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**FSC GUIDANCE DOCUMENT
FSC-GUI-30-001**

**FSC Pesticides Policy:
Guidance on implementation**



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Guidance Document

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The Forest Stewardship Council (FSC) is an independent, not for profit, non-government organisation based in Bonn, Germany.

The mission of the Forest Stewardship Council is to support environmentally appropriate, socially beneficial, and economically viable management of the world's forests.

FSC develops, supports and promotes international, national and provincial standards in line with its mission; evaluates, accredits and monitors certification bodies which verify the use of FSC standards; provides training and information; and promotes the use of products that carry the FSC logo.

Summary

FSC's revised policy on pesticides (*FSC-POL-30-001 FSC Pesticides Policy (2005)*) was approved by the FSC Board of Directors in December 2005.

The policy is designed to implement the relevant requirements of the FSC Principles and Criteria for Forest Stewardship and has three main elements:

- The identification and avoidance of highly hazardous pesticides;
- Promotion of 'non-chemical' methods of pest management as an element of an integrated pest and vegetation management strategy;
- Appropriate use of the pesticides that are used.

The policy requires the establishment of indicators and thresholds for the identification of pesticides recognised by FSC as being particularly hazardous, based on their active ingredients. These indicators and thresholds and the resulting list of pesticides recognised by FSC as being 'highly hazardous' are listed in this FSC Guidance document.

The FSC Pesticides policy prohibits the use of these 'highly hazardous' pesticides in FSC-certified forest management units unless such use has been explicitly justified on specified grounds and is supported by a broad range of national stakeholders (social, environmental and economic). In these circumstances the FSC Board of Directors may approve a 'derogation' for the specified use in a defined geographical area (usually national or sub-national). This Guidance document describes the basis on which applications for derogations may be justified, and the procedures for review and decision-making on derogation requests.

Finally, this Guidance document recognises that further work is required in relation to general requirements for minimising pesticide use in FSC-certified forests, and for the appropriate measures to minimise risk when pesticides are used. This document will be revised and updated as and when this work is completed.

FSC Pesticides Policy: guidance on implementation
FSC-GUI-30-001

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Introduction

FSC's mission is to promote environmentally appropriate, socially beneficial and economically viable management of the world's forests.

“Environmentally appropriate forest management ensures that the harvest of timber and non-timber products maintains the forest's biodiversity, productivity, and ecological processes.

“Socially beneficial forest management helps both local people and society at large to enjoy long term benefits and also provides strong incentives to local people to sustain the forest resources and adhere to long-term management plans.

“Economically viable forest management means that forest operations are structured and managed so as to be sufficiently profitable, without generating financial profit at the expense of the forest resource, the ecosystem, or affected communities. The tension between the need to generate adequate financial returns and the principles of responsible forest operations can be reduced through efforts to market forest products for their best value”.

(extract from FSC By-laws, 1994)

As a tool to achieve its mission FSC has developed and implements an international, voluntary conformance assessment scheme applicable to forest management. FSC's Principles and Criteria of Forest Stewardship (FSC-STD-01-001) is the international standard against which all FSC-certified forests and plantations are evaluated. The FSC Principles and Criteria provide the international 'level playing field' to which all FSC-certified forest and plantation managers operate. Specific indicators and means of verification may then be developed at the national or sub-national levels in order to take account of variations in ecological, social, environmental and institutional conditions within this consistent international framework.

Products from forests which are certified as meeting the requirements of the FSC Principles and Criteria can be marketed to businesses and consumers as 'FSC-certified', and through the use of FSC's internationally recognised labels.

In relation to pesticides, the FSC Principles and Criteria aim to minimise the negative environmental and social impacts of pesticides use whilst promoting economically viable management of the world's forests. The FSC label is a 'green' label, indicating high levels of social and environmental performance. FSC requirements commonly exceed the minimum legal obligations applicable to every company within a particular jurisdiction.

FSC takes a precautionary approach to pesticide use, in part because experience has repeatedly shown the difficulty of ensuring consistent proper use, and the limits of knowledge of the ecological and environmental impacts of pesticides and the consequent unforeseen consequences of their use.

A policy to implement these objectives was first approved by the FSC Board of Directors in May 2002, after extensive consultation. The policy was reviewed and revised during 2005. A substantially shorter policy was approved by the FSC Board of Directors in December 2005, together with this associated guidance document.

The policy and the associated guidance specify the correct implementation of the FSC Principles and Criteria as applicable to pesticide use, for the benefit of certification bodies, their clients, and other stakeholders.

2. The FSC Principles and Criteria of Forest Stewardship

The FSC Principles and Criteria were developed through a multi-stakeholder consultative process incorporating the views and concerns of forest companies, environmental and social NGOs, academics and others. They are approved by the FSC membership. They may be revised on the basis of a vote of the FSC General Assembly, requiring the consensus support of the members of the three FSC chambers (social, environmental and economic), North and South.

Definitions

FSC has adopted the following definitions of the terms 'pest' and 'pesticide', approved by the FSC Board of Directors in December 2005:

Pest: Organisms, which are harmful or perceived as harmful and as prejudicing the achievement of management goals. Some pests, especially introduced exotics, may also pose serious ecological threats, and suppression may be recommended. They include animal pests, plant weeds, pathogenic fungi and other micro-organisms.

