, *i.e*. standard PECsoil calculations based on residue quantities (see Appendix I for an example). The relevant crop qualifier **'grown in organic media'** must also be specified (both on the Notice of Approval (NA) and the label) with the relevant associated OSR of **'Only crops grown in organic media, such as soil or compost, either in containers or on impervious surfaces. Not to be used on crops grown in artificial media such as rockwool.'**

If no risk envelope is in place then an additional 'Disposal of growing media' assessment is required, *i.e*. standard PECsoil calculations based on residue quantities. A basic first tier example of how to conduct a soil incorporation PEC calculation following application to growing media is provided below. It is recommended that any higher tier refinements to support a UK approval should be discussed with HSE.

Application rates are typically given in g a.s./$m^3$of growing media or compost. To allow for our standard PEC calculators to be utilised this application rate must first be converted into g a.s./ha. Based upon the reported values in '*THE USE AND DISPOSAL OF GROWING MEDIA - Report to summarise current practice*', ADAS, March 2001, it is assumed that 50 tonnes of growing media is applied per hectare and an appropriately conservative estimate of the bulk density of the compost is 0.4Kg/L. Utilising these standard assumption it is calculated that 125m^3 of compost is applied per hectare.

Utilising the active substance concentration, the active substance application rate can then be calculated. For example a product providing 40 g a.s./m^3 compost, will result in an application rate of 5 kg a.s./ha (based upon 125 m^3 compost/ha). This application rate can now be utilised within the standard soil PEC calculators. Utilising the above application rate of 5 kg a.s./ha, the $PEC_{soil, ini}$ would be calculated to be 1.667 mg/kg, where the soil depth is set to 20 cm (to reflect incorporation of applied compost) and final bulk density is set to 1.5 kg/L (the bulk density of the receiving soil compartment), both these values are taken from the above ADAS report. Crop interception is set to 0 %.