Guidelines for the Notification and Testing of New Substances:

Organisms

Pursuant to
The New Substances Notification Regulations
of the
Canadian Environmental Protection Act, 1999

Government of Canada
Environment Canada
Health Canada

December, 2001

Inquiries

Technical inquiries and New Substances Notifications should be addressed to:

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Environment Canada
Ottawa, ON Canada
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More information can also be obtained from the New Substances Website at http://www.ec.gc.ca/substances/

Additional copies of this report are available from the following location :

Environmental Protection Publications
Environmental Technology Advancement Directorate
Environment Canada
Ottawa, Ontario
K1A 0H3

Ces directives sont disponibles en français. On peut obtenir des copies àl'adresse suivante :

Publications du Service de la protection de l'environnement
Direction générale pour l'avancement des technologies environnementales
Environnement Canada
Ottawa (Ontario)
K1A 0H3

Although care has been taken to ensure that these Guidelines accurately reflect requirements prescribed in the *Canadian Environmental Protection Act, 1999* (CEPA 1999) and the New Substances Notification Regulations (NSNR), notifiers are advised that, should any inconsistencies be found, CEPA 1999 and the NSNR will prevail.

Abstract

This document has been prepared to assist notifiers responsible for complying with Part II.1 of the New Substances Notification Regulations (NSNR) under the *Canadian Environmental Protection Act, 1999.*

These guidelines explain how notifiers determine whether a living organism is subject to notification under the NSNRs and identify the applicable information requirements. In addition, the guidelines elaborate the technical information requirements, provide step-by-step instructions for the completion of a New Substances Notification (NSN) Form, and outline how confidential information should be treated. These guidelines conclude with an explanation of how Environment Canada and Health Canada assess the information submitted in an NSN, and the implications of assessment decisions.

Résumé

Le présent document a été préparé pour aider les déclarants responsables àobserver le *Règlement sur les renseignements concernant les substances nouvelles* de la *Loi canadienne sur la protection de l'environnement*, 1999.

Les directives expliquent en détail aux déclarants comment établir si une substance doit être déclarée en vertu du Règlement, et comment déterminer les renseignements àfournir. Elles s'appliquent aux substances qui sont des organismes en vertu de la parties II.1 du Règlement.

Les directives expliquent en détail aux déclarants comment établir si une substance doit être déclarée en vertu du Règlement et comment déterminer les renseignements àfournir. Elles renferment aussi des instructions détaillées pour remplir la Déclaration de substance nouvelle (DSN), des précisions sur les renseignements techniques exigés, ainsi qu'un aperçu du mode de traitement des renseignements confidentiels. En conclusion, on explique comment Environnement Canada et Santé Canada évaluent les renseignements fournis dans la DSN et quelles sont les conséquences des décisions d'évaluation pour les déclarants.

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List of Acronyms

CBI.....Confidential Business Information
CAB .....Commonwealth Agricultural Bureau
CEPA 1999 ..*Canadian Environmental Protection Act, 1999*
COSEWIC .....Committee on the Status of Endangered Wildlife in Canada
CRIS .....Current Research Information System
DNA .....Deoxyribonucleic acid
DSL.....Domestic Substances List
HA .....Hectares
LC50.....Lethal concentration at which 50% of the test population dies
LD50.....Lethal dose at which 50% of the test population dies
MIC.....Minimal inhibitory concentration
NIH .....National Institutes of Health (United States)
NSN .....New Substances Notification
OECD.....Organization for Economic Co-operation and Development
PCB .....Polychlorinated biophenyl
PCR.....Polymerase chain reaction
R&D .....Research and development
RNA .....Ribonucleic acid
SNAc .....Significant new activity
TSCA.....*Toxic Substances Control Act* (United States)

How to Use these Guidelines

These Guidelines have been prepared for the benefit of individuals responsible for complying with the information provisions of the New Substances Notification Regulations (NSNR) of the *Canadian Environmental Protection Act, 1999* (CEPA 1999). It is recommended that the entire text be read before a notification dossier is prepared. A sequential review of the sections will allow the reader to focus on requirements specific to his or her circumstance. The key to avoiding unnecessary delays or expenses when preparing a notification is to understand thoroughly the new substances notification program. These Guidelines are organized into 10 sections:

1. **Introduction** — explains the purpose, statutory powers, and features of the new substances notification program.

2. **Living Organisms Subject to Notification** — helps to determine whether the organism to be imported, manufactured or used must be notified.

3. **Information Requirements** — if the organism must be notified, this Section helps identify the appropriate notification group, information that must be included in the notification dossier, and the time available to provide the information to Environment Canada.

4. **Technical Information Requirements** — describes the meaning and intent of each information requirement

5. **Waiver of Information Requirements** — describes features of subsection 106(8) of CEPA 1999, which provides for the waiver of information requirements when one of several criteria is met.

6. **Pre-notification Consultation** — encourages consultation with government officials to resolve notification issues while the notification dossier is being prepared.

7. **Preparing a New Substances Notification** — provides instructions for completing and submitting a notification form.

8. **Confidential Information** — describes issues pertaining to confidential business information, such as confidentiality claims, masking of organism identity, and determining the presence of confidential substances on the Domestic Substances List.

9. **Processing a Notification** — explains what happens after a notification is received, including how a notification is processed and reviewed, and the types of correspondence the government sends to the notifier.
10. **Post-notification Responsibilities** — reviews obligations of notifiers after a notification has been submitted.

Further clarification on any topic covered by these Guidelines, can be obtained by contacting the office noted on page i of these guidelines.

Section 1 Introduction

These Guidelines provide detailed information on Part II.1 of the New Substances Notification Regulations (NSNR) for new substances that are living organisms, to clarify the obligations of notifiers and to assist with the preparation of notifications. Information pertaining to new substances that are chemicals, biochemicals, polymers and biopolymers can be found in the *Guidelines for the Notification and Testing of New Substances: Chemicals and Polymers* .

1.1 The Canadian Environmental Protection Act, 1999

The *Canadian Environmental Protection Act, 1999* (CEPA 1999), promulgated in 1988 and amended in 1999, provides the federal government the authority to address pollution issues. It addresses substances ranging from chemicals to animate products of biotechnology (i.e. living organisms). The Act takes a preventative approach by requiring that substances be identified and assessed, prior to market introduction, to determine whether they are "toxic" or capable of becoming toxic. Toxic, as defined in CEPA 1999, refers to risk to human health, the environment or its biological diversity. The Act also provides for a comprehensive "cradle-to-grave" management approach for toxic substances.

Principle amendments in CEPA 1999 concerning new substances that are living organisms include:

1. a new Part to deal specifically with animate products of biotechnology;

2. provisions for the notification of significant new activities;

3. provisions for prescribing fees; and

4. provisions for terminating the assessment period.

1.2 Overview of New Substances Provisions for Animate Products of Biotechnology under the Canadian Environmental Protection Act, 1999

The regulation of substances that are new to Canadian commerce fall under the purview of Parts 5 and 6 of CEPA 1999. New substances that are chemicals, polymers or inanimate products of biotechnology are covered in Part 5 of CEPA 1999. Part 6 of CEPA 1999 deals with new substances that are animate products of biotechnology (i.e. living organisms that are products of biotechnology).

The CEPA 1999 approach to controlling new substances is both proactive and preventative, employing a pre-import or pre-manufacture assessment process. When this process identifies a new substance that may pose a risk to health or the environment, the Act empowers Environment Canada to intervene prior to or during the earliest stages of its introduction to Canada. This ability to act early makes the new substances program a unique and essential component of the federal management of toxic substances.

Substances determined to be or suspected of being toxic or capable of becoming toxic may be controlled as necessary, including by prohibiting their import or manufacture. The assessment process begins when Environment Canada receives a notification under the New Substances Notification Regulations prepared by the company or individual that proposes to import or manufacture a new substance. New Substances Notifications must contain all required administrative and technical data and must be provided to Environment Canada by a prescribed date before manufacture, or import. Notification information is jointly assessed by the departments of Environment and Health to determine whether there is a potential for adverse effects of the substance on human health, the environment or its biological diversity. This assessment, which must be completed within a specified time, will result in:

1. a determination that the substance is not suspected of being toxic or capable of becoming toxic; or

2. a suspicion that the substance is toxic or capable of becoming toxic, which may require (i) controls on, or prohibition of, import and manufacture, or (ii) prohibition pending submission and assessment of additional information determined to be required by the departments; or

3. limiting the purpose for which a substance may be used to permit the waiver of information requirements defined under paragraph 106(8)(b) of CEPA 1999; or

4. a suspicion that a significant new activity in relation to the substance may result in the substance becoming toxic. In these cases, a significant new activity notice would be issued.

1.3 New Substances Notification Regulations for Living Organisms

Part II.1 of the NSNRs implements Part 6 Animate Products of Biotechnology of CEPA 1999 (sections 104-115) and prescribes the information as well as the time lines for the notification to Environment Canada of the manufacture or import of living organisms that are animate products of biotechnology .

The NSNRs were first published in the *Canada Gazette* in three parts. Parts I and II prescribe the process for notification of new substances that are chemicals and polymers, and Part III prescribes general administrative and testing requirements. These Regulations came into force on July 1, 1994.

Parts I and II were amended to prescribe the process for notification of biochemicals and biopolymers. Part II of the Regulations was also amended to include Part II.1, which prescribes the process for notification of new substances that are living organisms, including micro-organisms and organisms other than micro-organisms. Part II.1 of the NSNRs came into force on September 1, 1997 and was amended on March 31, 2000 to reflect the legislative changes in CEPA 1999.

Information from notifications under Part II.1 of the Regulations is used by Environment Canada and Health Canada to assess living organisms before they are imported into or manufactured in Canada. The assessment is to ensure that human health, the environment and biological diversity are protected.

The main regulatory features of the program are the establishment of classes or groups of substances; identification of administrative and information requirements; timing of notification before import, manufacture or use outside the scope of a significant new activity notice; requirements for the departments to assess information within a set time; and specification of conditions, test procedures, and laboratory practices to be followed when developing test data.

To meet the need for evaluating different categories of living organisms, information requirements are arranged into schedules for different notification groups of living organisms. Living organisms are first categorized by generic class (i.e., ,micro-organisms, organisms other than micro-organisms), and then factors such as conditions or circumstances of introduction This system of notification groups allows the government to match information requirements with anticipated concerns about the characteristics of specific notification group of living organisms and to ensure appropriate assessment of potential environmental and human health risks.

1.4 Compliance and Enforcement

Under the *Canadian Environmental Protection Act*, *1999,* Environment Canada enforcement officers may carry out inspections in order to ensure that the activities governed by the Act are in compliance with all regulatory and legislative provisions. These inspections are part of the National Inspection Plan of the Enforcement and Compliance Policy of CEPA 1999, which was established to ensure that the Act is applied throughout Canada in a manner that is fair, predictable and consistent.

Where there is sufficient evidence of a violation, enforcement officers must take the necessary and appropriate measures in accordance with the criteria set out in the Policy.

The possible responses for dealing with violations range from warnings to ticketing and prosecution. Other available measures are discussed in further detail in the Enforcement and Compliance Policy. Copies of CEPA 1999, and the Enforcement and Compliance Policy are available from any of the Environment Canada offices listed in Appendix 1.

You may also obtain information on the web site:

http://www.ec.gc.ca/enforce/homepage/english/index.htm; or
http://www.ec.gc.ca/CEPARegistry/

1.4.1 Penalties

With respect to the NSNRs, anyone convicted of an indictment under CEPA 1999 is liable to a fine not exceeding one million dollars and/or imprisonment for a term not exceeding three years. Upon summary conviction, anyone who commits an offense is liable to pay a fine of up to $200,000 and/or serve up to six months in prison.
Environment Canada will act upon violations of the regulations consistent with the Enforcement and Compliance Policy implemented under CEPA.

Section 2 Living Organisms Subject to Notification

Notification is required if the material proposed for import or manufacture is subject to the Animate Products of Biotechnology provisions of CEPA 1999 (Part 6, sections 104 to 115). In this context, materials that require notification are:

1. substances, as defined in CEPA 1999;

2. new, in the context of CEPA 1999;

3. living organisms that are animate products of biotechnology;

4. imported, manufactured or used for a significant new activity; and

5. neither excluded nor exempted from notification as specified by section 3 or subsection 106(6) of CEPA 1999 or by sections 29.16 or 29.19 of the NSNRs.

2.1 Definition of Substance

Substance is defined in section 3 of CEPA 1999 as:

> *any distinguishable kind of organic or inorganic matter, whether animate or inanimate, and includes*
>
> *(a) any matter that is capable of being dispersed in the environment or of being transformed in the environment into matter that is capable of being so dispersed or that is capable of causing such transformations in the environment,*
>
> *(b) any element or free radical,*
>
> *(c) any combination of elements of a particular molecular identity that occurs in nature or as a result of a chemical reaction, and*
>
> *(d) complex combinations of different molecules that originate in nature or are the result of chemical reactions but that could not practicably be formed by simply combining individual constituents.*

The definition of substance includes animate material such as a living micro-organism, or a living organism other than a micro-organism. Micro-organisms and organisms other than micro-organisms can be pure cultures or complex unformulated natural combinations (consortia). A pure culture of a bacterium is considered a substance, as is a complex

unformulated natural combination of micro-organisms isolated from the environment. A deliberate mixture of micro-organisms is not considered a substance (see Section 2.5.1.1 of these Guidelines).

2.2 Definition of New

The Domestic Substances List (DSL) is the sole basis for determining whether a substance is "new" for the purposes of CEPA 1999. A substance included on the DSL is considered to exist in Canadian commerce and is not required to be notified unless it is proposed for a significant new activity as indicated on the DSL. Substances not on the DSL are considered to be new to Canada and are subject to notification.

Certain organisms are implicitly included on the DSL although they are not listed individually. Consequently, these organisms are not considered "new" for the purposes of CEPA 1999 and do not require notification under the NSNRs. Organisms implicitly listed on the DSL include:

1. common domestic animals and livestock species and their progeny produced through traditional breeding, artificial insemination or surrogate hosting;

2. species of animals confined to public zoos, aquariums and circuses and their progeny produced through traditional breeding, artificial insemination or surrogate hosting; and

3. animal strains indigenous to Canada including Canadian wildlife species and their progeny produced through traditional breeding, artificial insemination or surrogate hosting.

A living organism is eligible to be included on the DSL if:

1. between January 1, 1984 and December 31, 1986 it:

(a) was manufactured in or imported into Canada; and

(b) entered or was released into the environment without being subject to conditions under any Act of Parliament or legislature of the province (subsection 105(1) of CEPA 1999); or

2. the government has received all the required information, the Minister is satisfied that the living organism has been manufactured or imported by the notifier, the period for assessing the information has expired, and no conditions specified under 109(1)(a) remain in effect.

In order to be eligible for DSL inclusion following assessment as specified in 2 above, the living micro-organism or organism other than a micro-organism must have been notified under subsection 29.11(1) or section 29.16 respectively of the NSNRs.

The DSL includes the original list for chemicals and polymers, published in the *Canada Gazette*, Part II, on May 4, 1994, all subsequent additions and deletions published in the *Canada Gazette*, Part II, including living organisms; and those living organisms implicitly included on the DSL.

2.3 Definition of Living Organism

Living organism is defined in section 104 of CEPA 1999 as

> *a substance that is an animate product of biotechnology.*

Biotechnology is defined in section 3 of CEPA 1999 as

> *the application of science and engineering in the direct or indirect use of living organisms or parts or products of living organisms in their natural or modified forms*.

As defined in CEPA 1999, biotechnology is not limited to activities involving genetic engineering. Living organisms subject to Part 6 of CEPA 1999 must be animate products of biotechnology and can be either naturally occurring or genetically modified.

2.4 Import, Manufacture or Use for a Significant New Activity

2.4.1 Import and Manufacture

Subsection 106(1) of CEPA 1999 prohibits the manufacture or import of a living organism not on the DSL unless the prescribed information and fee have been provided and the period for assessing the information has expired. The trigger for notification under this subsection of CEPA 1999 is manufacture or import of a living organism.