Pesticide: Any substance or preparation prepared or used in protecting plants or wood or other plant products from pests; in controlling pests; or in rendering such pests harmless. (This definition includes insecticides, rodenticides, acaricides, molluscicides, larvaecides, fungicides and herbicides).

The FSC Principles & Criteria of Forest Stewardship (approved in 1994, revised in 2000) include the following criteria relating to the use of pesticides:

Criterion 6.6

(1) Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides.

(2) World Health Organization Type IA and IB and chlorinated hydrocarbon pesticides; pesticides that are persistent, toxic or whose derivatives remain biologically active and accumulate in the food chain beyond their intended use; as well as any pesticides banned by international agreement, shall be prohibited.

(3) If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks.

Criterion 10.7

(1) Measures shall be taken to prevent and minimize outbreaks of pests, diseases, fire and invasive plant introductions.

(2) Integrated pest management shall form an essential part of the management plan, with primary reliance on prevention and biological control methods rather than chemical pesticides and fertilizers.

(3) Plantation management shall make every effort to move away from chemical pesticides and fertilizers, including their use in nurseries.

(FSC-STD-01-001 FSC Principles and Criteria for Forest Stewardship)

3 The FSC approach to the use of pesticides

FSC's approach to the implementation of the applicable FSC Criteria was developed through a series of draft proposals and background papers between December 1999 and May 2002, and revised in 2005.

The FSC Criteria include three core elements:

- The identification and avoidance of highly hazardous pesticides;
- Promotion of 'non-chemical' methods of pest management as an element of an integrated pest management strategy;
- Appropriate use of the pesticides that are used.

To date, FSC policy has focused primarily on the first of these elements: the avoidance of highly hazardous pesticides. This guidance document follows this precedent, since it is this element that has attracted most comment. The remaining elements are introduced briefly in Sections 5 and 6 of this paper but are not covered in detail. FSC recognises that further guidance needs to be developed focussing on the remaining elements.

4 Identification, avoidance and control of highly hazardous pesticides

4.1 Overview

The FSC pesticides policy recognises the distinction between hazard and risk. Hazard refers to the inherent danger in a situation. Risk recognises that the inherent danger may be limited by specific controls. The overall risk may be reduced both by identifying and avoiding hazard, and also by taking steps to control hazards which have been identified.

FSC policy follows this two-step approach. The chemical properties of pesticides are generally hazardous, but some are more hazardous than others. FSC Criterion 6.6 lists aspects of hazard that FSC considers (e.g. persistence, toxicity, etc). FSC has then specified technical indicators by which each identified element of hazard may be objectively evaluated (e.g. LD50 value as an indicator of toxicity) and specified a threshold above which a particular pesticide is considered 'highly hazardous' and below which it is considered 'less hazardous' (e.g. . LD50 < 200 mg/kg for mammals is 'highly hazardous', LD50 > 200 mg/kg for mammals is 'less hazardous').

Annex I of this guidance document specifies the complete set of indicators and thresholds used for the identification of 'highly hazardous' pesticides. Annex II lists the active ingredients which exceed these thresholds and which are therefore identified by FSC as being 'highly hazardous'.

The listing of a pesticide as 'highly hazardous' does not mean that the pesticide cannot be used under any circumstances. Nor does the fact that a pesticide is not on this list mean that it is 'safe'. Inclusion on the list means that FSC considers the pesticide as highly hazardous in relation to one or more of the specified indicators. In order to reduce the risk of negative environmental or social impacts these pesticides should be avoided if possible, and should only be used in FSC-certified forests and plantations if there is no viable alternative. This implies that less hazardous (or no) pesticides should be preferred, and that ultimately, if possible, use of the most hazardous pesticides should be eliminated.

Pesticides that are included on the FSC list of 'highly hazardous' pesticides may not therefore be used in FSC-certified forests unless there is no viable alternative and such use is recognised by social and environmental as well as economic stakeholders at the national

and/or sub-national levels as being necessary for the effective promotion of forest stewardship.

In order to implement this, FSC requires that managers wishing to use these highly hazardous pesticides must justify such use through a specific process which includes consultation with social, environmental and economic stakeholders. This is the ‘derogation’ process, described in more detail in Section 4.4 of this paper.

In summary the FSC approach to the use of highly hazardous pesticides is as follows:

STEP ONE		STEP TWO
<p>Is a pesticide highly hazardous for one or more of the elements specified? (i.e. is it included on the <i>FSC list of highly hazardous pesticides</i>?).</p>	<p>IF YES:</p>	<p>Do not use the pesticide, OR, if there is no viable alternative, justify a derogation with the support of national and/or sub-national social and environmental, as well as economic, stakeholders.</p> <p>If a derogation is approved, the pesticide may be used under the conditions specified in the derogation. Other FSC and national requirements (e.g. safe use, training of operatives) continue to apply.</p>
	<p>IF NO:</p>	<p>The pesticide may be used without a specific derogation, so long as the other FSC requirements (e.g. consideration of alternatives, safe use, training, disposal, etc.) are met, <i>AND</i> the pesticide is used in accordance with national legislation and regulations for its use.</p>

Table 1. Overview of FSC approach to use of pesticides.

This two-step description is a simple illustration of FSC’s overall approach in relation to one aspect of pesticide use, based on evaluation of hazard. It is NOT intended to act as a full decision support framework for the use of pesticides and should not be used as such.

