Environmental and Social Risk Assessment (ESRA) - UREA

Date	27th September 2023	Last Reviewed: 26th June 2026	
Country	Ireland		
Proposed chemical pesticide[1]	Urea	**Purpose of use (protection of vegetation, logs, human health, livestock, native species, seeds or seedlings, weed control, others)**	Control against the butt-rot fungus *Heterobasidion annosum,* post harvesting

ESRA Summary for Urea

This ESRA covers the use of Urea as a fungicide applied to cut conifer stumps to protect against infection by Heterobasidion annosum as part of forest operations and has been prepared and designed to assist IForUT in the Risk Assessment of Urea where its use as a fungicide is proposed within their portfolio. When used for stump treatment, Urea is considered a plant protection product under FSC pesticide policy and must therefore be managed in accordance with FSC requirements.

The use of Urea in Ireland is forestry best practice and is often a condition of Felling Licences.

Urea is generally applied to the conifer stump immediately after felling, unless the stumps are located in areas where Urea is not to be applied, as outlined in Forest Service (DAFM) Guidelines or in the Felling Licence.

The EU Commission considers that urea is a low-risk active substance. There is currently EU approval of Urea as a fungicide for the preventative control of woodrotting pathogenic fungus Heterobasidion annosum (Fomes root and butt rot) until 30th April 2039.[2]

Only one dose is applied immediately after felling. As the Urea solution is colourless a dye is added to show the coverage on the stump.

As Urea is soluble in water, care should be taken during application and mixing to keep it out of surface water drainage systems that discharge to the environment.

Where the decision making process (or the felling licence condition) has identified justifiable use of Urea to prevent infection by Heterobasidion annosum, standard mitigating measures should be taken when using this pesticide.

Mitigating measures should include:

- adhering to industry best practice and health & safety regulations
- using trained operators
- following best practice with regards to application rate and method
- use of Personal Protective Equipment (PPE)
- observing buffer zones in aquatic and sensitive areas in adherence with DAFM environmental guidelines and requirements
- applying agreed application rate directly to the conifer stump (manually / by machine head)
- suitable weather conditions

It is IForUT Policy to adhere to industry best practice and health & safety **regulations as detailed in its Integrated Pest Management Strategy (IPMS) and associated policy and procedural documents and operation contracts.**

[1] The term 'pesticides' is commonly used as a synonym for plant protection products

[2] https://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/start/screen/active-substances/details/187

Background Information

Regulation

In Ireland pesticides are regulated by the Pesticide Registration & Controls Division (PRCD), formerly Pesticide Control Services (PCS), of the Department of Agriculture, Food and the Marine (DAFM). http://www.pcs.agriculture.gov.ie/

The Pesticide Registration & Controls Division (PRCD) is responsible for implementing the regulatory system for plant protection and biocidal products. PRCD is also responsible for the national regulations controlling pesticide use. All of their regulatory work is based on scientific evidence to ensure that controls on the sale, supply and use of pesticides are effective. Where applicable, approval status and conditions of use must be verified against current regulatory guidance and requirements prior to use.

There is currently EU approval of Urea as a fungicide for the preventative control of woodrotting pathogenic fungus Heterobasidion annosum (Fomes root and butt rot) until 30th April 2039.[3]

There is no data available in Ireland from the Pesticide Registration & Controls Division (PRCD) on use of Urea as a fungicide, therefore for the purpose of this ESRA, UK data have been consulted.

In the UK, the Health and Safety Executive (HSE) have judged that urea fertilizer utilised as a fungicide does not pose an unacceptable risk to consumers, operators, bystanders or the wider environment, if applied according to the conditions they have specified on their approval document. The HSE (UK) have granted Urea for use as a fungicide in forest situations, a 'commodity substance'[4] approval.

Heterobasidion annosum

Heterobasidion annosum (formerly called Fomes annosus) is a pathogenic fungus which kills the roots and rots the heartwood of most commercially grown conifer species. The pathogen gains entry to a crop, predominantly conifer species, when spores land on freshly created stumps. It then grows down into the root system and transfers across into the roots of adjacent trees, or a newly re-planted crop.