Exclusions from the scope of manufacture:
Certain activities involving the proliferation of organisms are excluded from the scope of what is considered to constitute manufacture. An organism (micro-organism or organism other than a micro-organism) that is not isolated from its natural environment and processed in some way, such as by selecting or promoting the growth of specific organisms, is not considered to be manufactured. As such, the following activities do not trigger the requirement to notify under the NSNRs:

1. *in situ* stimulation of organism growth by adding nutrients or altering by physical means such as tilling;

2. stimulation of organism growth in soil or sediment which is excavated for bioremediation and where the organism is not isolated from its natural environment and processed;

3. municipal and industrial wastewater treatment that does not isolate the organism from the natural environment and process the organism; and

4. composting and septic tank operations that do not isolate the organism from the natural environment and process the organism from the treated waste.

Further clarification on other activities that may not constitute manufacture can be obtained by contacting the office noted on page i of these guidelines.

2.4.2 Use for a Significant New Activity

Subsection 106(3) of CEPA 1999 prohibits the use, manufacture or import of a living organism for a significant new activity (SNAc) where the organism is listed on the DSL with an indication that the SNAc provisions apply.

Similarly, subsection 106(4) of CEPA 1999 prohibits the use, manufacture of or import for a significant new activity of a living organism *not* listed on the DSL but for which a notice has been published in the Canada Gazette indicating that the SNAc provisions apply.

A s*ignificant new activity* is defined in section 104 of CEPA 1999 as

> *in respect of a living organism, any activity that results or may result in*
>
> *(a) the entry or release of the living organism into the environment in a quantity or concentration that, in the Ministers' opinion, is significantly greater than the quantity or concentration of the living organism that previously entered or was released into the environment; or*
>
> *(b) the entry or release of the living organism into the environment or the exposure or potential exposure of the environment to the living organism in a manner or circumstances that, in the Ministers' opinion, are significantly different from the manner and circumstances in which the living organism previously entered or was released into the environment or of any previous exposure or potential exposure of the environment to the living organism.*

The SNAc provisions in CEPA 1999 (section 110 and subsections 112(3) and 112 (4)) allow the government to impose terms of use to which a manufacturer, importer or user of the organism must adhere.

Section 112(3) provides the Minister with the authority to amend the DSL to indicate that the SNAc provisions apply. Thus, the SNAc provisions allow new or existing living organisms to be listed on the DSL with an attached set of terms of use specified in the DSL amendment. This system allows for the import, manufacture and use of a living organism without notification under the NSNRs provided the person remains compliant with the terms of use stated in the SNAc notice. Persons proposing to import, manufacture or use the living organism outside of the conditions specified on the DSL are required to provide the specified information within the time frame specified in the DSL amendment.

Where a SNAc notice has been published in the Canada Gazette for a living organism that is not eligible for DSL listing, the SNAc provision allows for the notifier to continue to import, manufacture or use the living organism in accordance with the terms specified in the SNAc notice without having to re-notify the living organism under the NSNRs provided the notifier remains compliant with the terms of use stated in the SNAc notice. Persons other than the notifier proposing to import, manufacture or use the living organism are required to notify under the NSNRs in accordance with subsections 106(1) and (4) of CEPA 1999.

2.5 Substances not Subject to Part 6, Animate Products of Biotechnology, of the Canadian Environmental Protection Act, 1999

2.5.1 Exclusions from the definition of a substance

For the purposes of Part 6 of CEPA 1999, limitations on the statutory definition of substance are imposed under section 3 of CEPA 1999. Living organisms described by the following clauses do not fall within the CEPA 1999 definition of substance and are consequently excluded from notification.

2.5.1.1 "Any mixture that is a combination of substances and does not itself produce a substance that is different from the substances that were combined."

Mixtures of organisms that are deliberately prepared formulations are not considered substances and, consequently, do not require notification. However, if any constituent organism of a mixture is a new substance, that constituent is a notifiable substance.

Combinations of organisms derived from natural sources that cannot be characterized because their composition is too complex or variable are considered single substances and are subject to notification. For example, a consortium of micro-organisms - that is, a complex unformulated natural combination of micro-organisms - is considered a single substance for notification. However, a formulation deliberately mixed from pure cultures of micro-organisms is not a single substance. In this case, each individual pure culture in the formulation is a substance and may require separate notification. Care should be taken to

check whether any biochemicals, biopolymers, polymers or other chemicals in a microbial formulation are also new, and therefore require notification under Parts I or II of the NSNRs.

2.5.1.2 "Any manufactured item formed into a specific physical shape or design during manufacture and has, for its final use, a function or functions dependent in whole or in part on its shape or design."

Materials that meet the above criteria for a manufactured item will possess a definite shape or design necessary to their final function. Shape describes the macrostructure - i.e., the physical three-dimensional structure - of the final item.

For example, a column containing immobilized micro-organisms for use in processing a chemical stream is not a notifiable substance, but the component micro-organisms may be. Similarly, the structural framework of a biofilter would not be considered a notifiable substance, although the micro-organisms used in the biofilter may be.

2.5.1.3 "Any animate matter that is, or any complex mixtures of different molecules that are, contained in effluents, emissions or wastes that result from any work, undertaking or activity."

Material—including micro-organisms, and organisms other than micro-organisms—contained in effluents, emissions, and wastes is excluded from the statutory definition of a new substance. However, any subsequent processing, such as selecting or promoting the growth of specific organisms, may qualify them as notifiable substances.

2.5.2 Living organisms not requiring notification - Subsection 106(6) of CEPA 1999

Subsection 106(6) of CEPA 1999 establishes criteria for living organisms that do not require notification.

2.5.2.1 "A living organism that is manufactured or imported for a use that is regulated under any other Act of Parliament that provides for notice to be given before the manufacture, import or sale of the living organism and for an assessment of whether it is toxic or capable of becoming toxic" - Paragraph 106(6)(a) of CEPA 1999.

Paragraph 106(6)(a) of the CEPA 1999 sets out criteria for exempting living organisms regulated by another federal Act and Regulation from the notification obligations of the CEPA 1999. The criteria to be met by the other Act and Regulation are that it must:

"provide for notice to be given before the manufacture, import, or sale of the substance and for an assessment of whether it is toxic or capable of becoming toxic".

Who determines whether these criteria have been met?

Under subsection 106(7) of the CEPA 1999, the Governor in Council (which is a committee of Cabinet) has the exclusive authority for determining whether these criteria are met by another federal Act and Regulation, and if so, to list them in Schedule 4 of the CEPA 1999. Once added to Schedule 4, organisms for uses regulated by the listed Acts are exempt from the reporting requirements of the CEPA 1999. This new provision is meant to ensure there is a federal assessment, that includes environmental and human health aspects of all organisms to a CEPA-comparable standard, prior to manufacture, import or sale, and to avoid unnecessary duplication of regulation.

Subsection 106(7) came into force on September 13, 2001.

Potential notifiers of living organisms regulated under Acts and Regulations other than CEPA and the NSNR should monitor Federal Government websites and/or the *Canada Gazette* to determine whether the use for which the substance is proposed remains under the jurisdiction of another federal Act or defaults to the CEPA 1999.

Production Organisms and Uses for Living Organisms Subject to Other Acts of Parliament.

Living organisms manufactured or imported for use as a production organism in the manufacture of substances regulated by other federal Acts are subject to the NSNRs if excluded from that other Act. For example, the manufacture of a production organism to be used to produce a drug is excluded from regulation under the *Food and Drugs Act* and thus would be subject to the NSNRs.

A living organism regulated for a particular use under one federal Act may be subject to the NSNRs if it is used in other applications. For example, if *Bacillus thuringiensis* were used to produce a pesticide, it would be regulated under the *Pest Control Products Act*; but if the same micro-organisms were to be used for bioremediation, it would be regulated under the NSNRs. In these instances, notification is required before manufacture or import commences for the other use.

2.5.2.2 "Impurities and contaminants related to the preparation of a living organism" - 106(6)(c) of CEPA 1999.

Paragraph 106(6)(c) exempts impurities and contaminants from the requirement to notify under subsections 106(1) to (4) of CEPA 1999. Impurities and contaminants are substances found in minimal concentration in the medium or substrate or are the result of secondary reactions that occur during the preparation of the living organism. These substances and partially unused medium or substrate present in the final product are the direct result of the preparation, are not necessary to the end use of the product, have not been intentionally added, and do not enhance the commercial value of the living organism.

2.5.2.3 "A living organism that is manufactured, used or imported under the conditions and in the circumstances prescribed as exempt from this section" 106(6)(b) of CEPA 1999.

Paragraph 114(1)(b) of CEPA 1999 gives the Ministers authority to prescribe conditions and circumstances under which the manufacture, use or import of a living organism is exempt from the NSNRs. Section 29.1 of the Regulations prescribes exemptions for micro-organisms and sections 29.16 and 29.19 prescribe exemptions for organisms other than micro-organisms.

Micro-organisms
A micro-organism that is a research and development (R&D) substance, and is manufactured in or imported to a contained facility below the maximum quantities prescribed in section 29.1 of the Regulations and is not for introduction outside the contained facility is exempt from notification. In order to meet the criteria for the exemption, the containment level provided for the micro-organism must be appropriate to the risk group of the micro-organism, determined in accordance with the *Laboratory Biosafety Guidelines* or Appendix K of the U.S. National Institute of Health (NIH) document entitled *Guidelines for Research Involving Recombinant DNA Molecules.*

Section 29.1 of the Regulations exempts quantities for the manufacture of micro-organisms that are R&D substances intended for use in a contained facility in a volume of less than 1000 litres, unless the micro-organisms require containment level 2, 3 or 4 (refer to the *Laboratory Biosafety Guidelines* defined in subsection 2(1) of the Regulations) or less than 250 litres for all other micro-organisms. However, these exemptions do not apply to Risk Group 3 or 4 micro-organisms, unless an import permit has been obtained for the micro-organism under Health Canada's Human Pathogen Importation Regulations, or written permission to transfer the imported human pathogen has been granted under the same regulations. The volume triggers are maxima, inclusive of micro-organisms and media, and include both batch and continuous culture. This section of the Regulations also exempts from notification the import of R&D micro-organisms where the total quantity of the consignment imported to a contained facility is less than 50 mL or 50 g, including micro-organisms and media.

Organisms other than Micro-organisms

Section 29.16 prescribes criteria that must be met in order for a micro-organism other than a micro-organism to be exempt from notification under the NSNRs. Section 29.19 pertains to exemption of organisms that were first manufactured or imported during the transitional period. Sections 29.16 and 29.19 of the Regulations prescribe the information that must be provided for an organism other than a micro-organism unless:

1. the organism is a research and development substance; and

2. there is no release from the facility to the environment of the living organism, the genetic material of the organism or material from the organism involved in toxicity.

An organism other than a micro-organism that is an R&D substance and that is imported to or manufactured in a facility meeting the specified conditions for containment is exempt from notification. For the purposes of this exemption, genetic material that has been introduced into the genome or cells of the organism is considered to be part of the genetic material of the organism.

2.5.3 Substances carried through Canada - Subsection 3(2) of the NSNRs

The NSNRs do not apply to a substance loaded on a carrier outside Canada and moved through Canada to a point outside Canada. This exemption, specified in subsection 3(2) of the Regulations, applies even if there is a change of carrier during transit. However, if a substance is brought into Canada and stored for subsequent distribution, the substance is subject to notification requirements.

2.6 Living Organisms Manufactured or Imported during the Transitional Period

Living organisms not listed on the DSL that were manufactured or imported between January 1, 1987 and June 30, 1994 are subject to the transitional provisions of the Act (subsection 106(2)), unless otherwise exempt. Subsection 106(2) of CEPA 1999 allows these organisms to continue to be manufactured or imported after the notification regulations came into force, as long as the proponent has provided the prescribed information to Environment Canada before March 1, 1998 (refer to sections 29.15 and 29.2 of NSNRs). The information that must have been provided is prescribed in sections 29.14 (micro-organisms) and 29.19 (organisms other than micro-organisms) of the NSNRs. Notification is not required if the manufacture or import of the organism was discontinued before the date on which Part II.1 of the NSNRs came into force (September 1, 1997).

If the manufacture or import of the organism is currently subject to a notification group other than that for which it was manufactured or imported during the transitional period, then it is considered new and requires notification under subsection 106(1) of the Act.

2.7 Living Organisms First Manufactured or Imported between July 1, 1994 and August 31, 1997

Under subsection 106(1) of CEPA 1999, manufacture or import of an organism is prohibited unless the importer or manufacturer provides the prescribed information and the period for assessing the information has expired. Accordingly, for an organism first manufactured or imported after the transitional period but before Part II.1 of the Regulations

came into force, a notification must have been provided and appropriately assessed before September 1, 1997. This was required so that the manufacture or import of the organism could continue uninterrupted, subject to the results of the assessment, after September 1, 1997. Six months between the date of publication of Part II.1 of the Regulations in the *Canada Gazette*, Part II and the date on which Part II.1 of the Regulations came into force (September 1, 1997), were provided to allow for the preparation, submission and assessment of notification packages before September 1, 1997.

If these organisms were not notified and assessed by September 1, 1997, they are considered new and are subject to CEPA 1999 106(1). Consequently, their manufacture or import will have to be discontinued until a notification is provided and the assessment period has expired.

Section 3 Information Requirements

Subsections 106(1) and 106(2) of CEPA 1999 prohibit the import or manufacture of any living organism not listed on the DSL unless the prescribed information is provided within a prescribed time, the period for assessing the information has expired and the prescribed fee has been provided. The information to be provided referred to in these subsections is prescribed in the NSNRs. The information prescribed in the NSNRs is both technical and administrative (see Sections 4 and 7 of these Guidelines).

Subsections 106(3) and 106(4) of CEPA 1999 refers to prescribed information that must be provided for living organisms to which the significant new activities (SNAc) provisions apply prior to the manufacture, import or use for a significant new activity of the organism. The information referred to in these subsections is not prescribed in the NSNRs but in the *Canada Gazette* notice or DSL amendment in accordance with subsections 110(3) and 112(4) of CEPA 1999 respectively.

This section of the guidelines helps identify both the technical information necessary to comply with the information prescribed in the NSNRs and the date before which notifications must be submitted to Environment Canada.

3.1 Classification of Substances

The NSNRs group new substances into several major classes to specify appropriate information requirements for assessment. Part I of the Regulations applies to non-polymeric substances referred to as chemicals and biochemicals, Part II to polymers and biopolymers, and Part II.1, which is the subject of these guidelines, applies to organisms.

Notifiers can find guidance for identifying the information necessary to comply with the Regulations for chemicals, biochemicals, polymers and biopolymers in the Environment Canada and Health Canada publication, *Guidelines for the Notification and Testing of New Substances: Chemicals, Polymers, Biochemicals and Biopolymers* . To obtain copies of this document the reader should contact the Environment Canada office listed on page i of these Guidelines.

Section 3.2 of these Guidelines details how to identify the information necessary to comply with Part II.1 of the Regulations.

3.1.1 Organisms

Organisms are classified either as micro-organisms or organisms other than micro-organisms. Organisms can be naturally occurring or genetically modified through the application of methods such as recombinant DNA techniques.

3.1.1.1 Micro-organisms

The information requirements for micro-organisms are prescribed in sections 29.11 and 29.14 of Part II.1 of the Regulations. *Micro-organism* is defined in subsection 2(1) of the Regulations as *a microscopic living organism that is:*

a) classified in the Bacteria, the Archaea, the Protista, which includes protozoa and algae, or the Fungi, which includes yeasts;

b) a virus, virus-like particle, or sub-viral particle;

c) a cultured cell of an organism not referred to in paragraphs (a) and (b), other than a cell used to propagate such organism; or

d) any culture other than a pure culture.

This definition includes a micro-organism as a pure culture, as well as a consortium of micro-organisms. A consortium is a complex natural combination of micro-organisms that is not a pure culture and has not been deliberately formulated. This would include, for example, a collection of diverse micro-organisms isolated from sludge or soil. Where pure cultures are added to a consortium, each of the component pure cultures and the consortium is a separate substance that may be subject to notification. As well, where two or more consortia are combined, each component consortium is a substance and may be subject to notification.

The definition of micro-organism includes micro-organisms that have been genetically modified by any means. Cultured cells of plants or animals are also included in the definition of micro-organism unless they are being imported or manufactured to propagate the organisms from which they were derived.