The following sections specify the indicators and thresholds that have been used by FSC to identify the list of highly hazardous pesticides, and then describe in more detail the elements that need to be addressed in order to justify a derogation for the use of these pesticides in an FSC-certified forest or plantation.

4.2 Indicators and thresholds for highly hazardous pesticides

Criterion 6.6 of the FSC Principles and Criteria identifies the general properties of pesticides that should be evaluated in the determination of hazard. These properties are:

- Persistence
- Toxicity (chronic or acute toxicity to non-target organisms)
- Biological activity and accumulation in the the food chain

In order to evaluate these properties effectively FSC considers the following aspects:

- Carcinogenicity
- Mutagenicity
- Endocrine disruption
- Presence of heavy metals
- Presence of dioxins (including dioxins in the by-products of burning)

In addition, FSC Criterion 6.6 identifies as highly hazardous pesticides which are, or include:

- Chlorinated hydrocarbons
- Chemicals identified by the World Health Organization (WHO) as either "Extremely Hazardous" (Class 1A) or "Highly Hazardous" (Class 1B)
- Pesticides which are banned by international agreement.

FSC pesticides policy specifies objective indicators and thresholds for the identification of particularly hazardous pesticides in relation to each of these aspects. The basis for selection of these indicators and thresholds was discussed in detail in the paper *Use of Chemical Pesticides in Certified Forests: clarification of FSC criteria 6.6, 6.7 and 10.7* (Radosevich, S., M.Lappé & B.Addlestone (2000) FSC-USA), and reviewed in detail in *Review of the Forest Stewardship Council's Pesticide Indicators and Thresholds* (2005) PAN-UK.

Review and revision of Indicators and thresholds

Clearly, the choice of thresholds is a socially determined decision, and in this sense is arbitrary. It should be emphasised that arbitrary does not mean 'non-objective'. A similar observation can be made about speed limits: there is a general correlation between speed and road accidents. Imposing speed limits is a recognised way to reduce fatalities. Whether the maximum speed limit is 100 km/hour, 110 km/hour or some other speed is arbitrary and is a socially determined decision. But the specification of speed as an indicator of hazard and the specification of 100km/hour (for example) as a threshold, are clearly objective and rational elements of a policy for road safety. No one needs to claim that speed is the only relevant factor in road accidents – clearly it is not. But a speed limit *is* a simple, practical and rational way of reducing deaths on the roads.

In the case of FSC policy the choices of indicators and thresholds were first specified in 2002 after consideration of existing norms used by organisations such as the WHO and US Environmental Protection Agency (EPA) followed by extensive consultation with social, environmental and economic stakeholders.

The specified thresholds remain under review and will be revised if necessary.

4.3 FSC list of highly hazardous pesticides

FSC has attempted to identify the active ingredients of all the pesticides which are commonly used in forest, plantation and nursery use worldwide. These active ingredients have then been evaluated against the indicators and thresholds specified in Annex I. The resulting FSC list of 'highly hazardous' pesticides is presented in Annex II. This list will continue to be reviewed and updated.

The most recently published version of this list shall be considered definitive at any point in time. Certification bodies are not expected to carry out their own evaluations of pesticides used by applicant or certified clients to determine whether the active ingredients or formulations exceed the thresholds specified by FSC.

Certification bodies shall check whether the active ingredient of any pesticide in use in a forest applying for certification is included on the FSC list of 'highly hazardous' pesticides. If a pesticide is not on the list then a derogation is not currently required. The list will be

regularly reviewed and updated by FSC. Updated lists will become effective on January 1st of each year. If an active ingredient or particular formulation (see below) is added to the list, then the managers of a certified forest currently using the newly listed pesticide will be permitted until the end of the year in which the pesticide is added to the list (i.e. a 12 month period) to phase out their use of any pesticides containing this ingredient or formulation, or to seek and receive a formal derogation for continued use.

Certification Bodies have a duty to inform their clients promptly of any additions to the list of highly hazardous pesticides, to ensure that their clients have enough time to phase out their use or apply for a derogation if needed.

Formulations

Pesticide formulations including the use of wetting agents, propellants, surfactants, solvents, etc. can all affect the value of the indicators specified in Annex I, either positively or negatively. However reliable information on the effects of these variables on particular formulations is not widely and publicly available. The FSC list of highly hazardous pesticides has therefore been based on an evaluation of active ingredients only. The impacts of formulations shall in future be accounted for as follows:

Formulations that reduce the level of hazard may be taken into account through the derogations process described in Section 4.4, below. If a derogation application clearly demonstrates that the formulation reduces the value of an indicator for the active ingredient to below the specified threshold, then a derogation for the use of the active ingredient in such a formulation may be approved.

NOTE: Dilution or equivalent effects would not be considered to reduce the value of the indicator *for the active ingredient*.

Advice that specified formulations increase the level of hazard will be reviewed, and specific formulations may be added to the list of highly hazardous pesticides in future revisions.

Mitigating factors

Specific factors such as soil type in the area of application, distance from water courses, rate, method and frequency of application are factors which may reduce the risk associated with the application of hazardous pesticides.

These factors may be taken into account in the consideration of requests for derogations (see Section 4.4, below), but do not affect the hazard classification of the active ingredients themselves.

4.4 Derogations and major non-compliances

In accordance with the FSC policy FSC-certified forest and plantation managers may not use pesticides containing the active ingredients listed on the *FSC list of highly hazardous pesticides* except in specific circumstances authorised by the FSC Board of Directors through the issue of a formal derogation, or through the approval of a national or sub-national FSC Forest Stewardship Standard.