The *DAFM - Forest Protection Guidelines* (2002)[5] list the following information about Heterobasidion annosum, formerly referred to as 'Fomes' or Butt rot':

> ***Potential damage*:** The fungus, Heterobasidion annosum, colonises freshly cut stumps of trees and spreads by root-contact to adjoining trees. It causes timber degrade and death.
>
> ***Vulnerable stage of forest growth*:** Infection is usually through freshly cut stumps so a forest is most likely to become infected sometime following harvesting.
>
> All stages of forest growth can be infected.
>
> ***Vulnerable season*:** Not seasonally dependent.
>
> ***Prevention*:** Apply a solution of urea (2 kilograms of urea in 10 litres of water) to completely cover the tree-stump immediately after felling. Ensure that the urea mix is properly dissolved. As the solution is colourless a dye[6] is added to show the coverage on the stump.
>
> ***Control*:**
> None is practical, apart from felling the infected trees to salvage the timber value.

[3] https://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/start/screen/active-substances/details/187
[4] https://www.hse.gov.uk/pesticides/commodity-substances/commodity-substance-urea.htm
[5] https://www.gov.ie/pdf/?file=https://assets.gov.ie/237567/fda9eb9e-652f-498c-9605-b15a9619a3cf.pdf#page=null

[6] http://www.coford.ie/media/coford/content/publications/projectreports/cofordconnects/Dyes.pdf

Biological Control
Since the publication of the *DAFM - Forest Protection Guidelines* (2002) considerable research has been undertaken in the UK on biological control methods on pine and spruce.[7]
There has been some success in the UK with a biological control agent, PG Suspension, against Heterobasidion annosum. It contains spores of another fungus, Phlebiopsis gigantea, and is very successful in controlling the pathogen in predominantly pine forests.

Disease risk assessment studies in the UK show that the risk of serious disease in spruce (Picea spp.) species varies with soil type and climate and shows that the greatest threat from this fungus comes on sites with well drained soils and relatively mild climates, whilst the risks are lowest on upland sites dominated by wet peats.

To show the significance of the threat of Heterobasidion annosum in Ireland, Forest Statistics Ireland, 2023[8] shows that the Irish forest estate is comprised of 69.4% conifers. Sitka spruce is the most common species, occupying 44.6% of the total forest area.

No data on whether equivalent research projects or studies are being undertaken in Ireland were available at the time of preparing this ESRA.

Urea

Urea has been used in the forest industry for a number of decades to treat stumps immediately after felling against the fungal butt rot Heterobasidion annosum (formerly Fomes annosus).

The solution usually contains a blue dye to indicate which stumps have been treated.
Urea is considered a low-risk substance; however, appropriate environmental and operational controls must still be applied. It is defined as a liquid fertiliser.

In the Report ***Peer review of the pesticide risk assessment of the active substance urea*** by EFSA[9]
Urea is considered a low-risk substance.
This report concluded that:

- In the area of mammalian toxicology, urea is of low toxicological concern and no risks to human health could be expected from the use as a plant protection product
- No evidence was found for urea's skin irritation potential.
- With regards to Environmental fate and behaviour, in soils urea is expected to be rapidly transformed via enzymatic hydrolysis to ammonia and carbamic acid, which is spontaneously converted to carbonic acid. Following the oxidation of carbonic acid and ammonia, the final products of urea dissipation in soil are carbon dioxide, nitrite and nitrate, respectively. Anaerobic metabolism is not expected to be a significant route of degradation in soil.
- Based on the information available, the application of urea as a plant protection product is not expected to significantly contribute to eutrophication of the surface water bodies.

On 28 September 2021, the applicant Forestry Research decided to formally withdraw its application from the European approval process. As a result, the assessments in relation to the representative

[7] https://www.forestresearch.gov.uk/research/treatment-of-root-and-butt-rot-in-conifers/
[8] https://www.gov.ie/pdf/?file=https://assets.gov.ie/267876/499d9f21-751b-4d53-89d6-ed8e8e9efb97.pdf#page=null
[9] https://www.efsa.europa.eu/en/efsajournal/pub/8112

fungicide use of the plant protection product supported by the applicant Forestry Research were not considered as part of the Peer Review Report.

The UK Health and Safety Executive (HSE) have judged that urea fertilizer, utilised as a fungicide, does not pose an unacceptable risk to consumers, operators, bystanders or the wider environment.