3.1.1.2 Organisms other than micro-organisms

The information requirements for organisms other than micro-organisms are prescribed in sections 29.16 and 29.19 of Part II.1 of the Regulations. Organisms other than micro-organisms include all living organisms not captured in the definition of micro-organism in subsection 2(1) of the Regulations.

3.2 How to Identify the Required Notification Information

These Guidelines deal only with information requirements of the Regulations pertaining to micro-organisms and organisms other than micro-organisms. Sections 29.11 and 29.14 of the NSNRs outline different notification groups for micro-organisms so that appropriate

information requirements may be obtained for environmental and human health assessments. Notification groups outlining appropriate information requirements for organisms other than micro-organisms are prescribed in sections 29.16 and 29.19 of the Regulations.

For micro-organisms, notifiers will be required to identify the appropriate notification group and then provide the information required in the corresponding schedule. The notification groups for micro-organisms are summarized in Figure 1 on page 22 and consist of the following:

1. manufacture or import for introduction anywhere in Canada;

2. manufacture or import for introduction in an ecozone where not indigenous;

3. manufacture or import for introduction in accordance with confinement procedures;

4. manufacture or import for introduction in an ecozone where indigenous;

5. manufacture in a contained facility or import to a contained facility, and not for introduction outside the contained facility, or for export only;

6. manufacture or import for introduction in an experimental field study; and

7. manufacture and introduction at the same site from where isolated.

The Regulations are written so that the notification group for "manufacture or import for introduction anywhere in Canada," outlined in subsection 29.11(1) of the Regulations, specifies the most comprehensive set of information requirements. These information requirements are prescribed in Schedule XV. The other subsections of 29.11 identify notification groups where less than the most comprehensive set of information requirements apply. The Regulations also outline, in section 29.14, notification groups for micro-organisms manufactured or imported during the transitional period (January 1, 1987 to June 30, 1994). Provisions for micro-organisms first manufactured or imported after the transitional period but before Part II.1 of the Regulations came into force (i.e., July 1, 1994 to August 31, 1997) are addressed in Section 3.2.1.9 of these Guidelines.

A notifier may propose to conduct an experimental field study, for example, before manufacturing or importing a micro-organism for commercial introduction. In this case, the notification group in subsection 29.11(5) of the Regulations specifies the information requirements. However, a notifier is not obligated to conduct an experimental field study before submitting a notification for commercial introduction.

In certain circumstances, the notification groups may not be mutually exclusive. For example, some environmental applications might be considered either as manufacture for introduction in an ecozone where not indigenous, or as manufacture for introduction in

accordance with confinement procedures. In such circumstances, the notifier must choose the most appropriate schedule. Notifiers are encouraged to consult with Environment Canada for assistance with such choices. The criteria for determining the appropriate notification group for a micro-organism are outlined in the following sections of these Guidelines.

For organisms other than micro-organisms, notifiers are required to provide the information prescribed in Schedule XIX for all notification groups. The notification groups for organisms other than micro-organisms are:

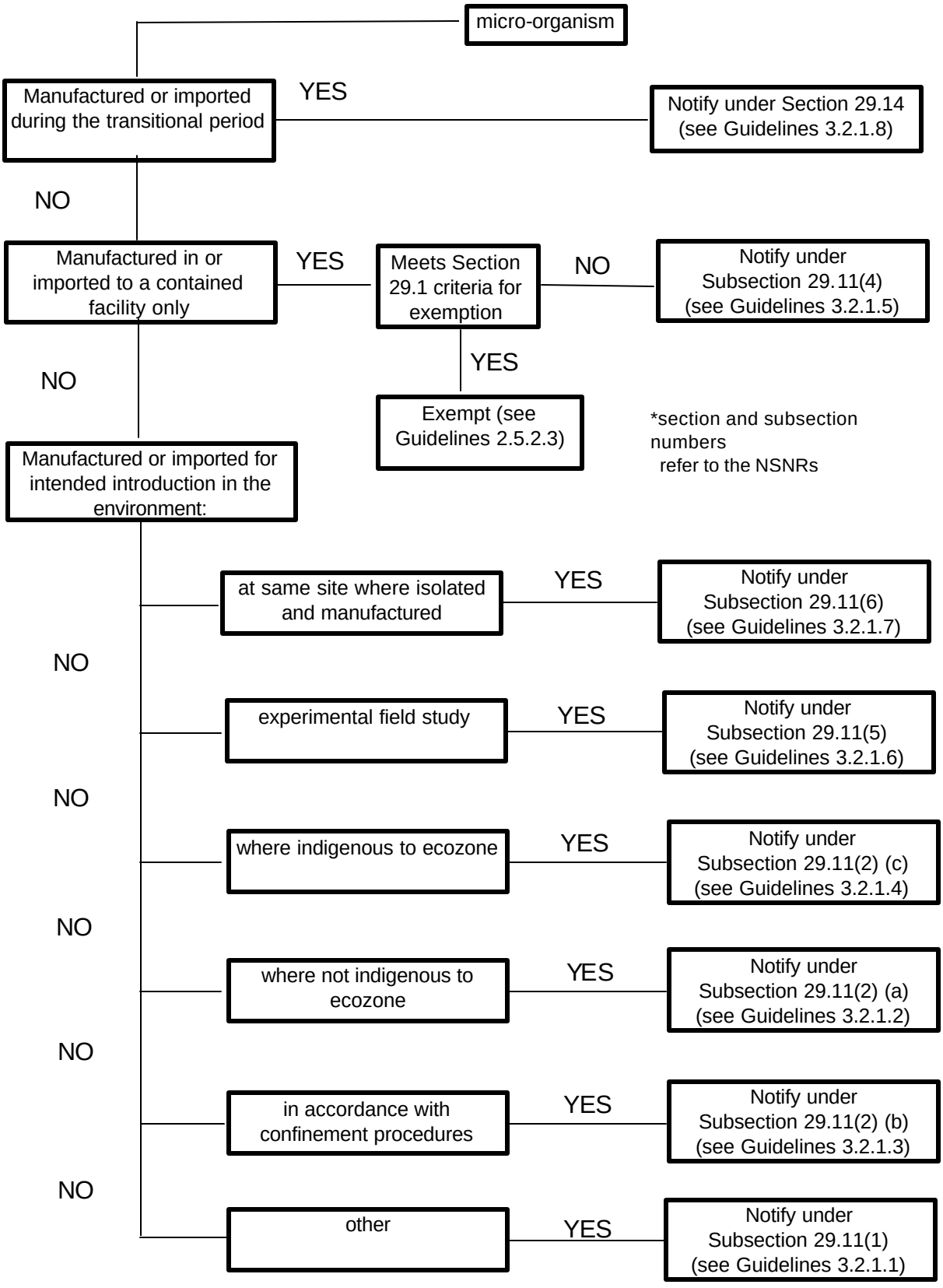
1. manufacture in or import into Canada;

2. manufacture or import during the transitional period; and

3. manufacture or import between July 1, 1994 and August 31, 1997.

If the conditions that trigger a notification are subsequently modified, a new notification may be triggered. For example, a notification may have been provided under paragraph 29.11(2)(a) for the manufacture of a micro-organism for introduction into a particular ecozone. Introduction of the micro-organism into a different ecozone would trigger a new notification. Notifiers are advised to contact the office noted on page i of these Guidelines for additional guidance on conditions that trigger a new notification.

Figure 1: Notification Groups for Micro-organisms under the New Substances Notification (NSN) Regulations



3.2.1 Micro-organism notification groups

3.2.1.1 Introduction anywhere in Canada

The notification group in subsection 29.11(1) of the Regulations applies to the manufacture or import of a micro-organism for introduction anywhere in Canada, including a micro-organism that does not meet the criteria for notification under any other group specified by the Regulations. For a micro-organism to be eligible for listing on the DSL, it must have been assessed under this notification group.

Information requirements for this notification group are prescribed in Schedule XV.

3.2.1.2 Introduction into an ecozone where not indigenous

Paragraph 29.11(2)(a) of the Regulations applies to the manufacture or import of a micro-organism that will be introduced into the environment in an ecozone where it is not indigenous. A micro-organism is indigenous, as defined in subsection 2(1) of the Regulations, if it occurs naturally in the ecozone for which introduction is intended. Ecozone is defined in subsection 2(1) of the Regulations to mean one of the ecozones illustrated on the map entitled Land Ecozones and Ecoregions, Canada, 1994, dated August 26, 1994. A reduced version of this map is presented in Appendix 2 to provide general guidance.

Subsection 29.11(3) of the Regulations provides an additional consideration for introducing a micro-organism close to an ecozone boundary. Where the point of introduction of a micro-organism is within 10 kilometres of another ecozone, a written notice can be made in a notification to elect that the introduction of the micro-organism be considered within the adjacent ecozone rather than the actual ecozone. For additional guidance to determine whether an introduction of a micro-organism is in one ecozone or another, notifiers can consult Environment Canada using the NSN Information Line (see page i of these Guidelines).

A notifier must provide a separate notification for each ecozone of introduction where the micro-organism is not indigenous. The information requirements for this notification group are prescribed in paragraph 29.11(2)(a) of the Regulations and Schedule XV.

3.2.1.3 Introduction in accordance with confinement procedures

The notification group in paragraph 29.11(2)(b) of the Regulations applies to the manufacture or import of a micro-organism that will be introduced into the environment outside of a contained facility but in accordance with appropriate confinement procedures. *Confinement procedures* are defined in subsection 2(1) of the Regulations as *any physical, chemical, operational or biological control, or combination thereof, to restrict*

the exit or dispersal of a micro-organism. The notifier must demonstrate that appropriate confinement procedures are being proposed. In selecting these procedures, the notifier should consider the characteristics of the micro-organism and its use. For example, there may be intrinsic properties in the biology of the micro-organism, such as unique habitat limitations, which greatly affect its survival beyond an introduction site, and serve as biological confinement procedures. As well, an enclosed structure such as a bioreactor can provide effective control over the release of a micro-organism if it is properly designed and operated. Proper design and operation would include inactivation procedures to effectively restrict the number of micro-organisms in aerosols, exhaust gases, and liquid and solid wastes. Notifications in this group must meet the following criteria:

1. All potential sources of micro-organism release from physical structures and site perimeters are identified including process streams (gases, liquids, and solid wastes) and potential dispersal vectors;

2. Confinement procedures for restricting micro-organism concentration, viability and dispersal are identified for the entire duration of the application for each potential source of release in (1) above; and

3. A description is provided of the effectiveness of each confinement procedure identified in (2) above.

The information requirements for this notification group are prescribed in paragraph 29.11(2)(b) of the Regulations and Schedule XV.

3.2.1.4 Introduction into an ecozone where indigenous

The notification group in paragraph 29.11(2)(c) of the Regulations applies to the manufacture or import of a micro-organism that will be introduced into the environment in an ecozone where it is indigenous. A micro-organism is indigenous, as defined in subsection 2(1) of the Regulations, if it occurs naturally in the ecozone for which introduction is intended. Ecozone is defined in subsection 2(1) of the Regulations to mean one of the ecozones illustrated on the map entitled Land Ecozones and Ecoregions, Canada, 1994, dated August 26, 1994. A reduced version of this map is presented in Appendix 2 to provide general guidance.

Notifications in this group must meet the following criteria:

1. The micro-organism has not been deliberately genetically modified; and either

2. Data are provided demonstrating the micro-organism was isolated from the ecozone of intended introduction; or

3. Data are provided demonstrating the micro-organism is taxonomically identical, at least to the species level, to a micro-organism known to occur naturally in the ecozone of intended introduction.

Any micro-organism, including a consortium, that was directly isolated from the environment within the ecozone of intended introduction would be indigenous to that ecozone unless it was subsequently deliberately genetically modified.

Subsection 29.11(3) of the Regulations provides an additional consideration for introducing a micro-organism close to an ecozone boundary. Where the point of introduction of a micro-organism is within 10 kilometres of another ecozone, a written notice can be made in a notification to elect that the introduction of the micro-organism be considered within the adjacent ecozone rather than the actual ecozone. For additional guidance to determine whether an introduction of a micro-organism is in one ecozone or another, notifiers can consult Environment Canada using the NSN Information Line (see page i of these Guidelines).

A notifier should provide a separate notification for each ecozone of introduction. The information requirements for this notification group are prescribed in paragraph 29.11(2)(c) of the Regulations and Schedule XV.

3.2.1.5 Not for introduction outside a contained facility

The notification group in subsection 29.11(4) of the Regulations applies to micro-organisms manufactured in a contained facility or imported to a contained facility and not for introduction outside the contained facility. This group also applies to a micro-organism manufactured in a contained facility or imported to a contained facility and destined solely for foreign markets (for export only). Section 29.1 of the Regulations exempts from notification micro-organisms that are research and development substances, manufactured in or imported to a contained facility in quantities not exceeding those specified in section 29.1 of the Regulations and not for introduction outside the contained facility, provided the containment level of the facility is appropriate to the risk group of the micro-organism (see Section 2.5.2.4 of these Guidelines).

A *contained facility* is defined in subsection 2(1) of the Regulations as *an enclosed building, with walls, floor and ceiling, or an area within such a building, where the containment is in accordance with the physical and operational requirements of a level set out in the Laboratory Biosafety Guidelines* [2nd Edition, established by the Department of Health, published in 1996] *or Appendix K of the Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines) June 1994 published by the United States Department of Health and Human Services, in the Federal Register (United States), Vol. 59, No. 127, on July 5, 1994, as amended from time to time*.

The *Laboratory Biosafety Guidelines* organize micro-organisms that can cause human or animal disease into four risk groups and describe physical and operational requirements

for the safe handling of each group. The requirement for identification of the appropriate containment level can be met either by reference to the *Laboratory Biosafety Guidelines* or by reference to Appendix K of the 1994 United States NIH *Guidelines for Research Involving Recombinant DNA Molecules*.

This notification group is not restricted to micro-organisms for use in high-level containment, but includes all containment levels. Notifiers are advised that the evaluation of proposed manufacture or import at an inappropriate containment level may result in a "suspicion of CEPA toxic" (see Section 9.3 of these Guidelines). The information requirements for this notification group are prescribed in Schedule XVI.

A single notification can refer to multiple facilities operated by the notifier (i.e., a single corporate entity) provided the required information is provided for each facility.

3.2.1.6 Introduction in an experimental field study

The notification group in subsection 29.11(5) of the Regulations applies to the manufacture or import of a micro-organism for introduction in an experimental field study. An *experimental field study* is defined in subsection 2(1) of the Regulations as *a study of a research and development substance that is a micro-organism, which study uses the minimum area, up to a maximum of 100 hectares, and the minimum quantity of the substance required to meet the objectives of the study*." These are studies conducted outside of a contained facility.

The notifier is not obligated to conduct an experimental field study before notification for commercial purposes. The notification group is for an experimental field study proposed by notifiers for their own purposes, and the information requirements are prescribed in Schedule XVII.

Where the experimental field study consists of introduction of the micro-organism into more than one site, the required information must be provided for each site of introduction. In this case, the combined area of the sites cannot exceed 100 hectares.

3.2.1.7 Introduction at the same site where isolated and manufactured

The notification group in subsection 29.11(6) of the Regulations applies to a micro-organism manufactured at the same site from which it was isolated and where it will be introduced. In general, this applies to micro-organisms or consortia of micro-organisms that are isolated by removing them, or material containing them (e.g., soil sample), from their natural environment (e.g., soil) and processed in some way (e.g., selecting or promoting the growth). However, a micro-organism whose growth is stimulated *in situ* by the addition of nutrients but is not isolated from its natural environment or processed in some way does not require notification (see Section 2.4.1 of these Guidelines). Notifications in this group must meet the following criteria:

1. Data must demonstrate that the micro-organism was isolated from the same site where it will be manufactured and introduced; and

2. The micro-organism is not deliberately genetically modified (including by selection in culture) or transported from the site for any purpose following its isolation.

The information requirements for this notification group are prescribed in Schedule XVIII.

This notification group can also apply to the manufacture of a micro-organism that is a research and development substance and that meets the above criteria.

3.2.1.8 Micro-organisms first manufactured or imported during the transitional period

A micro-organism first manufactured or imported during the transitional period (January 1, 1987 to June 30, 1994) is subject to notification pursuant to subsection 106(2) of CEPA 1999.