In the absence of an approved derogation the use of a pesticide on the FSC list of highly hazardous pesticides shall be considered as a major non-compliance with the requirements of *FSC-STD-01-001 FSC Principles and Criteria of Forest Stewardship*. The procedures for applying for a formal derogation are summarised in Section 4.7, below.

Derogations for use of a 'highly hazardous' pesticide may be issued for a specified territory where:

- there is a **demonstrated need**;
- there are **specified controls** in place to mitigate the associated hazard, and/or the formulation has been clearly demonstrated to reduce any indicators of concern to a level below the associated threshold for the indicator;
- there is an ongoing **programme in place to identify alternatives**;
- the requested derogation is **supported by stakeholders** representing social, environmental and economic interests in the specified territory;

If approved, derogations are normally applicable for a five-year period. There is a presumption against renewal at the end of this five-year period unless it can be clearly demonstrated that the programme to identify alternatives has been fully implemented but has failed to identify an acceptable alternative in the available time. Therefore, forest managers using a derogated pesticide shall demonstrate that:

- there is a **contingency plan in place for the elimination of the pesticide's use** at the forest management unit level before the expiry of the derogation period.

Each of these elements is described below:

Demonstrated need

Need may be demonstrated where:

- The pesticide is used for protecting native species and forests against damage caused by introduced species or for protecting human health against dangerous diseases, OR
- Use of the pesticide is obligatory under national laws or regulations, OR
- Use of the pesticide is the only economically, environmentally, socially and technically feasible way of controlling specific organisms which are causing severe damage in natural forests or plantations in the specified country (as indicated by consideration, assessments and preferably field-trials of alternative non-chemical or less toxic pest-management methods)

Specified controls to mitigate the hazard

The derogation shall specify the controls that will be implemented to mitigate the hazard associated with the use of the pesticide, for example restrictions related to weather conditions, soil types, application method, water courses, etc..

If the specified formulation is considered to reduce the level of hazard then the information on which this claim is based shall be presented, and the applicant shall provide credible independent, third party support for the claimed reduction of hazard.

Programme to identify alternatives

The application shall describe the programme(s) which are in place in the territory concerned or which will be put in place during the period over which the derogation will be applicable, designed to identify alternative pest control methods which do not use highly hazardous pesticides.

Stakeholder support

All applications for derogations shall include presentation of evidence that the application is supported by social, environmental and economic stakeholders in the best interests of promoting FSC's goals in the territory concerned. It is the responsibility of the applicant to present this evidence in support of their application (see summary of procedures in Section 4.7, below).

The level of stakeholder support required will be evaluated taking account of the geographical scope of the derogation, the justification of need, and other factors included in the application such as the strength of the programme to identify alternatives, and the level of controls to mitigate the identified hazards.

A written letter of support by the Board of Directors of the FSC National Initiative for the territory concerned will normally be considered sufficient evidence of national stakeholder support for the application.

Contingency plan to eliminate use of the pesticide during the derogation period

Derogations will normally be issued for a five-year period. There will be a presumption against renewal of a derogation after the expiry of the five-year period unless it can be clearly demonstrated that the programme to identify alternatives has been fully implemented but has failed to identify an acceptable alternative in the available time.

Forest managers seeking certification under an approved derogation shall therefore ensure that they have a contingency plan in place with the objective to eliminate use of the pesticide prior to the end of the derogation period. If a derogation is not renewed, the continued use of a highly hazardous pesticide after the expiry of the derogation shall be considered a major non-compliance and shall lead to the withdrawal of the certificate.

As a condition of use of a derogated pesticide, forest managers shall be required to record quantitative and qualitative information about their use of such a pesticide, and this information shall be included in the certification body's evaluation reports and in all subsequent surveillance reports (see Section 4.8, below).

Compliance with these requirements shall be demonstrated by an applicant for certification at the Forest Management Unit (FMU) level and be verified by the certification body prior to the issue of a certificate. However, this evaluation is independent of the decision to issue a derogation for use of a pesticide over a geographical area.

A template for the presentation and evaluation of derogation requests in accordance with this guidance is included as an annex to the FSC procedure *FSC-PRO-01-004 Processing applications for derogations to FSC Pesticides Policy (2005)*.

An up to date list of approved derogations is published separately as *FSC-GUI-30-001a Approved derogations for the use of highly hazardous pesticides in FSC-certified forests and plantations*.

4.5 National and sub-national FSC standards

The system for the issue of derogations emphasises the need for national or sub-national stakeholder consultation and support to justify an exception to the usual implementation of the requirements of the FSC Principles and Criteria.

Where national or sub-national FSC standards are in development, the national or sub-national standards development process provides the most appropriate mechanism for such consultation and decisions on derogations. Therefore, National FSC bodies are required to consider the possible use of highly hazardous chemicals within the geographical scope of an FSC national or sub-national standard, and if necessary seek derogations at the time that such a standard is developed.

In geographical areas in which a national or sub-national standard is being developed it is the responsibility of the FSC National Initiative to consider the issue of FSC-prohibited chemicals and to include any requests for derogations, if required, within the national or sub-national standard when it is submitted to the FSC International Center for accreditation.

The criteria for justifying use of a highly hazardous chemical are the same as those specified above for territory-specific applications for approval by the FSC Board of Directors.