When used in the treatment to prevent 'butt rot', Urea effectively becomes a forestry fungicide and falls under the definition of a pesticide in the FSC® Pesticide Policy:

Pesticide: any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest, or regulating plant growth (Source: FAO International Code of Conduct on Pesticide Management). This definition includes insecticides, rodenticides, acaricides, molluscicides, larvaecides, nematicides, fungicides and herbicides.

Urea is not currently listed as a Highly Hazardous Pesticide (HHP) under FSC policy; however, its use remains subject to FSC requirements for justification, control and monitoring.

Dose of Active Ingredients used
In general the amount of chemicals used in forestry is very low and would represent only a small fraction of the amounts used in other sectors. Across the EU Member States, generally less than 1 % of all active substances are used in forestry.[10]

IE Guidance: Recommended mixing rate is 1 kg of fertiliser grade urea, 5 litres of water and one bottle of dye.[11]

UK Guidance: (Max Dosage) 1 litre of 37% w/v aqueous solution/m2 of cut stump. [12]

[**Note** that the UK Guidance on application rate and dye differs. Where DAFM guidance is available (e.g. in felling licence conditions and guidance notes, the DAFM Guidance should be followed.]

Maximum number of treatments
One per cut stump.

Latest time of application
Stumps should be treated immediately after cutting.

Application method:
The urea solution may be applied to run-off either manually by brush and bucket, or by harvesting machine heads fitted with a special applicator.

Preparation and Storage:
Urea, used in forestry operations as a fungicide, should be prepared and securely stored under shelter on a dry, elevated site at least 50 m from the nearest aquatic zone.[13]
Gloves should be worn when mixing and applying the solution.
In accordance with best practice and DAFM guidance, fuel, lubricants, anti-freeze, urea and other hazardous compounds should be removed from the site on the completion of operations.[14]

[10] Source: https://www.arc2020.eu/wp-content/uploads/2023/07/pesticides_sup_commission-response_art-241.pdf
[11] Source: Code of Best Forest Practice (Part 2, Section 8.6.2) https://wayback.archive-it.org/11501/20201127124453/https://www.agriculture.gov.ie/media/migration/forestry/publications/codeofbestforestpractice/Code%20of%20Best%20Forest%20Prac%20Part%202.pdf
[12] https://www.hse.gov.uk/pesticides/commodity-substances/commodity-substance-urea.htm
[13] Forestry and Water Quality Guidelines https://www.gov.ie/pdf/?file=https://assets.gov.ie/237003/fbb5bd09-4e89-4282-bb03-e76eca41cda6.pdf#page=null

[14] Forest Harvesting and the Environment Guidelines https://www.gov.ie/pdf/?file=https://assets.gov.ie/237005/90136892-316e-4bf2-af30-6d39eca5e843.pdf#page=null

Weather conditions
The application of chemicals is subject to suitable weather conditions to prevent drift and runoff.

Many of the mitigating measures recommended in this ESRA are already described in the Integrated Pest Management Strategy and associated Forest Management Policies implemented by the Irish Forestry Unit Trust (IForUT).

IForUT Policy

IForUT is committed to sustainably managing their forest resource and only subscribe to pesticide use as a last resort. However, the preventative use of Urea in conifer plantations is considered best practice and the decision to use this substance may be the subject of felling licence conditions, which then have to be adhered to.

It is IForUT policy to:

- Assess each site on an individual needs basis and have a clear rationale to justify chemical usage as opposed to non-chemical alternatives.
- When chemical control is deemed necessary, only use chemicals which are fully approved as safe to use in forestry in Ireland by the DAFM's Pesticide Registration and Control Division (PRCD).
- When chemical control is deemed necessary, comply with the FSC® Pesticide Policy.
- Record usage and monitor effectiveness of chemical applications.
- Comply with statutory legislation on health and safety and environmental and water protection.
- Only use operators who are fully trained in safe handling and use of chemical pesticides, health and safety and environmental aspects of the use of chemicals.
- Reduce chemical usage as a long-term goal.
- Continue to investigate and review non-chemical alternative weed control methods, as part of IForUT's commitment to sustainable management of their forest estate.
- Employ mitigating measures as outlined in this ESRA and in its Integrated Pest Management Strategy (IPMS) and associated policy and procedural documents and operation contracts.
- Keep records of all site visits to monitor/supervise operations.