Section 29.14 of the Regulations outlines notification groups for any micro-organism manufactured or imported during the transitional period. The appropriate notification group is determined by the conditions and circumstances of environmental introduction of the micro-organisms. Any change in notification group from that which would have applied during the transitional period will require notification pursuant to subsection 106(1) of CEPA 1999. For example, if a micro-organism was manufactured during the transitional period for introduction according to confinement procedures, information specified by paragraph 29.14(2)(b) of the Regulations would be required for the manufacture to continue for introduction according to confinement procedures. However, if the notifier then intends to manufacture this micro-organism for introduction anywhere in Canada after the transitional period without the confinement procedures, notification would be required pursuant to subsection 29.11(1) rather than paragraph 29.14(2)(b) of the Regulations.

3.2.1.9 Micro-organisms first manufactured or imported between July 1, 1994 and August 31, 1997

Any micro-organism first manufactured or imported after the transitional period and before the date on which Part II.1 of the Regulations came into force—between July 1, 1994 and August 31, 1997—is subject to notification pursuant to subsection 106(1) of CEPA 1999. The appropriate notification group is determined by the conditions and circumstances of introduction of the micro-organism for which the manufacture or import is intended after August 31, 1997. For example, notification of the manufacture or import of a micro-organism for introduction with confinement procedures would require the provision of information specified under paragraph 29.11(2)(b) of the Regulations.

Notifiers with a micro-organism subject to this notification group are strongly encouraged to read Section 3.3.3 of these Guidelines for information on when to notify their micro-organism.

3.2.2 Notification groups for organisms other than micro-organisms

3.2.2.1 Manufacture or import of an organism other than a micro-organism

The notification group in section 29.16 of the Regulations applies to the manufacture or import of a living organism that does not meet the definition of micro-organisms in subsection 2(1) of the Regulations. An organism other than a micro-organism, assessed under this notification group may be eligible for listing on the DSL.

This notification group applies to any organism other than a micro-organism, manufactured or imported for introduction across Canada or for use in containment where the containment conditions do not meet the criteria for exemption specified in section 29.16 of the Regulations (see Section 2.5.2.4 of these Guidelines). Organisms other than micro-organisms are exempt from notification if they are research and development substances that are manufactured in or imported to a facility such that there is no release of the living organism, its genetic material, or any material from the organism involved in toxicity. The information requirements for this notification group are prescribed in Schedule XIX.

3.2.2.2 Organisms other than micro-organisms, manufactured or imported during the transitional period

An organism other than a micro-organism, manufactured or imported during the transitional period (January 1, 1987 to June 30, 1994), is subject to notification pursuant to subsection 106(2) of CEPA 1999.

Section 29.19 of the Regulations specifies the notification group for an organism other than a micro-organism, manufactured or imported during the transitional period, and the information requirements are prescribed in Schedule XIX.

3.2.2.3 Organisms other than micro-organisms, first manufactured or imported between July 1, 1994 and August 31, 1997

This notification group applies to the manufacture or import of a living organism other than a micro-organism, first manufactured or imported after the transitional period but before the date on which Part II.1 of the Regulations came into force. This period is between July 1, 1994 and August 31, 1997. An organism other than a micro-organism, first manufactured or imported during this time, is subject to notification pursuant to subsection 106(1) of CEPA 1999, and the information requirements are prescribed in Schedule XIX.

Notifiers of an organism other than a micro-organism, subject to this notification group are strongly encouraged to read Section 3.3.3 of these Guidelines for information on when to notify their organism.

3.3 When to Notify the Government

Sections 29.12 and 29.17 of the Regulations specify the number of days preceding manufacture or import by which the notifier must provide the prescribed information to Environment Canada. The timing for the submission of a notification depends on the notification group for which the manufacture or import of the organism is being notified. Sections 29.13 and 29.18 of the Regulations prescribe assessment periods defining the period within which Environment Canada and Health Canada must assess the information.

3.3.1 Notification of a micro-organism or organism other than a micro-organism, not manufactured or imported before September 1, 1997

Notification of a micro-organism or organism other than a micro-organism, not manufactured or imported before September 1, 1997 must be provided within the prescribed time period before its intended manufacture or import. These time periods are prescribed in sections 29.12 and 29.17 of the Regulations (see Table 1), and apply to notification of the first manufacture or import of the organism in Canada, as well as to notification required because of a change in notification group. For example, if a micro-organism has been introduced in Canada in an experimental field study and is subsequently proposed for unrestricted introduction anywhere in Canada, notification would be required under subsection 29.11(1) of the Regulations, 120 days before manufacture or import.

Table 1 Notification periods for micro-organisms and organisms other than micro-organisms

Schedule	Notification period (days before manufacture/import)
XV and XIX	120
XVI	30
XVII	90
XVIII	30

3.3.2 Notification of a micro-organism or organism other than a micro-organism, manufactured or imported during the transitional period

A micro-organism or organism other than a micro-organism, manufactured or imported during the transitional period (January 1, 1987 to June 30, 1994) required notification in order that its manufacture or import continue. The notification must have been provided on or before the date prescribed in sections 29.15 or 29.2 of the Regulations: March 1, 1998. Assessment periods are not prescribed for micro-organisms or organisms other than micro-organisms manufactured or imported during the transitional period. If the manufacture or import was discontinued before September 1, 1997, notification is not required.

3.3.3 Notification of a micro-organism or organism other than a micro-organism, first manufactured or imported between July 1, 1994 and August 31, 1997

A micro-organism or organism other than a micro-organism, first manufactured or imported between July 1, 1994 and August 31, 1997 required notification and assessment before Part II.1 of the Regulations came into force, so that manufacture or import could continue uninterrupted, subject to the results of the assessment. Six months were provided between the date Part II.1 of the Regulations was published in the *Canada Gazette*, Part II, and the date on which Part II.1 of the Regulations came into effect (September 1, 1997) to allow for the preparation, submission and assessment of notification packages before September 1, 1997. If the information had not been provided in time for the assessment to be completed by September 1, 1997, manufacture or import must have ceased until the assessment had been completed. If the manufacture or import of the micro-organism or organism other than a micro-organism, was discontinued before September 1, 1997, notification was not required.

Individuals with technical questions or who require additional information on procedures for New Substances Notifications or on the status of submitted notifications, may contact the New Substances Division, Environment Canada, at the address given on page i of these Guidelines).

3.4 Fees

Section 106 of CEPA 1999 provides the authority to prescribe a fee that must accompany the prescribed information. There are currently no fees prescribed.

Section 4 Technical Information Requirements

4.1 Overview of Technical Information

The New Substances Notification Regulations contain two categories of prescribed information —administrative and technical. To help notifiers compile and generate the required information, this section explains the technical information requirements specified in sections 29.11, 29.14, 29.16 and 29.19 of the Regulations and the various schedules. These explanations provide details such as: type of information required; conditions under which various tests are required; and what constitutes complete and adequate information in the opinion of Environment Canada and Health Canada. The prescribed administrative information is discussed in Section 7 of these Guidelines.

The information requirements for micro-organisms and organisms other than micro-organisms are described in Sections 4.2 and 4.3 of these Guidelines. Many of the information requirements for micro-organisms appear in more than one schedule. The different information requirements are identified and explained. While the information requirements are described for the micro-organism notification groups in section 29.11 of the Regulations, they also apply to notification groups identified for the transitional period in section 29.14 of the Regulations. The information requirements for organisms other than micro-organisms are described for Schedule XIX and apply to notifications under sections 29.16 and 29.19 of the Regulations. The description of the information requirements is organized in the following order:

1. information about the micro-organism or organism other than a micro-organism;
2. manufacturing and import information;
3. information on the introduction;
    - information on the site of introduction (Schedules XVII and XVIII)
    - information on the experimental field study (Schedule XVII)
4. environmental fate information;
5. ecological effects information;
6. human health effects information;
7. additional information.

Notifiers should thoroughly address each of the information items required in the Regulations in order to avoid the notification being deemed incomplete. Unless specified as test data, the information required is that which is known about the micro-organism or organism other than a micro-organism from a review of the scientific literature and from results available on unpublished laboratory or experimental field studies. Wherever possible, the information should be provided for the specific organism being notified. Where there is little information available on the specific organism, information on a surrogate organism (i.e., close relative or the parental organism of a genetically modified organism) should be provided in order to fulfil the information requirement. Notifiers are

advised to consult with Environment Canada at the NSN Information Line (see page i of these Guidelines) on the choice of an appropriate surrogate organism. If an inappropriate surrogate organism is chosen, the assessment will not commence until the appropriate information is provided (see Section 9.1.1 of these Guidelines). When the information provided is based upon a literature search, the search should be conducted within six months of the submission of the notification and should cover major scientific information sources such as Commonwealth Agricultural Bureau (CAB), Current Contents, Biosis Previews, Science Citation Index or Agricola. Other more specific databases such as the Biotechnology Citation Index, Derwent Biotechnology Abstracts Service, Current Biotechnology Abstracts, Current Research Information System (CRIS) and Enviroline may also be useful. The search must provide information for a complete and thorough overview of the relevant information requirement. If most of this information is available in recent reports, a search of the literature dating back a number of years may not be necessary. Where recent reports are unavailable, inconclusive or contradictory, a more extensive search over a longer time period should be conducted. Additional guidance on the provision of information in respect of the human health effects of a micro-organism is provided in Section 4.2.8 of these Guidelines.

Documentation submitted based on a literature search should include:

1. copies of the literature search performed, indicating the time period of the search, the information sources, title of published papers, and search strategy, including search terms;

2. copies of the documents which provide the information relevant to addressing an information requirement in either of the official languages; and

3. a summary of the findings from the literature search for each of the information requirements.

When a notifier finds no relevant information from the scientific literature or unpublished studies for items pertaining to mode of action and estimated micro-organism quantities and population trends, laboratory tests may be required.

In other situations, data from tests are prescribed in the Regulations that will require laboratory testing to obtain information related to effects on plant, invertebrate, and vertebrate species; antibiotic susceptibility; and pathogenicity to humans. The requirement for data from tests can be fulfilled by providing the results of tests performed by the notifier or as already reported in the scientific literature for the specific organism being notified. Further guidance on when notifiers are required to conduct testing is provided in Sections 4.2 and 4.3 of these Guidelines.

4.2 Micro-organisms

4.2.1 Information in respect of the micro-organism (Sched. XV 1; XVI 1; XVII 1; XVIII 1)

4.2.1.1 Identification and the information substantiating the identification (Sched. XV 1(a); XVI 1(a); XVII 1(a); XVIII 1(a))

Identification:
The accurate identification of the micro-organism will be the cornerstone of all notifications. The notifier is expected to make a bona fide attempt to assign a taxonomic designation to the micro-organism, following international codes of nomenclature and standard taxonomic sources.

The level to which the taxonomic designation is made is at the discretion of the notifier, but in general a designation to the species level is expected. To avoid the conclusion in the assessment that the micro-organism may be a pathogen, the taxonomic designation should be provided to a level that distinguishes the micro-organism from pathogenic species and, if applicable, from known biovars or pathovars.

Tests for preformed enzyme function and for carbohydrate utilization, both oxidatively and fermentatively, should be conducted. For a bacterium, the cellular and colony morphology with reference to the types of media and stains used, should be provided. For higher organisms (e.g., fungi or protozoa), morphological criteria indicating definitive characteristics should be provided. Data from commercial rapid identification kits may be acceptable, provided the response criteria are sufficient to provide an identification at a high confidence level and alternative identifications with lower probabilities are also provided. Other identification criteria may be submitted provided they include relevant literature supporting the validity of the technique. The following are examples, but other procedures may be acceptable:

- the polymerase chain reaction (PCR) using primers specific for the species in question;
- DNA-DNA or DNA-RNA hybridization studies using specific probes;
- fatty acid analysis of the cellular fatty acids and comparison of the profile obtained with an identical profile in an accessible fatty acid data base; and
- reaction with antisera shown to be specific for the species in question.

In general, the methods should be consistent with methods currently used in microbial taxonomy.

Where the micro-organism is not a pure culture, but a complex unformulated natural combination of micro-organisms, it is called a consortium. A consortium should be identified in terms of its source, collective biological and ecological characteristics, and functional tests representing the combined activities of the microbial population. Notifiers should attempt taxonomic designation of micro-organisms in a consortium.
For consortia, where taxonomic designation of all component micro-organisms is not possible, data on the presence of indicator micro-organisms should be submitted. The consortium should be screened for species pathogenic to humans, with the level (percentage of total micro-organisms) and taxonomic designation of such species within the product clearly stated. Notifiers should screen for *Salmonella* sp., *Listeria monocytogenes*, *Vibrio* sp., *Campylobacter* sp., *Clostridia* sp., *Bacillus anthracis*, *Pseudomonas aeruginosa, Yersinia* sp., *Candida albicans, Aspergillus fumigatus,* faecal coliforms and Enterococci.

Where the micro-organism is genetically modified, the parental micro-organism and all organisms that were sources of genetic material should be identified.

If the identity of the micro-organism is claimed as confidential, a masked name should be provided (see Section 8.2.2 of these Guidelines).

Notifiers are encouraged to deposit the micro-organism in a permanently established and recognized culture collection.

Information substantiating the identification:

To satisfy the requirement for substantiation of the identity, a taxonomic designation should be accompanied by a list of the tests used to arrive at the designation, with the results and any other information used to make the designation. A brief description of the type of tests used should be provided. Where a taxonomic designation is not provided, the requirement to substantiate identification may be satisfied with documentation (e.g., company records) regarding the source of the micro-organism, a list of tests used to determine the collective biological and ecological characteristics, and a list of functional tests representing the combined activities of the microbial population and the results of such tests.

Notifiers are encouraged to have the taxonomic designation verified by an independent authority.

4.2.1.2 Synonyms and common and superseded names (Sched. XV 1(b); XVI 1(b); XVII 1(b))

Notifiers should provide any synonyms, common and superseded names for the micro-organism. If there are none, then this should be specified.

4.2.1.3 Strain history (Sched. XV 1(c); XVI 1(c); XVII 1(c))

Information on the historical record of the micro-organism strain from its original source of isolation (e.g., environmental/clinical isolate) until final product development should be provided. This information includes any strain bank and accession number (e.g., American Type Culture Collection) and the history of storage and culturing conditions provided by the proponent. Copies of any published reports of the strain's isolation, characterization, and any previous genetic modifications should be provided.

4.2.1.4 Description of any modifications to the micro-organism (Sched. XV 1(d); XVI 1(d); XVII 1(d))

Any directed or intentional modifications made to the micro-organism by any means should be described. If none have been made, then this should be specified.

(i) Purpose of the modifications
Notifiers should describe the purpose of each modification made to the micro-organism.

(ii) Methods and steps taken to make the modifications
A description of the methods and steps taken to make any directed or deliberate modifications to the micro-organism, either through classical, physical (e.g., ionizing and non-ionizing radiation, photodynamic action) or chemical (e.g., base analogues, acridines, nitrous acid, hydroxylamine, alkylating agents) mutagenesis techniques or through other methods (e.g., recombinant DNA techniques), should be provided. A description of any selection methods employed should also be provided.

Where the micro-organism has been modified using recombinant DNA techniques, the description should take into account the following areas:

- cloning strategies and procedures including schematic representations;
- vector construction details, and information on the functional elements within the vector (e.g., promoters and other regulatory elements, replication elements, structural genes, markers);
- gene transfer methods employed (e.g., conjugation, transformation, transduction, electroporation, microinjection, ballistic injection);
- vector characteristics (e.g., shuttle, conjugative, self-transmissible, mobilizable);
- vector copy number;
- expression levels obtained and cellular location of expressed product; and

- detection techniques including sensitivity, reliability and specificity.

(iii) Phenotypic and genotypic changes resulting from modifications

The phenotypic and genotypic changes known to have resulted from the modifications to the micro-organism should be described. Known changes, including unintended changes, in physiological characteristics and biological functions should be described. The description of genetic changes should be based on one or more of the following:

- restriction enzyme analysis, restriction map;

- nucleic acid hybridization (gene probe) analysis results;

- DNA sequence analysis;

- electrophoretic analysis results (e.g., DNA/DNA and RNA/DNA hybridizations).