If standards are submitted for approval without specific requests for derogations for the use of pesticides identified by FSC as being 'highly hazardous', it is assumed that all stakeholders party to the standard agree that such pesticides shall not be used within the geographical scope of the standard unless a derogation is subsequently submitted to FSC-IC with the written support of the Board of Directors of the relevant FSC National Initiative.

4.6 Emergencies.

Emergencies may include invasions or infestations of animal pests, weed plants, certain fungal diseases, or dramatic changes in vegetation composition, which threaten ecological stability, and which cannot feasibly be controlled by conventional means.

In the case of such emergencies FSC certificate holders should take whatever action they deem necessary in the circumstances, and shall inform the issuing certification body of the action and its justification at the earliest opportunity.

The certification body shall immediately inform the FSC International Center of the situation, including an explanation of the nature of the emergency and the justification for the use of a highly hazardous pesticide in response. The FSC International Center shall review the information provided and inform the FSC Pesticides Committee.

The FSC Board of Directors reserves the right to determine that the use of highly hazardous pesticide is not justified in the absence of an approved derogation, following the normal processes. In this case the continued use of the pesticide by the forest or plantation manager shall constitute a major non-compliance, and shall lead to the withdrawal of the certificate by the certification body unless use is discontinued (or unless a derogation is approved in accordance with the normal procedures).

4.7 Implementation.

The FSC International Center has developed a specific procedure for the review and approval of derogations for the use of highly hazardous pesticides in FSC certified forests (FSC-PRO-01-004). The following provides a brief overview of the main elements.

The FSC International Center has responsibility for evaluating derogation requests and making a recommendation as to whether the application complies or does not comply with the requirements specified by FSC policy and associated guidance.

In geographical areas in which there is already an FSC-accredited or preliminarily accredited national or sub-national standard, requests for derogations for the use of 'FSC-prohibited' chemical pesticides must only be subsequently submitted to the FSC Policy and Standard

Unit (PSU) by the accredited FSC National Initiative with responsibility for that geographical area.

In geographical areas in which there is *no* FSC-accredited or preliminarily-accredited national or sub-national standard, requests for derogations for the use of 'FSC-prohibited' chemical pesticides must be submitted to the PSU by the certification body whose client(s) request the derogation.

In all cases, derogation applications are evaluated on the basis of documented evidence of compliance with the requirements of the current policy and associated guidance. In all cases it is the responsibility of the certification body seeking the derogation on behalf of a client or clients to submit application materials that demonstrate compliance with these requirements. Such materials must include evidence of stakeholder consultation and support. It is the responsibility of the certification body and not of FSC to carry out stakeholder consultation in support of a requested derogation.

Further detail is included in FSC-PRO-01-004, available from FSC on request.

4.8 Monitoring

It is essential to the credibility of the system for issuing derogations that the continuing use of pesticides is monitored both by the certification body and by FSC. The collection of basic data allows FSC to evaluate the impacts of its policy over time, and if necessary propose modifications.

FSC policy therefore requires that forest managers maintain records of their use of pesticides, and certification bodies shall be required to include basic quantitative and qualitative data on such use in evaluation and surveillance reports on FSC-certified forests and plantations.

Monitoring the use of pesticides listed as 'highly hazardous' as well as other pesticides not on the list allows FSC to ensure that the list can be readily updated. It should also allow FSC to monitor the overall impact of its policy, for example to indicate whether the avoidance of 'highly hazardous' pesticides is leading to an increased use of other pesticides.

Forest managers shall therefore be required to record at least the following information for *all* pesticides used:

- the brand name and the active ingredient(s) of the pesticide;
- the area to which the pesticide has been applied in the previous 12 months (i.e. the actual area of land for which pesticide application was considered necessary - not the 'pro-rated' area depending on whether the application was a 'spot' application, etc);
- the quantity of the active ingredient applied in the previous 12 months (i.e. the quantity of the undiluted active ingredient);
- the reason for the application(s).

The certification body shall include a copy of this information in its evaluation report, and in all subsequent surveillance reports. FSC shall then include this information in its certificate database, allowing the international monitoring of the use of such pesticides in FSC-certified forests.

5 Decision support, and integrated pest and vegetation management

FSC's requirement to avoid the use of highly hazardous pesticides should be considered in the context of the more general support for 'non-chemical' methods of pest management as an element of an integrated pest and vegetation management strategy. General requirements are specified in both FSC Criterion 6.6 and 10.7:

Criterion 6.6

(1) Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides.

Criterion 10.7

(1) Measures shall be taken to prevent and minimize outbreaks of pests, diseases, fire and invasive plant introductions.

(2) Integrated pest management shall form an essential part of the management plan, with primary reliance on prevention and biological control methods rather than chemical pesticides and fertilizers.

A lot of attention has been focussed over the past years on the identification and avoidance of highly hazardous pesticides. Much less attention has been devoted to the development of indicators and means of verification for recognising effective integrated pest management strategies, and methodologies for promoting non-chemical methods.

In the UK, work to implement forest certification standards has led to the development of a 'decision support framework' that might provide a model for use in other countries.

Well-designed integrated pest and vegetation management should be an essential part of implementing FSC standards in relation to pesticide use. FSC is committed to develop guidance on appropriate indicators and means of verification for inclusion in generic and national or sub-national Forest Stewardship Standards.