Where chemical control is deemed warranted, it is IForUT policy to always manually apply chemicals carefully and directly to the targeted area. In the case of Urea the application is directly to the stumps and may be applied as part of the harvesting operation by the harvesting machine head. Buffer zones (setbacks) are strictly observed and no chemicals are applied near watercourses or other sensitive natural features.

It is IForUT policy to only apply Urea where necessary or where legally obliged as part of a Felling Licence condition. Urea is only applied to sites that are being re-planted with conifer crops. Due to the minimal risk of Fomes in cold and waterlogged soils, Urea will generally not be applied in upland peat sites. Urea will generally not be applied on sites where there are biodiversity conservation reasons for not doing so, e.g. water buffer zones adjacent to rivers and lakes.

The IForUT Integrated Pest Management Strategy (IPMS) also outlines its strategy in this regard and outlines steps that will be undertaken in first instance to prevent any unnecessary action to be undertaken, to identify and monitor pests to ascertain whether any action will have to be undertaken and to identify whether alternatives such as mechanical or biological methods can be used.

It is IForUT policy to erect notices in the forest area, prior to the application of chemicals, to inform the public where and when chemicals are being sprayed.
Given the low-risk nature of Urea when used correctly under controlled forestry conditions, and the fact that these applications are considered standard best practice during forestry operations and that these applications are made during operations at the harvesting site, which will be closed to the general public, the standard felling site notices and health & safety safeguards for harvesting operations should suffice.

It is IForUT policy to ensure that Urea solutions on harvesting sites are retained in secure double skin tanks to minimise the risk of accidental spillage.

Waste Management

The product labels for pesticide products contain information for the disposal of empty containers including triple rinsing containers and not re-using empty product containers. The IForUT waste policy with recommendations for responsible waste management in accordance with EPA and PRCD[15] guidelines is included in its IPMS and associated policy and procedural documents and operation contracts. Disposal of empty containers through a registered waste disposal service [16] is recommended. All spent oil, machine parts and refuse generated by the operation should also be removed from site after forestry operation has ceased.

[15] Good Practice Guide for Empty Pesticide Containers
https://www.pcs.agriculture.gov.ie/media/pesticides/content/sud/Good_Practice_Guide_for_empty_pesticide_containers.pdf
[16] Example of farm plastics recycling facility: https://www.farmplastics.ie/

ESRA - Environmental and Social Risk Assessment

This ESRA takes into account the potential risk of Urea to:

1. Worker Health & Safety
2. The Environment
3. Social risk and the wider public

and outlines mitigating measures to be undertaken

1. Worker Health & Safety

The risk to workers from the use of Urea as a fungicide is considered low when applied in accordance with best practice. The operator must comply with best practice when handling pesticides. Operators must wear suitable nitrile protective gloves and face protection when mixing Urea solution. If handling or applying pre mixed Urea, it is still advisable to wear gloves. Operators should also adhere to recommended mitigations for use of any chemical:

- Care should be taken when handling.
- Contact with skin and eyes should be avoided
- The use of protective clothing is mandatory.
- Care should be taken not to breathe spray.
- Workers should not eat, drink or smoke while working with chemicals.
- Chemicals should be kept away from foodstuffs and beverages.
- All protective clothing should be washed thoroughly after use, especially the insides of gloves.
- Hands and exposed skin should be washed thoroughly before eating and drinking/smoking/after work.
- Chemicals should be kept away from children
- Chemicals should be kept only in the original container

The above precautions should be universally applied when using chemicals and it is assumed that trained operators are aware of these precautions. (See also FISA Safety Guide 202 'Application of pesticides by hand-held equipment')

Where Product Labels are available, contractors will be expected to follow the instructions on the pesticide product label including those related to Personal Protective Equipment (PPE), application rates and equipment suitability.

Mitigating Measures:
It is IForUT Policy that best practice will be followed for all forestry operations, which includes adherence with the suite of DAFM environmental and water guidelines and requirements.

Application of Urea is generally the subject of Felling Licence conditions, in which case DAFM conditions should be adhered to.

Prior to any chemical application, it is IForUT policy to undertake Operational Planning, including EIAs and Health & Safety checklists, and all operations require signed contracts and are supervised by the Forestry Works Manager.