(iv) Stability of changes

A description of the stability of the phenotypic and genotypic changes known to have resulted from the modifications to the micro-organism should be provided. This should include any available information pertaining to:

- genetic maintenance (e.g., chromosomal integration or episomal maintenance);

- genetic stability with and without selective pressure;

- inheritance of phenotype through several generations.

(v) Nature, source, and function of any inserted genetic material

A description of the nature, source, and function of any genetic material introduced into the micro-organism should be provided, and include:

- the host/vector system;

- the size of the introduced genetic material;

- the source of any inserted genetic material, including the taxonomic designation of donors;

- functional characteristics of nucleic acids, level of expression, regulatory function, origin(s) of replication, coding and non-coding sequences, vector type (e.g., plasmid, bacteriophage, cosmid) and markers (e.g., antibiotic, heavy metal, physiological).

4.2.1.5 Description of methods that can be used to distinguish and detect the micro-organism (Sched. XV 1(e); XVI 1(e); XVII 1(e))

A description of available methods that could be used to detect the micro-organism in the environment and distinguish it from background levels should be provided. If no methods exist or none have been developed, the notifier should propose a method that might be used.

4.2.1.6 Description of the biological and ecological characteristics of the micro-organism (Sched. XV 1(f); XVI 1(f); XVII 1(f); XVIII 1(b))

Information on the biological and ecological characteristics of a micro-organism should be submitted to provide a basic understanding of the behaviour of the micro-organism in the environment. The information is that which is known from a review of the scientific literature and from results available in unpublished laboratory or experimental field studies. Notifiers are not required to generate data from tests to fulfil the information requirements outlined in the following items. Not all of the items listed below are required in all of the schedules. For schedule XVII notifications, certain items are only required where the micro-organism is not indigenous.

(i) Life cycle

The morphology, life cycle and life history stages of the micro-organism should be described, as well as spore-forming ability or other means for surviving environmental stresses.

(ii) Infectivity, pathogenicity to non-human species, toxicity, and toxigenicity

Information should be provided on any infectivity and pathogenicity to non-human species, as well as any toxicity, and toxigenicity associated with the micro-organism. The information should address infectivity, toxin production, conditions under which toxins are produced, and involvement of the micro-organism as an obligate or opportunistic pathogen, as well as any biota known to be susceptible to the micro-organism. Any known toxicity resulting from by-products of biodegradative pathways of the micro-organism should also be described. Information requirements on infectivity and pathogenicity to humans are outlined in Sections 4.2.8.1 and 4.2.8.3 of these Guidelines.

(iii) Resistance to antibiotics and tolerance to metals and pesticides

Notifiers should provide information on any specific resistance such as tolerance to heavy metals, pesticides, and antibiotics.

(iv) Involvement in biogeochemical cycling

Information on any involvement of the micro-organism in biogeochemical cycles should be provided, including a summary of the potential role of the micro-organism in mediating major biogeochemical cycles (e.g., carbon, sulphur and nitrogen).

(v) Conditions required for, and conditions that limit survival, growth and replication

Information should be provided to describe ranges and optima for significant environmental parameters like pH, temperature, salinity, oxygen and nutrient requirements pertaining to growth, survival and replication of the micro-organism. Where survival, growth, or

replication are known to be limited by specific parameters, this information should also be provided.

(vi) Mechanisms of dispersal of the micro-organism and modes of interaction with any dispersal agents
Information regarding the mode of dispersal of the micro-organism, including modes of interaction with dispersal agents, vectors, and the ability to spread to other sites should be provided.

4.2.1.7 Description of the known mode of action in relation to the intended use (Sched. XV 1(g); XVI 1(g); XVII 1(g))

Notifiers should describe the mode of action of the micro-organism in relation to its intended use and how the micro-organism functions by altering the physical, chemical, or biological environment. This could involve a description of the activity of the micro-organism and how this could result in changes to pH, chemical concentrations, biogeochemical cycling, or ecological interactions with other organisms. A notifier should to describe the possible biochemical breakdown pathways and by-products from biodegradation or bioremediation applications. The description should indicate whether the micro-organism needs to be alive to function or whether parts of the micro-organism will have the same function.

Information normally collected by the notifier in the process of product development and efficacy studies as well as a literature survey will generally fulfil this information requirement. Notifiers will not be required to generate data to describe the mode of action for Schedules XVI, and XVII. However, for Schedule XV, laboratory data will need to be generated (e.g., characterize potential by-products) where there is no relevant information available to describe the mode of action.

4.2.1.8 Description of the reasonably expected by-products following introduction (Sched. XVIII 1(c))

The notifier should describe the resulting chemical and biochemical breakdown products and end products from biodegradation or bioremediation applications. This description may be based upon a review of the literature or any information collected as part of product development and efficacy studies.

4.2.1.9 Identification of any patent or any application for a patent (Sched. XV 1(h); XVI 1(h); XVII 1(h))

If the notifier has been granted or has applied for a patent, the authority under which the patent was issued or applied for, and the patent number or application number, should be provided. If none has been granted or applied for, then this should be specified.

4.2.1.10 Dispersal by gene transfer of traits of pathogenicity to non-human species, toxigenicity and resistance to antibiotics (Sched. XV 1(i); XVII 1(i))

A description of the potential for transfer of genetic material from the micro-organism to other organisms at an introduction site should be provided. For schedule XVII notifications, this item is only required where the micro-organism is not indigenous. This description should take into account the known mechanisms of gene transfer between the micro-organism and other organisms, and contain the following.

(i) Genetic basis for pathogenicity to non-human species, toxigenicity, and resistance to antibiotics

The known genetic basis for the traits of pathogenicity to non-human species, toxigenicity, and resistance to antibiotics should be provided. The number of genes coding for the trait, their location (e.g., chromosomal or extrachromosomal), and their linkage should also be provided.

(ii) Capability to transfer genes

A description of the known capability for transfer of genetic material from the micro-organism to other organisms should be provided. This includes information regarding the presence and nature of extrachromosomal genetic elements, integrated plasmids and transposable elements, and lysogenic viruses associated with the micro-organism. Information respecting these genetic elements, such as copy number, host range, incompatibility group, conjugative and mobilization ability, size, insertion specificity, transduction potential, transposition potential, and any resulting phenotypic changes should also be provided.

Known characteristics of the micro-organism and the environmental conditions that may influence gene transfer capability from the micro-organism should be provided. These may include such characteristics as the presence of genes that may decrease the rate of conjugation, and whether the micro-organism is a good mating partner or subject to easy bacteriophage-mediated transfer.

(iii) Conditions that might select for dispersal of traits and whether the conditions are likely to exist at the locations of introduction or within range of dispersal of the micro-organism

A description of the conditions that may select for the dispersal of the traits of pathogenicity to non-human species, toxigenicity and resistance to antibiotics should be provided. The notifier should consider whether these conditions are likely to exist at the locations of introduction or within the range of dispersal of the micro-organism.

4.2.1.11 Description of the geographic distribution of the micro-organism (Sched. XV 1(j); XVII 1(j))

A description of the known geographic distribution of the micro-organism, including particular attention to its distribution within North America, should be provided. Any claim that the micro-organism is ubiquitous should be supported with documentation.

4.2.2 Information in respect of the manufacture and importation of the micro-organism (Sched. XV 2; XVI 2; XVII 2; XVIII 2)

4.2.2.1 Identification of trade names and manufacturers, importers and vendors (Sched. XV 2(a); XVI 2(a); XVII 2(a))

All known trade names under which the micro-organism has been or is to be used should be supplied, including names previously used to identify the formulation and any foreseeable name changes. The name of any manufacturer of the formulation should be identified. If the formulated product is to be imported into Canada for use on the domestic market, the final destination of the product should be provided. The names and addresses of all potential and/or confirmed vendor distribution points for the product should be disclosed. Additional information for micro-organisms imported into Canada should include the planned destinations, for example, manufacturing plants, processing plants or distribution centres. If there are no trade names, manufacturers, importers or vendors, then this should be specified.

Information provided under this information requirement does not exempt other parties from notification obligations under these Regulations if they subsequently manufacture or import this notified micro-organism.

4.2.2.2 Identification of locations of manufacture in Canada (Sched. XV 2(b); XVI 2(b))

All intended locations of manufacture of the micro-organism in Canada should be identified. If there are no locations of manufacture in Canada, then this should be specified.

4.2.2.3 The containment level for each manufacturing facility in Canada or for each facility to which the micro-organism was or will be imported (Sched. XVI 2(c))

This information requirement applies to the notification of a micro-organism imported to or manufactured in a contained facility. "Contained facility" is defined in Subsection 2(1) of the Regulations (see also Section 3.2.1.5 of these Guidelines).

The proposed containment can be identified by referring to a containment level described in the *Laboratory Biosafety Guidelines* or Appendix K of the 1994 U.S. National Institutes

of Health document entitled *Guidelines for Research Involving Recombinant DNA Molecules* (NIH Guidelines).

When identifying the proposed containment level, the notifier should indicate that the facility meets the standards set out in the *Laboratory Biosafety Guidelines* or NIH Guidelines, with reference to: layout of the facility; personnel, material and product flow in the facility; process containment features; standard operating procedures; access to workplace; accident reporting; culture transfers between unit operations; inactivation of the production micro-organism; treatment of process wastes before discharge; and emergency response measures handling small and large spills involving the production micro-organism. Where Good Large Scale Practice is proposed, notifiers should specify all physical and operational procedures employed.

A single notification can refer to multiple facilities operated by the notifier (i.e., a single corporate entity). Where multiple facilities are to be employed, the identification of the containment level is applicable to each facility where the micro-organism will be manufactured.

4.2.2.4 Physical state of the formulation (Sched. XV 2(c); XVII 2(b))

Notifiers should describe the physical form of the formulation (e.g., powder, solution, mist), the nature of any carrier medium (e.g., process water or air), and the particle size.

4.2.2.5 Concentration of the micro-organism in the formulation (Sched. XV 2(d); XVII 2(c))

The concentration of the micro-organism in the commercial formulation should be provided.

4.2.2.6 Identification and concentration of other ingredients and of any contaminants in the formulation (Sched. XV 2(e); XVII 2(d))

An inclusive list of the components making up the commercial formulation should be provided, including each ingredient and its relative concentration. Any sampling procedures for potential microbial contaminants should be described and data on representative samples provided.

4.2.2.7 Viability of the micro-organism in the formulation (Sched. XV 2(f); XVII 2(e); XVIII 2(b))

Notifiers should identify what proportion of the micro-organisms in the formulation is in a viable state. Any substances that are added to the formulation in order to stimulate growth or metabolic activity of the micro-organisms should be identified.

4.2.2.8 Description of any recommended storage and disposal procedures (Sched. XV 2(g); XVI 2(f); XVII 2(f))

A description of any recommended storage procedures, including containers used to store the micro-organism formulation at the manufacturing facility and after manufacture should be provided. The projected shelf life of the formulation should also be provided, as well as a description of any recommended disposal procedures for unused portions of the micro-organism or the formulation. If no storage or disposal procedures are recommended, then this should be specified.

For notifications under Schedule XVI, only a description of any recommended storage procedures should be provided.

4.2.2.9 Estimation of the quantity of the micro-organism that was or will be imported or manufactured in Canada (Sched. XV 2(h); XVI 2(d); XVII 2(g); XVIII 2(c))

Notifiers should estimate the quantity of micro-organism to be manufactured or imported for the first 12 months, and the maximum quantity in any 12-month period during the first three years. Quantitative units (concentration, volume, mass) should reflect the usual and customary physical state of the micro-organism formulation.

Notifiers should also estimate how much product will be distributed by a given vendor within the first 12 months, and the maximum amount distributed in a 12-month period for the first three years.

4.2.2.10 Description of the equipment and methods of manufacture and of quality control and quality assurance procedures (Sched. XV 2(i); XVI 2(e); XVII 2(h); XVIII 2(d))

A brief description of the manufacturing process, detailing growth conditions, the nature (batch or continuous) and scale of the process should be provided.

The quality control and assurance procedures used to manufacture the micro-organism should be described, including how strain integrity is maintained. This should include information on maintenance of the culture, a brief description of any enrichment or selective media used, seed culture methods (active, sub-culture), cultural conditions (media composition and state, temperature), long-term storage options (storage in liquid nitrogen, lyophilisation) and master cell bank maintenance.

Any record of testing conducted to verify that the notified strain is indeed the strain described should be provided. A description of the testing procedures (e.g., measurements, frequency, extent, limits, range, duration) should be provided for all quality assurance testing. If there are no quality control and quality assurance procedures, then this should be specified.

4.2.2.11 Description of the location of manufacturing facilities in Canada (Sched. XV 2(j), XVII 2(i))

A brief description, including scale drawings, of the manufacturing location, and proximity to populated areas and watercourses should be provided. Where a containment level, as described in the *Laboratory Biosafety Guidelines* or the United States NIH *Guidelines for Research Involving Recombinant DNA Molecules* (see Section 3.2.1.5 of these Guidelines), has not been identified for the manufacturing facility, briefly describe the manufacturing premises, including floor plans that indicate the flow of personnel, material and product, the ventilation system (air handling zones, air flow), a flow diagram of the manufacturing process (including features such as fermenters, up/downstream processing equipment, holding tanks) and the points of entry or exit of all raw materials and waste materials. If there are no manufacturing facilities in Canada, then this should be specified.

4.2.2.12 Description of the nature of potential releases of the micro-organism from manufacturing facilities in Canada or from facilities to which the micro-organism was or will be imported, and procedures to control releases (Sched. XV 2(k), XVII 2(j))

A description of intended and inadvertent emissions should be provided. For effluents, indicate whether the effluent will enter municipal waste treatment facilities or go directly into surface waters (identify those facilities or water bodies, where applicable). The notifier should estimate the amount of micro-organism expected to be released during batch or continuous operations for effluents and emissions and indicate whether the concentration of micro-organisms released at the manufacturing site will be greater or less than at the site of introduction. Where the facility is a contained facility as defined in subsection 2(1) of the Regulations, information regarding effluents and emissions may be satisfied by stating the containment level (see Section 3.2.1.5 of these Guidelines). A description of any contingency plans to deal with unintended releases from the manufacturing processes, including any engineering controls (e.g., recovery trench, dike) in place to prevent widespread release should be provided.

4.2.2.13 Description of procedures for treatment and disposal of wastes containing the micro-organism from manufacturing facilities in Canada (Sched. XV 2(l), XVII 2(k); XVIII 2(e))

A description of the waste management practices designed to prevent or minimize the release of the micro-organism in effluents and emissions should be provided. If there are no procedures for treatment and disposal of wastes, then this should be specified.

4.2.2.14 Data to demonstrate that the micro-organism was isolated from the site of introduction (Sched. XVIII 2(a))

Data to demonstrate that the micro-organism was isolated from the site of introduction should be provided. This may consist of laboratory records or documentation that refers to the micro-organism being notified and the site from which it was isolated.

4.2.3 Information in respect of the introduction of the micro-organism (Sched. XV 3, XVI 3; XVIII 4)

4.2.3.1 Intended and potential uses (Sched. XV 3(a); XVI 3(a); XVIII 4(a))

A description of the intended function of the micro-organism and the specific type of intended use (e.g., hydrocarbon degradation of marine oil spills, leaching of copper from the mining of ores, PCB degradation at contaminated soil sites) should be provided. The information should provide sufficient detail to help predict releases into the environment and the nature of potential plant, animal, and human exposure. A description of any other known or potential uses of the micro-organism should also be provided. For Schedule XVIII, only the intended use is required.

4.2.3.2 History of use (Sched. XV 3(b), XVI 3(b))

Notifiers should describe any history of use of the micro-organism in Canada or any other country. This description should indicate the length of time the micro-organism has been used and any other known uses, including experimental field studies. If there is no history of use, then this should be specified.

4.2.3.3 Identification of the ecozone of intended introduction (Paragraph 29.11(2)(a) and (c))

This information requirement applies to the notification of a micro-organism to be manufactured or imported for introduction into an ecozone where it is not indigenous (paragraph 29.11(2)(a) of the Regulations), or for introduction into an ecozone where it is indigenous (paragraph 29.11(2)(c) of the Regulations). The ecozone for introduction should be specified in reference to the map referred to in the definition of ecozone in subsection 2(1) of the Regulations. A reduced version of this map is provided in Appendix 2. Further information on ecozone boundaries can be obtained from the NSN Information Line (see page i of these Guidelines).