6 General requirements for use of pesticides

Finally, it should not be forgotten that the FSC Principles and Criteria include basic requirements for the proper use of pesticides when they are accepted as the most appropriate choice for pest management.

Criterion 6.6

(3) If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks.

The FSC International Center is committed to develop guidance on appropriate indicators and means of verification for the implementation of these requirements.

References

Forest Stewardship Council (2005-1) Review of the Forest Stewardship Council's Pesticide Indicators and Thresholds, PAN-UK, April 2005

Forest Stewardship Council (2005-2) FSC-DIS-01-003 PAN-UK Review of FSC Pesticides Indicators and Thresholds: FSC initial response

Forest Stewardship Council (2005-3) FSC-DIS-01-006 FSC Pesticides Policy: proposed revisions

Radosevich, S., M.Lappé & B.Addlestone (2000) Use of Chemical Pesticides in Certified Forests: clarification of FSC criteria 6.6, 6.7 and 10.7. FSC-USA.

Annex I: Indicators and thresholds for the identification of ‘highly hazardous’¹ pesticides (as of 1st January 2006)

NB: these indicators and thresholds are scheduled for review during the first six months of 2006.

Criterion (derived from FSC Principles and Criteria, 2002)	Indicator	Threshold for inclusion on FSC list of ‘highly hazardous pesticides’
Quantitative or semi-quantitative		
Acute toxicity to mammals	WHO toxicity class (active ingredients) Acute toxicity (oral LD50 for rats) (Acute) reference dose (RfD)	If acute oral LD50 for rats \leq 200 mg/kg b.w. WHO toxicity class 1a, 1b.
Acute toxicity to aquatic organisms	Aquatic toxicity (LC50)	If LC50 < 50 ug/l (microgrammes per liter)
Chronic toxicity to mammals	Reference dose	If RfD < 0.01 mg/kg day
Persistence in soil or water	Half-life in soil or water (DT50)	If DT50 \geq 100 d, ‘strongly persistent’
Bio-magnification, bio-accumulation	Octanol-water partition coefficient (KOW) or bio-concentration factor (BCF) or bio-accumulation factor (BAF)	If KOW > 1000 i.e. $\log(\text{KOW}) > 3$
Carcinogenicity	IARC carcinogen; US EPA carcinogen	If listed in any category below (a) International Agency for Research on Cancer (IARC) within Group 1: ‘The agent (mixture) is carcinogenic to humans’, or within Group 2A: ‘The agent (mixture) is probably carcinogenic to humans’ (IARC 2004); (b) US Environmental Protection Agency (EPA) defined as a chemical that is within Group A: ‘Human carcinogen’ (US EPA 1986); (c) US EPA defined as a chemical that can ‘reasonably be expected to be carcinogenic to humans’ (chemicals categorised by EPA into Group B2, see below)
Endocrine disrupting chemical (EDC)	EDC listed by the US EPA and NTP	If classified as EDC by US NTP or EPA
Mutagenicity to mammals	(not specified any further)	If mutagenic to any species of mammals
Qualitative		
Specific chemical class	Chlorinated hydrocarbon (definition from Radosevich et al, 2002): Compounds which contain only carbon, hydrogen and one or more	If chemical meets definition from Radosevich et al, 2002. Note: the 2002 policy includes the statement that “not all organochlorines

¹ Based on explicit FSC indicators and thresholds and not to be confused with the WHO classification of pesticides

Criterion (derived from FSC Principles and Criteria, 2002)	Indicator	Threshold for inclusion on FSC list of 'highly hazardous pesticides'
	<p>halogen, AND/OR</p> <p>organic molecules with hydrogen and carbon atoms in a linear or ring carbon structure, containing carbon-bonded chlorine, which may also contain oxygen and/or sulphur, but which do not contain phosphorus or nitrogen.</p>	<p>exceed the stated thresholds for toxicity, persistence or bioaccumulation, and they are not included in this list of prohibited pesticides, but they should be avoided".</p> <p>However, the current list of 'highly hazardous' pesticides does not include organochlorines unless they are excluded on the basis of other indicators.</p>
Heavy metals:	Lead (Pb), cadmium (Cd), arsenic (As) and mercury (Hg)	If pesticide contains any heavy metal as listed
Dioxins (residues or emissions)	Equivalents of 2,3,7,8-TCDD	If contaminated with any dioxins at a level of 10 part per trillion (corresponding to 10 ng/kg) or greater of tetrachlorodibenzo-p-dioxin (TCDD) equivalent, or if it produces such an amount of] dioxin[s] when burned
International legislation	Banned by international agreement	If banned by international agreement

Indicators and thresholds for the identification of 'highly hazardous' pesticides

Annex II: List of pesticides identified by FSC as 'highly hazardous'² and therefore prohibited unless a temporary derogation for use in the applicable territory has previously been approved by the FSC Board of Directors.

January 2006

NB: this list will be reviewed and may be revised on completion of the review of the associated indicators and thresholds specified in Annex I.

The chemicals listed below are used as pesticides in forestry and qualify as *highly hazardous* in relation to one or more of the indicators specified in Annex I of this guidance document. Their use is prohibited in FSC-certified forests unless a formal derogation has been approved for the use of the pesticide within the applicable territory.

The indicator(s) for which these chemicals have been identified as highly hazardous is (are) listed.