Operators must have:

- Appropriate training certificate for Pesticide Application
- Appropriate PPE (PPE should be worn at all times)
- First Aid Certificate
- First Aid Kit on site (containing sufficient eye wash for emergency use)
- Spill Kit on site containing a supply of absorbent material to deal with accidental spillage
- Public Liability & Employer Liability Insurance
- Suitable equipment which is in good working order

Operators will be provided by the Forest Manager with

- FISA Safety Guide 202 'Application of pesticides by hand-held equipment'
- Hazard and Sensitivities Map
- Pollution Control Plan
- Emergency Response Details and Contact Numbers
- Site Risk Assessment/Site Environmental Impact Assessment
- Operation Contract to be agreed and signed before commencement of work
- Signage to be erected to inform the Public of operations[*)]
- Chemical Usage Record for completion (containing section for reporting ill effects)

Monitoring & Control Measures:

Forest Managers will undertake (and record) supervision visits to check that:

- Health & Safety procedures are followed
- risk assessment controls are being adhered to
- industry best practice guidelines is being applied
- all site sensitivities are protected
- no ill-effects are being reported

Forest Managers will:

- Collect/complete chemical usage record
- Check all works are completed to specification and contract.
- Check all waste material and storage containers are removed from site and disposed of appropriately.
- Follow up on any ill-effects as soon as reported

[*)] Given the low-risk nature of Urea when used correctly under controlled forestry conditions, and the fact that these applications are considered standard best practice during forestry operations and that these applications are made during operations at the harvesting site, which will be closed to the general public, the standard felling site notices and health & safety safeguards for harvesting operations should suffice.

2. The Environment

Urea fertiliser utilised as a fungicide is not expected to pose an unacceptable risk to consumers, operators, bystanders or the wider environment, if applied according to the conditions as set out in this ESRA.

If Urea is stored, handled and used according to manufacturers' instructions and environmental guidelines, it poses a minimal risk to operators and a limited risk to the environment. However, urea is soluble in water and therefore care should be taken to keep it out of surface water drainage systems that discharge to the environment.[17]

DAFM Guidance specifies: Store and prepare all chemicals, Urea, fuel and machine oils at a dry, elevated location on site at least 50 metres from the nearest aquatic zone and at least 20 m from the nearest relevant watercourse. Do not utilise water, habitat or archaeological setbacks for this purpose. DAFM Guidance further specifies: Do not apply Urea to stumps within 10 metres of any relevant watercourse or aquatic zone.[18]

Care must be taken to prevent nutrient runoff to watercourses, particularly in sensitive catchments.

Mitigating Measures:

It is IForUT Policy that best practice will be followed for all forestry operations, which includes adherence with the suite of DAFM environmental guidelines and requirements.

If flowing watercourses are present, the Forest Managers shall:

- Ensure that the site operatives observe all buffer zones (set backs) in relation to any of the watercourses present.
- Make sure that site operatives are in possession of risk assessment, pollution control plan, emergency contact numbers and site hazards and sensitivities map.
- Ensure that contractors have suitable facilities for preparation, cleaning and maintenance such that any spillage or run off will be prevented from entering watercourses.
- Check that site operatives fully understand the site hazards and sensitivities map and can easily identify such features on the ground.
- Familiarise him/herself with catchment and weather forecasts for the duration of operations.
- Stop operations, if at any point the mitigation measures identified are not proving adequate protection and
- Carry out emergency remedial works, if required, including monitoring water quality if required.

Operators must have:

- Appropriate training certificate for Pesticide Application
- Appropriate PPE (PPE should be worn at all times)
- First Aid Certificate
- First Aid Kit on site (containing sufficient eye wash for emergency use)
- Spill Kit on site containing a supply of absorbent material to deal with accidental spillage
- Public Liability & Employer Liability Insurance
- Suitable equipment which is in good working order

[17] https://ukfisa.com/Safety/Safety-Guides/ureaadblue-storage-handling-best-practice

[18] Standards for Felling and Reforestation https://www.gov.ie/pdf/?file=https://assets.gov.ie/240285/ea3862d4-e2a4-4475-8333-40b4306e0633.pdf#page=null

Operators must ensure that:

- Any washings be used as part of the application programme and that water for the programme is not abstracted[19] on site unless it is put in an intermediate container or the sprayer is fitted with a device preventing back siphoning.
- Preparation, cleaning and maintenance is only undertaken at suitable sites such that any spillage or run off will be prevented from entering watercourses
- Only the required amount of diluted solution is prepared for the areas to be treated.