A separate notification under paragraph 29.11(2)(a) or (c) of the Regulations should be made for each ecozone of introduction. A notifier who manufactures or imports a micro-organism for introduction into an ecozone at a point within 10 kilometres from the boundary of another ecozone may elect to have the micro-organism considered to be in that other ecozone and not the actual ecozone of introduction. In that case, the notifier should provide

a written notice of the election along with the information required by paragraph 29.11(2)(a) or (c) of the Regulations.

4.2.3.4 Data that demonstrates the micro-organism is indigenous to the ecozone (Paragraph 29.11(2)(c))

For notification of the manufacture or import of a micro-organism for introduction into an ecozone where it is indigenous (paragraph 29.11(2)(c) of the Regulations), data should be provided to demonstrate that the micro-organism is indigenous to the ecozone. This data should show that the micro-organism was either isolated from the ecozone of intended introduction or is taxonomically identical (at least to the species level) to a micro-organism known to occur naturally in that ecozone.

4.2.3.5 Comparison of the natural habitat of the micro-organism to the habitat at the potential locations of introduction of the micro-organism, and the nature of selection that may operate on the micro-organism at the potential locations of introduction (Sched. XV 3(c))

A general description of the potential locations of introduction of the micro-organism within Canada (e.g., hazardous waste sites, grease traps, industrial wastewaters) should be provided. Notifiers should also compare the natural habitat of the micro-organism (and of the parental micro-organism for micro-organisms that are genetically modified) and these potential locations of introduction. Where it is anticipated that natural selection may favour the micro-organism at the potential locations of introduction, the nature of this selection should be described.

4.2.3.6 Description of the procedures for the introduction of the micro-organism (Sched. XV 3(d), XVIII 4(c))

(i) Method of application

The proposed equipment and methods of application for the micro-organism should be described, including how the micro-organism is to be sprayed, injected, poured, inoculated, or otherwise introduced. This should include reference to the physical form of the micro-organism (e.g., powder, solution, mist), the nature of any carrier medium (e.g., aerosol, liquid, solid), the media (air, land, water) into which the micro-organism will be introduced. A description of any necessary biosafety procedures such as handling precautions and personal protection equipment should also be provided.

(ii) Quantity, frequency, and duration of application

A description of the intended and recommended quantity, frequency, and duration of application for the micro-organism, including identification of the density to be applied, rate of application, an estimate of the total number of micro-organisms to be applied, and whether multiple applications are intended or recommended should be provided.

(iii) Activities associated with the introduction

Notifiers should describe any recommended activities associated with the introduction of the micro-organism (e.g., addition of surfactants or amendments of nutrients, aeration or venting of oxygen, mixing or tilling). If there are no associated activities, then this should be specified.

4.2.3.7 Description of any contingency plans for accidental release (Sched. XV 3(e))

A description of any contingency plans for handling accidental releases of the micro-organism, including any available decontamination or control equipment and criteria for determining when contingency plans should be initiated should be provided. If there are no contingency plans, then this should be specified.

4.2.3.8 Description of any recommended procedures for terminating the introduction of the micro-organism (Sched. XV 3(f))

A description of any recommended procedures necessary for terminating the introduction of a micro-organism, involving the identification of demobilization and site restoration activities should be provided. This should include information concerning shut-down and removal of equipment from locations of introduction. If there are no recommended procedures, then this should be specified.

4.2.3.9 Description of confinement procedures and their effectiveness in restricting the dispersal of the micro-organism from the locations of introduction (Paragraph 29.11(2)(b))

This information requirement applies only to the notification of a micro-organism for manufacture or import for introduction in accordance with confinement procedures (paragraph 29.11(2)(b) of the Regulations). Descriptions of the following should be provided:

- all potential sources of micro-organism release from physical structures and site perimeters, including process streams (gases, liquids, and solid wastes) and potential dispersal vectors (e.g., animals, humans);

- all confinement procedures for restricting micro-organism concentration, viability, and dispersal for each potential source of release identified above; and

- the effectiveness of each confinement procedure identified above.

If micro-organisms are intended for use in physical structures such as enclosed bioreactors, identification of the model and manufacturer of the structure should be provided.

4.2.4 Information in respect of the site of the experimental field study/introduction (Sched. XVII 3, XVIII 3)

The information requirements in Sections 4.2.4.1 to 4.2.4.8 of these Guidelines apply to the notification of a micro-organism for introduction in an experimental field study (Schedule XVII). Item 4.2.4.1 also applies to the site of introduction for notifications under Schedule XVIII.

Where the experimental field study consists of introduction of the micro-organism into more than one site, the information should address each site of introduction.

4.2.4.1 Location and a map (Sched. XVII 3(a), XVIII 3)

The exact location of the experimental field study site or site of introduction should be clearly identified and located on a geographic map. The municipality, county, province, and address if available, for the site should also be identified.

4.2.4.2 Size (Sched. XVII 3(b))

The length, width and depth of the site should be identified including any buffer zones.

4.2.4.3 Distance to populated areas (Sched. XVII 3(c))

The distance to the nearest habitation should be identified.

4.2.4.4 Distance to any protected areas (Sched. XVII 3(d))

Notifiers should indicate the distance to any nearby designated protected areas, including national parks, wildlife reserves, and bird sanctuaries. If there are no protected areas within 100 Km, then this should be specified.

4.2.4.5 Description of the geological landscape at the site and surrounding the site (Sched. XVII 3(e))

Notifiers should describe the physical and chemical characteristics of the environment at and closely surrounding the site. This should include a brief summary of the geological landscape (e.g., flat, hilly), and for terrestrial applications, a brief description of the slope of the land and soil types (e.g., clay, sand).

A brief description of any water bodies, either surface water or underlying aquifers, at and surrounding the site should also be provided. This should include an estimate of the distance to water bodies for terrestrial applications and the likelihood that they could serve as means of dispersal for the micro-organism.

Notifiers should identify any chemical in significant quantity at the site such that its exposure to the micro-organism could result in adverse ecological effects. This includes any substances other than a target chemical (e.g., other contaminants known to occur at a waste site), that could be degraded by the micro-organism, producing a significant quantity of toxic by-products.

4.2.4.6 Description of the biological diversity found at site and surrounding the site (Sched. XVII 3(f))

Notifiers should briefly describe the biological diversity at and surrounding the site. While a detailed taxonomic inventory is not required, notifiers should identify the most common species of plants and animals at the site, and closely surrounding the site, to identify those that could be exposed to the micro-organism. Notifiers should consider identifying migratory species that might transit at the site when the experimental field study is to take place.

Any plant or animal species of economic or social importance that could occur at or closely surrounding the site should also be identified, including species of importance to agriculture, forestry, and fisheries.

(i) Identification of the endangered or threatened species
Any endangered or threatened species that could occur at the site, or closely surrounding the site, should be identified. Species are designated as endangered or threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

A list of these species is published each year and can be obtained from:

Endangered Species Conservation
Canadian Wildlife Service
Environment Canada
Ottawa, Ontario
K1A 0H3

Telephone: (819) 953-4389
Facsimile: (819) 953-6283
Web site: http://www.speciesatrisk.gc.ca/sar/main.htm

(ii) Where infectivity, pathogenicity to non-human species, toxicity or toxigenicity have been identified in subitem 1(f)(i) of Schedule XVII, identification of any receptor species.

If a micro-organism is known to be associated with infectivity, pathogenicity, or toxigenicity, any plant or animal species that are potential receptors (e.g., hosts) for the micro-organism, and that could occur at the site, or closely surrounding the site, should be identified.

4.2.4.7 Comparison of the natural habitat of the micro-organism to the habitat at the site of the experimental field study, and the nature of selection that may operate on the micro-organism at that site (Sched. XVII 3(g))

Notifiers should describe the natural habitat and geographic distribution of the micro-organism, or of the parental micro-organism for micro-organisms that are genetically modified. A comparison of the natural habitat of the micro-organism, or parental micro-organism and the proposed environmental introduction site should also be provided. Where it is anticipated that natural selection may favour the micro-organism at the site, the nature of this selection should be described.

4.2.4.8 Where the micro-organism is indigenous, data to demonstrate that it is indigenous (Sched. XVII 3(h))

This information requirement applies only where the manufacture or import is for an experimental field study with a micro-organism that is "indigenous" as defined in subsection 2(1) of the Regulations. A micro-organism that has been deliberately modified will not be considered indigenous. The ecozones for defining indigenous are outlined in the map referred to in the definition of "ecozone" in subsection 2(1) of the Regulations. A reduced version of this map is provided in Appendix 2. Further information on ecozone boundaries can be obtained from the NSN Information Line (see page i of these Guidelines).

Data should demonstrate that the micro-organism is indigenous to the ecozone of the intended experimental field study. These data should show the micro-organism was either isolated from the ecozone of the intended field study, or that it is taxonomically identical, at least to the species level, to a micro-organism known to occur naturally in the ecozone of the field study.

4.2.5 Information in respect of the experimental field study/introduction (Sched. XVII 4, XVIII 4)

The information requirements in Sections 4.2.5.1 to 4.2.5.10 of these Guidelines apply to notification of a micro-organism for manufacture or import for introduction in an experimental field study (Schedule XVII). Sections 4.2.5.3 and 4.2.5.10 also apply to the introduction of a micro-organism notified under Schedule XVIII.

4.2.5.1 Objectives of the experimental field study (Sched. XVII 4(a))

The objective of the experimental field study should be described.

4.2.5.2 History of use of the micro-organism (Sched. XVII 4(b))

A description should be provided of any history of use of the micro-organism in Canada or any other country, including the length of time the micro-organism has been used and any

other known uses, such as experimental field studies. If there is no history of use, then this should be specified.

4.2.5.3 Start date and duration (Sched. XVII 4(c); XVIII 4(b))

The estimated start date and duration of the experimental field study or introduction should be provided.

4.2.5.4 Description of procedures for transporting the micro-organism to and from the site of the experimental field study (Sched. XVII 4(d))

A description of the mode of transporting the micro-organism to and from the site, as well as the packaging and labelling of the micro-organism for transport should be provided.

4.2.5.5 Description of the procedures and design for the experimental field study (Sched. XVII 4(e))

A description of the experimental design and procedures for the field study should be provided, and should include a protocol for introducing the micro-organism and a brief summary of the statistical design and control treatments for the study.

(i) Method of application of the micro-organism
A description of the proposed equipment and methods of application for the micro-organism should include how the micro-organism is to be sprayed, injected, poured, inoculated, or otherwise introduced. There should be reference to the physical form of the micro-organism (e.g., powder, solution, mist), the nature of any carrier medium (e.g., aerosol, liquid, solid), and the media (air, land, water) into which the micro-organism will be introduced.

(ii) Quantity, frequency, and duration of application of the micro-organism
The quantity, frequency, and duration of application for the micro-organism should be described, including the micro-organism density to be applied, rate of application, an estimate of the total number of micro-organisms to be applied, and whether multiple applications are intended or recommended.

(iii) Any activities associated with the experimental field study
Any planned activities associated with the application of the micro-organism in the experimental field study (e.g., addition of surfactants or amendments of nutrients, aeration or venting of oxygen, mixing or tilling) should be described. If there are no associated activities, then this should be specified.

4.2.5.6 Description of any procedures for monitoring the micro-organism and its ecological effects at the site of the experimental field study, during and after the experimental field study (Sched. XVII 4(f))

A description of any procedures for monitoring the micro-organism and its ecological effects during and after the experimental field study, including the number of samples, frequency and duration of sampling, and types of samples (e.g. soil, water) at the site and closely surrounding the site, should be provided. The notifier should also include a description of procedures for observing and recording any potential adverse ecological effects. If there are no procedures for monitoring the micro-organism, then this should be specified.

4.2.5.7 Description of the security measures at the site of the experimental field study (Sched. XVII 4(g))

A description of any security measures for controlling public access and for preventing access by potential animal vectors, as well as procedures for maintaining records of site activities, should be provided. The person in charge of the experimental field study and all other personnel conducting the study should be identified, along with procedures for communicating with field study personnel at the site. If there are no security measures, then this should be specified.

4.2.5.8 Description of any contingency plans for accidental release (Sched. XVII 4(h))

A description of any contingency plans for handling accidental releases of the micro-organism, including any available decontamination or control equipment and criteria for determining when contingency plans should be initiated, should be provided. If there are no contingency plans, then this should be specified.

4.2.5.9 Description of any recommended procedures for terminating the experimental field study (Sched. XVII 4(i))

A description of any procedures recommended for terminating the experimental field study, including demobilization activities, shut-down and removal of equipment from the study site, should be provided. If there are no recommended procedures, then this should be specified.

4.2.5.10 Description of any confinement procedures and biosafety conditions for the micro-organism at the site of the experimental field study, and a description of their effectiveness (Sched. XVII 4(j); XVIII 4(d))

Notifiers should provide a detailed description of any confinement procedures and safe practices proposed to conduct the experimental field study or introduction. Appropriate confinement procedures and safe practices should be based on the characteristics of the micro-organism, its use, and the introduction environment. A pre-notification consultation may assist notifiers in this regard. If no confinement procedures or biosafety conditions are proposed, then this should be specified.

4.2.6 Information in respect of the environmental fate of the micro-organism (Sched. XV 4; XVII 5)

4.2.6.1 Identification of plant and animal species likely to be exposed and, where infectivity, pathogenicity to non-human species, toxicity and toxigenicity have been identified, the identification of the receptor species likely to be exposed (Sched. XV 4(a))

Notifiers should identify potential plants and animals that could be exposed to the micro-organism, based on its intended introduction. A detailed taxonomic inventory is not required, but rather, an identification of common and economically important plant and animal species that could be reasonably inferred to occur at potential locations of introduction. Particular attention should be paid to identifying any receptor species known to be susceptible to the micro-organism (e.g., hosts for a pathogen).

4.2.6.2 Description of habitats where the micro-organism may persist or proliferate (Sched. XV 4(b); XVII 5(a))

A description of potential habitats where the micro-organism could persist or proliferate should be provided. This includes a reference to the known habitat specificity of the micro-organism and the likelihood of it reaching suitable habitats for proliferation based on its intended introduction.

4.2.6.3 Estimated quantities of the micro-organism in the air, water and soil at the points of introduction, and the estimated population trends (Sched. XV 4(c); XVII 5(b))

The notifier should estimate the quantities of the micro-organism to be introduced into the environment and the persistence of the micro-organism in the environment. The concentration of micro-organisms in the formulation, the amount of formulation used, the method of application, and frequency of application should be used to estimate concentrations of micro-organisms in air, water, and soil during application. The calculations and basis for deriving the estimated values should be included.

Notifiers should indicate whether the quantities of micro-organisms are likely to persist above background levels for an extended period of time, and result in elevated or unusual levels of exposure to plants, animals and the human population. Population trend estimates at time points after application should be based on survival data, and may be obtained from the primary literature or data already collected. The estimate should be based on pertinent data and a strong scientific rationale. Modelling data may be used to supplement, but not replace, data collected from laboratory or field studies. Modelling data should be appropriate for the conditions of use, and all assumptions made during the development of the model should be stated. If no relevant data are available from the literature or other sources mentioned above, the notifier should generate data sufficient to

indicate whether populations of the micro-organism will increase, remain the same, or decrease (in air, water and soil) under conditions that simulate those of the intended use.

The following should be used to estimate quantities and trends where appropriate:

- the presence of survival structures (e.g., spores);
- limitations on growth and survival;
- selection mechanisms;
- biological factors (other organisms within the environment);
- physical and chemical factors.

4.2.6.4 Any other information on the environmental fate of the micro-organism (Sched. XV 4(d); XVII 5(c))

Any known information on the persistence, proliferation, or dispersal of the micro-organism in the environment from experimental field studies or other sources should be provided.