Name of chemical	Basis for inclusion on FSC 'highly hazardous' list
aldicarb	WHO Table 1, Class Ia.
aldrin	Chlorinated hydrocarbon
Aluminium phosphide	Toxicity similar to sodium cyanide. WHO Table 7.
amitrole	Carcinogenicity (Group B2, US EPA)
benomyl	Persistence: 6 - 12 months. Toxicity: LD50 100 mg/kg. LC50 60 - 140 microg/l. Mutagen
brodifacoum	WHO Table 1, Class Ia.
bromadiolone	WHO Table 1, Class Ia.
Carbaryl	Toxicity: LD50 of 100 mg/kg in mice.
chlordane	Organochlorine Persistence: half-life of 4 years. Toxicity: oral LD50 in rabbits approx. 20-300 mg/kg.
chloropicrin	Acute aquatic toxicity (PM) Chlorinated hydrocarbon containing nitrogen but not a pyridine (PM) (no exemption)
chlorothalonil	Acute aquatic toxicity (PM) Chlorinated hydrocarbon (chlorinated aromatic) (PM) [BCF (molluscs, phytoplankton)?]
cyfluthrin	Acute aquatic toxicity (PM) Chlorinated hydrocarbon (PM)
cypermethrin	Acute aquatic toxicity (PM)

² Based on explicit FSC indicators and thresholds and not to be confused with the WHO classification of pesticides

Name of chemical	Basis for inclusion on FSC 'highly hazardous' list
	Chlorinated hydrocarbon (PM) [BCF (aquatic plants, fish, insects, phytoplankton)?]
alpha-cypermethrin	Acute aquatic toxicity (PM) Chlorinated hydrocarbon (PM) [BCF (aquatic plants, fish, insects, phytoplankton)?]
zeta-cypermethrin	Acute toxicity to mammals (WHO) Acute aquatic toxicity (PM) Chlorinated hydrocarbon (PM)
2,4-D, butoxyethanol ester	Chlorinated hydrocarbon (PM) [BCF (aquatic plants, fish)?]
2,4-D, diethanolamine salt	Chlorinated hydrocarbon (PM)
2,4-D, dimethylamine (dma) salt	Chlorinated hydrocarbon (PM) [BCF (aquatic plants, fish)?]
2,4-D, 2-ethylhexyl ester	Chlorinated hydrocarbon (PM)
2,4-D, isopropylamine salt	Chlorinated hydrocarbon (PM)
2,4-D, triisopropanolamine salt	Chlorinated hydrocarbon (PM)
2-(2,4-DP), dma salt (= dichlorprop, dma salt)	Chlorinated hydrocarbon (PM) Endocrine disrupting chemical (TRI Developmental toxin)
DDT	Chlorinated hydrocarbon
diazinon	Toxicity: 0.0009 mg/kg/day. LD50 2.75 - 40.8 mg/kg.
dicamba, dma salt	Chlorinated hydrocarbon (PM) Endocrine disrupting chemical (TRI Developmental toxin)
dichlobenil	Persistence (PM) Chlorinated hydrocarbon (PM) [BCF (aquatic plants, fish, insects, molluscs, phytoplankton, zooplankton)?]
dicofol	Persistence: 60 days. Biomagnification: log Kow 4.28.
dieldrin	Chlorinated hydrocarbon
dienochlor	Organochlorine. Toxicity: LC50 of 50 microg/l in aquatic environments.
difethialone	WHO Table 1, Class Ia.
diflubenzuron	Acute aquatic toxicity (PM) Chlorinated hydrocarbon (PM)

Name of chemical	Basis for inclusion on FSC 'highly hazardous' list
	[BCF (aquatic plants, terrestrial plants, phytoplankton, zooplankton)?]
dimethoate	Toxicity: RfD 0.0002 mg/kg/day. LD50: 20 mg/kg in pheasants.
diquat dibromide	Reference dose (chronic), as the acceptable daily intake (see 3.1) (WHO 2003) [BCF (aquatic plants, fish, zooplankton)?]
diuron	Persistence (PM) Endocrine disrupting chemical (US EPA, TRI Developmental toxin) Chlorinated hydrocarbon (PM) [BCF (molluscs, phytoplankton, zooplankton)?]
endosulfan	Organochlorine. Toxicity: LD50 much less than 200 mg/kg in several mammals. RfD 0.00005 mg/kg/day.
endrin	Organochlorine. Persistence: half-life >100 days. Toxicity: LD50 <200 mg/kg. Biomagnification high in fish.
esfenvalerate	Acute aquatic toxicity (PM) Persistence (PM) Chlorinated hydrocarbon (PM) [BCF (aquatic plants, fish, molluscs, phytoplankton, zooplankton)?]
gamma-HCH, lindane	Chlorinated hydrocarbon
haloxyfop	Chlorinated hydrocarbon (PM)
heptachlor	organochlorine. Persistence: half-life 250 days. Toxicity: LD50 100-220 mg/kg in rats, 30-68 mg/kg in mice. RfD 0.005 mg/kg/day. Biomagnification: Log Kow 5.44.
hexachlorobenzene	WHO Table 1, Class Ia.
hexazinone	Persistence (PM) [BCF (fish)?]
hydramethylnon	Acute aquatic toxicity (PM) Endocrine disrupting chemical (TRI Developmental toxin, TRI Reproductive Toxin)
imazapyr	Persistence (PM)
imazapyr, isopropylamine salt	Persistence (PM)