Operators will be provided by the Forest Manager with:

- FISA Safety Guide 202 'Application of pesticides by hand-held equipment'
- Hazard and Sensitivities Map
- Pollution Control Plan
- Emergency Response Details and Contact Numbers
- Site Risk Assessment/Site Environmental Impact Assessment
  (Including Risk Assessment on storage of chemicals in original manufacturer containers on site in locked containers during work hours. No chemicals will be stored on site outside work hours.)
- Operation Contract to be agreed and signed before commencement of work
- Signage to be erected to inform the Public of Spraying operations*)
- Chemical Usage Record for completion

Monitoring & Control Measures:

The Forest Manager will undertake (and record) supervision visits to check that:

- Health & Safety procedures are followed
- risk assessment controls are being adhered
- industry best practice guidelines is being applied
- all site sensitivities are protected

The Forest Manager will:

- Collect/complete pesticide application record
- Check all works are completed to specification and contract
- Check all waste material and storage containers are removed from site and disposed of appropriately

*) Given the low-risk nature of Urea when used correctly under controlled forestry conditions, and the fact that these applications are considered standard best practice during forestry operations and that these applications are made during operations at the harvesting site, which will be closed to the general public, the standard felling site notices and health & safety safeguards for harvesting operations should suffice.

[19] Taking water from a surface source (such as a river, stream or canal)

3. Social risk and the wider public

Forests near urban areas are more likely to be used for recreation (e.g. hiking, walking, dog walking, cycling) and some forests may be used for foraging for herbs, berries or mushrooms. Some forests may have third party rights, such as rights of way, shooting or fishing rights. These types of access will be taken into consideration in the decision making process.

The application of Urea is generally the subject of a Felling Licence condition and takes place as part of forestry operations at the operation site, which will be closed to the public. **The application of Urea poses a very low risk to the public**.
Standard Mitigating Measures to protect the Public during Chemical applications therefore do not fully apply. Mitigating measures should follow the best practice guidance with regards to protecting the public during forestry operations.

Mitigating Measures:

It is IForUT Policy that best practice will be followed for all forestry operations, which includes adherence with the suite of DAFM environmental guidelines and requirements.

Where access to the forest is provided to the public, access to routes leading to work sites will be closed off and notices shall be posted to inform the public of forest operations.

All forestry applications will be stopped if an unauthorised person enters the work site.

Local caretakers, immediate neighbours, and people with third party access rights will be informed in advance of forestry operations.

All other mitigations as listed under point 1 and 2 also apply.

4. Guidance Note

This ESRA should be read in conjunction with the following IForUT FMM documents:

3. Health & Safety Policy
3.0 Health & Safety Policy Statement

4. Management Planning
4.1.16 Pesticide Usage Policy

4.8 IForUT Integrated Pest Management Strategy

5. Operational Procedures
5.13 Chemical Application Procedure
5.19 Monitoring Plan
5.22 Water Quality Monitoring

6. Contract Documentation
6.1 Hazard Identification & Risk Assessment (HIRA)
6.4 Emergency Contact Details
6.5 Pollution Plan & Site Safety Rules
6.8 General Operations Contract
6.12 Pesticide Usage Record
6.18 ESRA Operational Checklist

Best Practice Guidance
FISA Guide 202 'Application of pesticides by hand-held equipment'
DAFM Good Plant Protection Practice[20]

This ESRA contains requirements designed to control, and mitigate against, the risks associated with the application of chemicals to operators, the environment and the wider public and represents best practice in the use of pesticides.

The above suite of documents are designed to assist the Forest Manager in implementing the controls and mitigating measures outlined in this ESRA in practice at FMU level, through the use of pre-commencement checklists, monitoring of operations and detailed record keeping when the operations have been completed.
The monitoring intensity is determined by the scale and intensity of the operation, the level of experience of the contactors and the risks imposed.

20 https://www.pcs.agriculture.gov.ie/media/pesticides/content/sud/professional/Good%20Plant%20Protection%20PracticeGPPP040624MLU050624.pdf