4.2.7 Information in respect of the ecological effects of the micro-organism (Sched. XV 5; subsection 29.11(2); XVII 6)

4.2.7.1 Data from tests conducted to determine the effects of the micro-organism on plant, invertebrate, vertebrate species (Sched. XV 5(a) and paragraph 29.11(2)(a))

This information requirement applies to the notification of a micro-organism to be imported or manufactured for introduction anywhere in Canada or for introduction into an ecozone where it is not indigenous (subsection 29.11(1) and paragraph 29.11(2)(a) of the Regulations). Data on the effects of the notified micro-organism on appropriate plant, invertebrate, and vertebrate species from the aquatic and terrestrial environments should be provided. Data from six tests (aquatic plant, vertebrate and invertebrate species as well as terrestrial plant, vertebrate and invertebrate species) should be provided for notifications under subsection 29.11(1), whereas three tests (aquatic plant, vertebrate and invertebrate species or terrestrial plant, vertebrate and invertebrate species) should be provided for notifications under paragraph 29.11(2)(a) of the Regulations. These data should be provided from *in vivo* animal or plant tests. Data from *in vitro* tests (e.g., cultured cells) or from methods such as gene probes may be considered in some circumstances.

In some cases, it may not be necessary for a notifier to conduct tests. For example, some appropriate test data may already be available for the notified strain from the scientific literature or other sources. Appropriate surrogate test data for other closely related micro-organism strains may also be available. In other cases, a waiver from providing data may be granted if, in the opinion of Environment Canada, the information is not needed to determine whether the living organism is "toxic" or capable of becoming toxic, or it is not practicable or feasible to obtain the test data necessary to generate the information (see

Section 5 of these Guidelines). However, if relevant test data are not available, and a waiver is not applicable, then notifiers should conduct tests to obtain the necessary data.

Pre-notification consultation with Environment Canada is strongly encouraged for guidance in determining testing requirements and requesting waivers.

Purpose

Pathogenicity and toxigenicity towards aquatic and terrestrial organisms are major effects of concern regarding the widespread environmental introduction of a micro-organism. While many microbial pathogens have a very narrow host range, other microbial pathogens may affect a wide range of species. Similarly, different toxins may vary considerably in the specificity of their effects. The purpose of the following section is to provide guidance for obtaining appropriate data that will allow assessment of pathogenicity and toxigenicity concerns associated with a micro-organism. A careful selection of test species considering the characteristics of a micro-organism and its intended use, and a maximum hazard dose approach to testing is recommended to obtain the data for assessment.

Selection of test species

The appropriate plant, invertebrate, and vertebrate species to be tested depends upon the known characteristics of the micro-organism and its intended use.

Notifiers should first consider the characteristics of the micro-organism and any known adverse effects associated with it. For example, if the micro-organism is known or suspected to be a pathogen, selection of test species should consider the most likely host species. If there is no evidence that a micro-organism is a pathogen, but it has closely related species (perhaps within the same genus) that are known to be pathogens, then selection of test species should again consider the most likely host species. When selecting the most likely host species, a centrifugal taxonomic approach should be considered (e.g., identify the Canadian test species most closely related to a known host). For genetically modified micro-organisms, selection should be based on the characteristics of both the parental micro-organism and the donor organism.

If there is no reason to suspect that the micro-organism or its close relatives are pathogens or capable of producing toxins, then notifiers should consider selecting test species based upon the characteristics of the intended use of the micro-organism. Notifiers should consider the probable commercial use pattern of the micro-organism and the plant and animal species likely to be exposed to the micro-organism. If any plant, invertebrate, or vertebrate species are obviously expected to be exposed to high concentrations of the micro-organism, then these species should be considered for testing. Priority should be given to those that are of significant ecological or economic importance.

Finally, if there is no suspicion that the micro-organism is a pathogen or toxin producer, and there is no obvious basis for expecting certain plant, invertebrate, or vertebrate species to receive high exposure to the micro-organism, then representative Canadian

species of ecological or economic importance should be tested. For example, the following species might be considered:

- plants such as the aquatic duckweed, *Lemna* sp., and important agricultural or forestry species;

- invertebrates such as daphnids, *Daphnia* sp. or *Ceriodaphnia* sp., and the honey bee, *Apis mellifera*; and

- vertebrates such as rainbow trout, *Oncorhynchus mykiss,* and the mallard duck, *Anas platyhynchos*.

These species are generally found across Canada, they have some ecological or economic importance, they are familiar test species that should be readily available, and they have been widely used as test species for assessing the ecological effects of a variety of environmental stressors. However, it must be emphasized that, due to the host specificity of many microbial pathogens, notifiers should make every effort to select test species based upon the known characteristics of their micro-organism and its intended use.

Selection of test methods

The design of appropriate test methods depends upon the characteristics of the micro-organism and its intended use. For micro-organisms that are suspected of being pathogens, existing *in vivo* pathogenicity test methods can be used as guidance for providing data. The specific test method used should match the infectivity requirements of the suspected pathogen and host and should be capable of detecting both infection and disease symptoms. Where there is no suspicion of pathogenicity, notifiers can rely on standard toxicity test methods designed to assess chemicals as guidance for providing data. Consistent with the maximum hazard dose approach to testing, the conditions of the test method should optimize the chances of detecting an adverse effect.

The most sensitive life cycle stage of the test species should be chosen to optimize the chances for detecting an adverse effect. The use of immature animals in tests is recommended considering that sufficient immunological and physiological differences exist between immature animals and mature animals to suggest that immature animals are potentially more susceptible to infection and possibly to the adverse effects of a micro-organism. For example, young fish and larval stages of invertebrates should be used whenever possible. Plant species should also be treated at the life cycle stage most likely to be susceptible.

Notifiers are strongly encouraged to contact Environment Canada if they are considering *in vitro* tests (e.g., cultured cells), microcosm tests, or methods such as gene probes for obtaining the data for notification. In many cases data from *in vitro* tests may be inappropriate because of the difficulties of extrapolation to effects on whole test organisms. However data from an appropriately designed microcosm test may be considered on a

case-by-case basis, if the test could provide meaningful maximum hazard effects data. Considerable understanding of the characteristics of the micro-organism and its intended use is required before a microcosm test system can be properly designed. The applicability of other methods such as the use of gene probes would need to be supported by a strong scientific rationale.

The laboratory practices used to develop test data should be consistent with the *Principles of Good Laboratory Practice* set out by the Organization for Economic Cooperation and Development (OECD).

Test micro-organism

The test micro-organism should be tested within the formulation of the commercial product. A formulation vehicle other than water or saline used to dilute the micro-organism should not enhance, reduce, or alter the pathogenic or toxic characteristics of the test micro-organism.

For microbial products that are a formulated mixture of pure cultures of micro-organisms, the mixture itself does not require notification although each pure culture within the product should be notified separately. Notifiers will not be required to test the effects of each pure culture in the mixture separately on plant, invertebrate, and vertebrate test species. For these microbial products, data from testing the whole mixture together should be provided. However, notifiers should also consider the known characteristics of pure cultures in a mixture, and in cases where there is reason to suspect masking of effects, the notifier should also consider testing some pure cultures separately.

For microbial products that are complex natural unformulated combinations of micro-organisms (e.g., consortia), testing should be conducted using the entire consortium. The test must represent the combined activities of the consortium constituents and should include some monitoring to ensure appropriate concentration or dose of micro-organisms (e.g., cell counts, organic carbon content). Notifiers should also consider the known characteristics of the consortium and its source, and in cases where there is reason to suspect the presence of animal or plant pathogens, screening for these pathogens should be considered.

Maximum hazard dose/concentration

Test organisms should be exposed to a "maximum hazard" concentration or dose of the micro-organism. If no adverse effects are observed at this maximum hazard concentration, additional testing of lower concentrations or doses of the micro-organism will not be necessary.

The maximum hazard concentration or dose should be 10^6 cells/mL or g, or 1000 times the expected micro-organism concentration in the environment, whichever is greater.

Route of exposure and test requirements

Where there is a suspicion of pathogenicity, test organisms should be treated using the route of exposure most likely to lead to infection. Otherwise, test organisms should be treated using the same route of exposure anticipated to be the most significant route of exposure in the environment. Notifiers should consider the potential for inhalation and ingestion.

At least 30 test organisms should be included in both the maximum hazard treatment group and control groups. Fewer test organisms may be required if there are multiple test groups for testing different micro-organism concentrations or doses.

Aquatic tests should be conducted as static renewal tests (test solutions are replaced periodically during the test) and the concentration of the micro-organism in the water should be monitored to ensure the test organisms are sufficiently exposed throughout the test period. A static renewal test should ensure that a high concentration of the micro-organism can be maintained in the test system and that this concentration does not lower water quality to an unacceptable level. If possible, consideration should be given to simultaneously administering the micro-organism to aquatic animals as a suspension in the water (aqueous exposure) and in the diet in the form of treated feed. This multiple route of exposure should help ensure a wider range of potential exposure routes is tested.

Regular observations are required to record mortalities and monitor sublethal effects (e.g., behavioral, pathogenic, or toxic effects). Gross necropsy, histopathological examination and culture and isolation should be performed on exposure site tissues and other organs showing anatomical or physiological abnormalities. In cases where tissue preferences are known or suspected, those tissues should be examined whether or not gross anatomical or physiological changes are seen. These observations should be collected in the context of the ability to subsequently diagnose any suspected disease or toxicity caused by the micro-organism after introduction into the environment.

Duration of test

The duration of the test should be determined based upon whether there is a suspicion of pathogenicity. For cases of suspected pathogenicity, the duration of the test should permit time for incubation, infection, and manifestation of effects in the test organisms. For other cases, chronic tests should be conducted except where there is evidence indicating the micro-organism will not persist in the environment, in which case acute tests may be appropriate.

In general, the maximum hazard dose of the micro-organism should be administered daily for 5 days, and for animals, the test should be 30 days long. For animals that are difficult to culture, or that have short life spans, a shorter test duration may be appropriate. Plants should be observed regularly until normal harvest or death, or, as in the case of perennials, at periodic intervals for at least the time required to adversely affect the plant. If a sublethal infection is observed in test organisms before the test is over, it may be necessary to continue the observation period to more accurately assess the significance of the infection (e.g., will it be lethal?).

Control groups
Test organisms subject to treatments with the micro-organism should be accompanied by an appropriate untreated (negative) control group of test organisms which is not exposed to the micro-organism. Control groups should be used to ensure that any observed effects are associated with the micro-organism exposure and should be identical in every respect to the treated test organisms except for exposure to the micro-organism. For example, the control test organisms should be from the same source, be of the same age, and receive the same nutrition and care as the treated test organisms. To prevent bias, test organisms should be randomly assigned to control and treatment groups.

Wherever possible, notifiers should attempt to establish a positive control group with a relevant, closely related micro-organism to ensure that the test system is capable of detecting an adverse effect.

Reporting of data
Notifiers should provide all information necessary for a complete and accurate description of the test procedures, and all data, information, and analysis necessary for Environment Canada to reach an independent conclusion. This should include justification for choosing a particular test species and test method and a statistical analysis of differences between the maximum hazard group and control groups.

Where adverse effects are found from a maximum hazard concentration or dose, additional testing over a range of concentrations or doses should be considered to establish an effect threshold. In these cases, an attempt should be made to establish an LC50 or LD50 and 95% confidence limits.

4.2.7.2 Involvement of the micro-organism in adverse ecological effects (Sched. XV 5(b), XVII 6(a))

Information indicating any potential involvement of the micro-organism in any adverse ecological effect should be provided, based upon a review of the scientific literature. This includes any adverse effects related to plants and animals (e.g., infection, disease), ecological processes (e.g., biogeochemical cycling) and any other adverse ecological effect not already addressed under the information provided under Section 4.2.1.6 of these Guidelines.

Whereas the information referred to in Section 4.2.1.6 of these Guidelines pertains specifically to the notified micro-organism, the information required in this section addresses broader consideration for identifying potential adverse ecological effects. For example, the notifier should consider if closely related micro-organisms are known to have the potential to produce an adverse ecological effect (e.g., if they produce a toxin). Notifiers should determine the need to consider the characteristics of closely related species based on the extent of known information for the notified micro-organism (e.g., for

a poorly known micro-organism, information should include a better characterization of its close relatives).

4.2.7.3 Potential of the micro-organism to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity (Sched. XV 5(c); XVII 6(b))

A brief summary of the potential of the micro-organism to displace species and alter ecosystems should be provided. Particular consideration should be given to the potential for adverse effects on threatened and endangered species, and unique and protected ecosystems. A brief summary of the potential of the micro-organism to adversely affect the sustainable use of biological diversity in resource sectors such as agriculture, fisheries, and forestry, with particular attention to economically important species should also be provided.

4.2.8 Information in respect of the human health effects of the micro-organism (Sched. XV 6; XVI 4; XVII 7; XVIII 5)

The following section will help notifiers provide technical information on the human health effects of the micro-organism. Where information from a review of the scientific literature is sufficient to satisfy the information requirement (see Section 4.1 of these Guidelines), notifiers should search Medline, Embase or Biosis Previews for information on the human health effects of the micro-organism. Other sources which could be consulted include recognised government health reports (e.g., from Laboratory Centre for Disease Control, Canada, and Centers for Disease Control, United States). The search should provide information to give a complete and thorough overview of any known involvement of the micro-organism in an adverse health effect or the lack of any documented adverse health effects caused by the micro-organism.

The literature search should provide information, such as, but not limited to the following:

- the number of cases reported;
- the nature and severity of the effect;
- availability of treatment;
- specific geographical locations where reported cases were most prevalent;
- differences in nature of exposure leading to the adverse effects; and
- any other predisposing factors related to the effect.

4.2.8.1 Any documented involvement of the micro-organism in adverse human health effects, and a description of the characteristics of the

micro-organism that distinguish it from known pathogens (Sched. XV 6(a); XVI 4(a); XVII 7(a); XVIII 5(a))

Information indicating any known involvement of the notified micro-organism, in any adverse human health effect, should be provided. A health hazard would include, but not be limited to, infection, disease, adverse immunologic reactions and toxicosis.

Notifiers should provide documentation of adverse health effects for all micro-organisms contributing to the final product, i.e., host micro-organism and all gene donors. In the case of a gene donor for which there is an association with adverse effects but where the donated genetic material is not associated with the effects, information substantiating the lack of association should be provided.

4.2.8.2 Data from tests of antibiotic susceptibility (Sched. XV 6(b); XVI 4(b); XVII 7(b))

Antibiotic susceptibility tests should be performed on the specific micro-organism being notified. The notifier should submit data on the minimal inhibitory concentrations (MIC) for a range of antibiotics to which the micro-organism has been tested. The antibiotics used should be selected from each of the major antibiotic classes, (aminoglycoside, macrolide, beta-lactam, tetracycline, fluoroquinolone). In the case of beta-lactams, test compounds should include representatives from each class (penicillins, first, second and third generation cephalosporins, monobactams, cephamycins).

The data should be derived from standard MIC tests using 24- and 48-hour growth periods at the temperature and in media (nutritive) which normally support growth of the micro-organism being tested. The use of liquid assays, either in standard test tubes or in micro-assay plates, is preferred, since these data are more likely to provide a result directly comparable to data provided for other members of the same genus in the literature. Each bacterial species should be run in triplicate, and data from two separate runs should be provided. The use of a standard growth media, supplemented with the antibiotic to be tested, is encouraged.

The definition of susceptible or resistant can be derived from the medical literature with the premise that a micro-organism should be considered resistant to an antibiotic if its MIC is higher than one-half of the concentration of that antibiotic normally achievable *in vivo*.

Where micro-organisms are considered resistant to the majority of the antibiotics tested, data from synergistic combinations of different antibiotics may be submitted to provide a broader potential base for a treatment protocol.

Testing of consortia should follow the above criteria. The media and growth conditions used should support the growth of most, if not all, of the micro-organisms in the consortium. Growth under both aerobic and anaerobic conditions should be attempted. Testing of consortia may result in breakthrough of some of the micro-organisms, and any micro-

organisms within the consortium producing enzymes capable of community protection (e.g., beta-lactamases or aminoglycoside modifying enzymes) may confer resistance on the entire population. As such, it is suggested that consortia filtrates be tested for protection of a susceptible control micro-organism. Where the consortium is suspected to contain fungi, antifungal agents (amphotericin B, flucytosine, nystatin, ketoconazole) under both anaerobic and aerobic growth conditions should be tested.