Name of chemical	Basis for inclusion on FSC 'highly hazardous' list
mancozeb	Toxicity: RfD 0.003 mg/kg/day.
metam sodium	Carcinogenicity (Group 2B, EPA) Endocrine disrupting chemical (TRI Developmental toxin)
methoxychlor	Persistence: half-life 60 days. Toxicity: RfD 0.005 mg/kg/day. LC50 <0.020 mg/l for trout.
methylarsonic acid (monosodium methanearsenate, MSMA)	Chemical class (heavy metals) [BCF (aquatic plants, crustaceans, fish, molluscs, phytoplankton, zooplankton)?]
methylbromide	reference dose (US EPA 1993)
metolachlor	Biomagnification: log Kow 3.45.
mirex	Organochlorine. Persistence: half-life > 100 days. Toxicity: LD50 50-5000 mg/kg. Carcinogen. Bioaccumulation high.
naled	Acute aquatic toxicity (PM) Endocrine disrupting chemical (TRI Developmental toxin)
oryzalin	Persistence: Half-life 20-128 days. Toxicity: LD50 100 mg/kg in birds.
oxydemeton-methyl, Metasystox	WHO Table 2, Class Ib.
oxyfluorfen	Toxicity: RfD 0.003 mg/kg/day Log Kow 4.47
paraquat	Persistence: > 1000 days. Toxicity: RfD 0.0045 mg/kg/day. Log Kow 4.47. Reference dose (US EPA 1993) [BCF (aquatic plants, fish, phytoplankton)?]
parathion	WHO Table 1, Class Ia.
pendimethalin	Persistence (PM) The log K _{ow} of pendimethalin is 5.2, above the threshold, although it is a root-contact herbicide and thus has no systemic activity, bio-magnification is likely to be small, however, the potential for bio-accumulation of a pesticide is assessed independently of persistence. Persistent chemicals may be transferred to plants, to ground water and surface waters where they can be absorbed by other organisms. The

³ US Environmental Protection Agency (EPA) 2004: Toxics Release Inventory (TRI) Program, TRI PBT chemical list, http://www.epa.gov/tri/chemical/pbt_chem_list.htm

Name of chemical	Basis for inclusion on FSC 'highly hazardous' list
	US EPA rates Pendimethalin as a persistent, bio-accumulative and toxic (PBT) chemical ³ .
pentachlorophenol	WHO Table 2, Class Ib.
permethrin	Toxicity: Log Kow 6.10. LC50 0.0125 mg/litre in rainbow trout.
quintozene	Organochlorine. Persistence: 1 - 18 months. Toxicity: high. Biomagnification: Log Kow 4.46.
simazine	Toxicity: RfD 0.005 mg/kg/day
sodium cyanide	WHO Table 2, Class Ib. Acute toxicity to mammals (WHO) Acute aquatic toxicity (PANNA 2002) [BCF (fish)?]
sodium fluoroacetate, 1080	WHO Table 1, Class Ia.
2,4,5-T	Organochlorine Toxicity: medium to high in mammals. Often contaminated with dioxin.
tebufenozide	Persistence (PM)
terbumeton	Persistence (PM) Reference dose (US EPA 1993)
terbuthylazine	Reference dose (US EPA, Reregistration Eligibility Decision, p. 13, 1995) Chlorinated triazine: exemption [BCF (phytoplankton, zooplankton)?]
terbutryn	Reference dose (US EPA 1993) [BCF (aquatic plants, insects, phytoplankton)?]
trifluralin	Toxicity: RfD 0.0075 mg/kg/day. Log Kow 5.07. LC50 0.02 mg/litre. (under review, to be clarified)
toxaphene (camphechlor)	Organochlorine. Persistence: > 100 days, high. Bioaccumulation high.
warfarin	WHO Table 2, Class Ib.
zinc phosphide	Acute toxicity to mammals (PM)

Name of chemical	Basis for inclusion on FSC 'highly hazardous' list
	Reference dose (US EPA, Reregistration Eligibility Decision, 1998):

FSC list of highly hazardous pesticides

The list is based on data from 'Pesticide Manual' (PM 2003) and 'Pesticides Database' (PANNA 2002). The acute aquatic toxicity was assessed on the basis of data from the 'Pesticide Manual' (PM). Data used for assessing persistence is based on the 'Pesticide Manual'. Persistence refers to soil where not specified otherwise and to the mean or median value. For a few chemicals, no half-life values were available.

Bio-accumulation was examined on a qualitative basis and the corresponding studies referred to in the source (PANNA 2002) need to be consulted for deciding if the bio-concentration factor (BCF) meets the required standard. However, no pesticide is included on the list solely on account of BCF. All those pesticides that are suggested to fail the bioaccumulation requirement would be included on the basis of other indicators.

Chemicals rated by the US EPA as 'Developmental Toxin' within the Toxics Release Inventory (TRI) program are identified as endocrine disrupting chemicals (see paragraph 3.2.9 of PAN-UK review for explanation) therefore these are unacceptable on the basis of the current policy.

A chemical that is a 'chlorinated hydrocarbon' is treated as being 'highly hazardous' when no exemption can be given on the basis of current policy. A compound that contains no nitrogen within a ring structure (and is therefore not a pyridine, which differ from chlorinated hydrocarbons toxicologically) is not given an exemption in line with Radosevich et al 2000, p.7.