4.2.8.3 Data from tests of pathogenicity that are valid for related micro-organisms that are pathogenic to humans (Sched. XV 6(c))

Pathogenicity tests should be performed on the specific micro-organism that is being notified, and may be conducted on either tissue culture cell lines or in whole animals. The particular test used should reflect tests described in the literature to detect pathogenicity of the notified species or other species within the same genus. Notifiers should choose the most appropriate test for the species. Preferred tests are those with clearly defined and measurable endpoints. If an animal model is used, the model should have the potential to detect invasion and adhesion as well as toxin production by the notified micro-organism. The tested material should be applied at least at 100 times the expected casual exposure rate for individuals applying the product and should reflect possible modes of exposure to the micro-organism when in use.

Whole animals selected to generate test data should be appropriate for the micro-organism being tested. Literature supporting this contention should accompany the submission. Similarly, data from cell lines should be accompanied by literature that supports the detection of toxins, adhesion or invasion for other members of the same microbial genus on the particular cell lines used.

If no suitable models are available or if the micro-organism is not related to any known pathogens, data from tests for toxin production should be provided. At least three different cell lines should be used to detect toxic materials produced by the notified micro-organism. For example, CHO (Chinese hamster ovary), Vero (African green monkey kidney) and HeLa (human epithelioid carcinoma, cervix) cell lines are suggested for surveillance of enterotoxins (both heat labile and heat stable), cytotoxins and cytolysins. These cell lines may be used also to detect microbial adhesion and invasion. Data from testing of other cell lines and/or combinations of different cell lines also will be acceptable, provided literature detailing their ability to detect pathogenic events for the species in question accompanies the submission. Data from positive and negative controls should be included with the test data, irrespective of the test procedure.

For consortia, pathogenicity tests should be done on the formulation. Since the formulation must be used for these tests, controls utilizing any chemical fillers and positive and negative micro-organism controls should be provided along with the test data on the formulation. The purpose of the micro-organism controls is to show that the chosen test system responds to positive but not to negative challenge. The choice of control micro-organisms is left to the discretion of the proponent, but should reflect species found in the

consortium (culturable micro-organisms) or species which could be suspected of being contained within the consortium (based upon literature reviews of micro-organisms found within sites analogous to the origin of the consortium).

4.2.8.4 Potential for adverse immunologic reactions in persons exposed to the micro-organism (Sched. XV 6(d))

Information regarding the micro-organism's capability to elicit adverse immunological reactions including hypersensitivity should be provided. Submitted information should include a detailed report on any incidents of hypersensitivity or similar adverse effects reported among people exposed to the micro-organism, and documentation of reported hypersensitivity reactions associated with similar micro-organisms. Information should include the type of effect, the nature of exposure preceding the effect, the frequency, duration and severity of the effect and the proportion of persons exposed who displayed the reaction. Where no reactions are reported, the notification should indicate how long there was potential exposure, the nature of this potential exposure, the number of persons potentially exposed, and the system in place for reporting effects.

4.2.8.5 Estimated number of persons that may become exposed and the degree of exposure to the micro-organism (Sched. XV 6(e); XVII 7(c); XVIII 5(b))

Notifiers should estimate the number of persons (in the general population and in occupational settings) who may be exposed to the micro-organism. This estimate should include information obtained from any studies of the level of exposure to employees, customers, and the public from the use of the micro-organism at each of the stages in the micro-organism's life cycle, including:

- manufacturing (including research and development, pilot plant, and commercial production);
- transportation and handling;
- processing;
- storage;
- intended use; and
- disposal, destruction, and recycling.

Not all individuals in a given population may be equally exposed. Therefore, when information is available, the possible routes of exposure at each stage should be included and the exposure should be described as quantitatively as possible.

4.2.9 Additional Information (Sched. XV 7; XVI 5; XVII 8; XVIII 6)

All other information and data relevant to environmental and health hazard identification should be provided, such as:

- experimental data (including negative results);
- summaries of literature reviews;
- results of searches from databases;
- results of studies of the risk to employees, customers, public, or the environment (e.g., environmental fate modelling) that may result from the use of the micro-organism.

Additional information encompasses information in the person's possession or to which the person should reasonably have access. "In the person's possession" means information in the company's offices in Canada or, if the notification was submitted by a foreign company through a Canadian agent, the offices in the country where the notification originated. The phrase, "to which the person ought reasonably to have access," means information in any of the company's offices worldwide, or other locations where the person can access the information.

Information on possible environmental benefits resulting from the manufacture or use of the micro-organism should also be provided. Following are some examples of such benefits:

- The micro-organism is a less toxic substitute for an existing substance or technology; or
- The manufacture or use of the micro-organism will generate less waste than an existing substance.

Any additional information may be provided in the language in which the information was originally prepared.

4.2.10 Other agencies notified (Sched. XV 8; XVI 6; XVII 9; XVIII 7)

Information should be provided of any known circumstances where the import or manufacture of the micro-organism has been notified to another agency or government, and the purpose of such notification should be given. For example, the Ontario Ministry of Labour may have been notified of the import of a new substance for use in an occupational setting, or an American supplier may have notified the United States Environmental Protection Agency under the pre-manufacture notification provisions of the Toxic Substances Control Act (TSCA).

4.2.11 Description of the test procedures (Sched. XV 9; XVI 7; XVII 10; XVIII 8)

The conditions and test procedures used to develop and report test data should be described and should be consistent with established procedures. At present, there are no specific guidelines for testing micro-organisms. However, many of the methods that will be applicable are available in standard reference texts or procedures (e.g., food and water testing). The notifier should clearly indicate the test that was used and its source. The notifier should also provide a description of the test procedures followed in developing test data including reference substances and quality control and quality assurance procedures as well as a description of how a test was performed where the test is not a standardized procedure.

4.3 Organisms other than Micro-organisms

4.3.1 Information in respect of the organism (Sched. XIX 1)

4.3.1.1 Identification, or current taxonomic name to species or subspecies level, strain, synonyms, common names and trade name (Sched. XIX 1(a))

The correct identification of the organism is the cornerstone of all notifications; the taxonomic name should follow international codes of nomenclature and standard taxonomic sources (e.g., *Birds of Canada*, W.E. Godfrey, 1986, University of Chicago Press; *Freshwater Fishes of Canada*, W.B. Scott and E.J. Crossman, 1973, Bulletin of the Fisheries Research Board of Canada). Where standard taxonomic keys are not available, such as for many invertebrates, substantiation of the identification is encouraged. In general, a designation to the species or subspecies level is encouraged. If the genus and species are not known or are proposed, but not recognized, then the taxonomic family should also be provided. Experimental designation, strain name, variety, trade or common names, if known, should also be provided. If none are known or there are none, then this should be specified.

4.3.1.2 Strain history (Sched. XIX 1(b))

Information on the historical record of the organism from named varieties or strains, experimental designations or wild sources (e.g., country, region, accession number, reason for selection) to the strain that is proposed to be introduced should be provided. This information should include breeding methods or selection practices if used to develop the new organism.

4.3.1.3 Description of any modifications to the organism (Sched. XIX 1(c))

A description of any directed or intentional modifications made to the organism by any means should be provided. If none have been made, then this should be specified.

(i) Purpose of the modifications
A description of the purpose of each modification made to the organism should be provided.

(ii) Methods and steps taken to make the modifications
Notifiers should describe the methods and steps taken to make any directed or deliberate modifications to the organism either through classical, physical (e.g., natural hybridization), chemical (base analogues, acridines, nitrous acid, hydroxylamine, alkylating agents), or other mutagenesis techniques, or through other techniques, e.g., recombinant DNA techniques.

Where the organism has been modified using recombinant DNA techniques, the description should take into account the following areas:

- cloning strategies and procedures including schematic representations;
- vector construction details, and information on the functional elements contained within the vector (e.g., promoters and other regulatory elements, replication elements, structural genes, markers);
- gene transfer methods employed (e.g., agrobacterium-mediated transformation, virus-mediated transformation, electroporation, microinjection, ballistic injection);
- vector characteristics (e.g., pathogenic, disarmed).

There should be appropriate references to the published scientific literature.

(iii) Phenotypic and genotypic changes that resulted from the modifications
A description of the phenotypic and genotypic changes known to have resulted from the modifications to the organism, such as any known changes in physiological characteristics and biological functions, including unintended changes should be provided. The description should include expression levels, cellular location, and resulting alterations, additions, or deletions in nucleic acid sequence.

(iv) Genetic stability of the changes
A description of the stability (inheritance through several generations, site of integration, effect of selective pressure) of the phenotypic and genotypic changes known to have resulted from the modifications to the organism should be provided.

(v) Nature, source, and function of any introduced genetic material

A description of the nature, source, and function of any genetic material introduced into the organism should be provided, including the:

- size of any introduced genetic material;

- identity of all organisms that were sources of genetic material, including the taxonomic designation and any relevant hazard characteristics of donor organisms;

- functional characteristics of nucleic acids, level of expression, origin(s) of replication, coding and non-coding sequences used, vector type (e.g. bacterium, virus) and selection markers (e.g., antibiotic, heavy metal, physiological);

4.3.1.4 Description of the methods that can be used to distinguish and detect the organism (Sched. XIX 1(d))

Notifiers should provide a description with sufficient detail to uniquely identify the organism, to the level of species if the species is new to Canada, or to the level of strain if the species already exists in Canada. If the organism is not readily identifiable (to the naked eye), or distinguishable from organisms of similar appearance, then procedures to detect the organism in the environment should also be provided.

4.3.1.5 Description of the biological and ecological characteristics of the organism (Sched. XIX 1(e))

Information on the biological and ecological characteristics of an organism should be submitted to provide a basic understanding of the organism's behaviour in the environment. The information is that which is known from a review of the scientific literature and from results available in unpublished laboratory or experimental field studies. Notifiers are not required to generate data from tests to fulfil the information requirements outlined in the following.

(i) Life cycle

Notifiers should describe the known life cycle and life history stages of the organism, including any means to survive environmental stresses, such as dormant stages.

(ii) Reproductive biology, including species with which the organism could interbreed in Canada

Information should be provided to describe the mode of reproduction, importance of asexual reproduction if it occurs, the importance of any vectors or hosts and environmental factors required. In addition, information on the amount of propagule or egg production, average viability, generation time and fertile period as well as information to identify potential interspecific gene recipients in Canada, should be provided.

(iii) Involvement in adverse ecological effects including pathogenicity, toxicity and invasiveness

Notifiers should provide known information on pathogenicity characteristics of the organism, its capability to produce toxins and conditions under which toxins are produced, and the capability or tendency of the organism to invade ecosystems. The information should address the capacity of the organism to produce hazardous effects from accumulations of substances, (e.g., heavy metals), including susceptible species, dose and effects.

(iv) Description of the geographic distribution and habitat of the organism

A description of known native and introduced habitats, the geographic distribution with reference to ecozones (if organism found in Canada, see Appendix 3) and the global distribution (if organism not found in Canada) should be provided.

(v) Potential for dispersal of traits by gene transfer

Notifiers should describe outcrossing frequency with species described in (ii) above, the potential for gene transfer in Canada, and the potential for the transfer to result in viable hybrid organisms. These related species, and any hybrids that may develop, should be described with regard to their toxicity, pathogenicity and invasiveness, and population dynamics in the environment.

(vi) Locations and situations where the organism has caused adverse ecological effects

Notifiers should provide any known information on adverse ecological effects, where the organism was involved, and which are not specified in (iii) above. This includes any adverse effects related to plants and animals or ecological processes. The locations (in Canada or worldwide) of these incidents should also be provided.

(vii) Involvement in biogeochemical cycling

Information should be provided on any known involvement of the organism in biogeochemical cycles, including a summary of the role of the organism in mediating major biogeochemical cycles (e.g., carbon, sulphur and nitrogen).

(viii) Interactions with other organisms in the environment

Organisms with which the notified organism has significant interaction should be identified along with the nature and importance of the interaction (e.g., parasites, hosts, predators, prey, symbionts, competitors).

(ix) Conditions required for survival, growth, reproduction and overwintering

Information should be provided to describe known ranges and optima for significant environmental parameters like pH, temperature, salinity, oxygen and nutrient requirements pertaining to growth, survival and replication of the organism. Where survival, growth, or replication are known to be limited or enhanced by these parameters, including winter survival in Canada, this information should be provided.

(x) Capability of the organism to act as a vector for agents involved in adverse effects

Notifiers should describe the ability of the organism to act as a carrier for other organisms (e.g., parasites, pathogens, epiphytes) or substances involved in adverse ecological and human health effects, including pathogenicity, toxicity, and invasiveness.

(xi) Mechanisms of dispersal of the organism and modes of interaction with any dispersal agents

Information should be provided on the mode of dispersal of the organism and its propagules/eggs, etc., including modes of interaction with biotic and abiotic dispersal agents, vectors of propagules or eggs, and its ability to spread to other sites.

4.3.1.6 Identification of patent or other rights or any application for a patent or other rights (Sched. XIX 1(f))

If the notifier has been granted or has applied for a patent or other right, the authority under which the patent or other right was issued or applied for should be provided, as well as the patent or right number or application number. If more than one has been granted or applied for, then this should be specified.

4.3.2 Information in respect of the manufacture and importation of the organism (Sched. XIX 2)

4.3.2.1 Identification of manufacturers, importers, and vendors (Sched. XIX 2(a))

The name and location of the breeder, potential growers, importers and vendors of the organism should be provided. Information provided does not exempt other parties from notification obligations under these Regulations if they subsequently manufacture or import this notified organism. If there are no other manufacturers, importers or vendors, then this should be specified.

4.3.2.2 Description of the locations of manufacture in Canada (Sched. XIX 2(b))

Notifiers should describe the location of manufacture, including scale drawings or a map, the number of hectares or volume involved, and distance to populated areas and protected areas, such as national parks, wetlands, woodlots, and watercourses. If there are no locations of manufacture in Canada, then this should be specified.

4.3.2.3 Description of the product containing the organism (Sched. XIX 2(c))

Notifiers should provide a description of the commercial form of the organism (e.g., seeds, eggs, larvae, organisms mixed with inert carrier), and, if applicable, an inclusive list of the other components making up the formulation. This should include each ingredient and its relative concentration. Any known contaminants should also be identified.

4.3.2.4 Description of any recommended procedures for the storage and disposal of the organism (Sched. XIX 2(d))

Notifiers should describe any procedures for organism or propagule storage and disposal of organism, seed, egg, sperm, propagule or other material recommended by the manufacturer or importer. Procedures for the storage and disposal of the organism, seed, and propagules at the manufacturing facility should also be given, if applicable. If no procedures are recommended, then this should be specified.

4.3.2.5 Estimation of the quantity of the organism that was or will be imported or manufactured in Canada (Sched. XIX 2(e))

Notifiers should estimate the quantity of the organism to be imported or manufactured for the first 12 months and for the maximum 12-month period in the first three years. Quantitative units (volume, mass) should reflect the usual and customary physical state of the organism. Notifiers should also estimate how much product will be dispersed by a given vendor within the first 12 months, and the maximum amount distributed in a 12-month period for the first three years.

4.3.2.6 Description of the methods of manufacture and of quality control and quality assurance procedures (Sched. XIX 2(f))

A description of the manufacturing facility and of the strain development process, detailing the containment of the facility, breeding method and pedigree, propagation methods and methods to maintain genetic purity should be provided. Submitted information should include any testing conducted to verify that the notified strain is indeed the strain described. If there are no quality control or quality assurance procedures, then this should be specified.

Notifiers should describe the manufacturing premises, including floor plans that indicate the flow of personnel. material and product, details on the ventilation system (air handling zones, air flow), a flow diagram of the manufacturing process indicating the points of entry or exit of all raw materials and waste materials.

4.3.3 Information in respect of the introduction of the organism (Sched. XIX 3)

4.3.3.1 History of use (Sched. XIX 3(a))

A description should be provided of the history of any use of the organism in Canada or any other country. This description should consider the length of time the organism has been used and any other known uses, including experimental studies. If there is no history of use, then this should be specified.

4.3.3.2 Intended and potential uses of the organism and the potential locations of introduction (Sched. XIX 3(b))

A description of the intended and potential uses of the organism or product containing the organism should be provided. Potential locations of introduction includes identification, in general terms, of the ecozone (identified on the map referred to in the definition of "ecozone" a reduced version of which is given in Appendix 2) and types of habitat (e.g., aquatic, terrestrial) where the organism could be predicted to be used.

4.3.3.3 Description of the mode of action in relation to the intended use (Sched. XIX 3(c))

The notifier should provide known information on relevant biochemical breakdown pathways and end products for the notified organism. The description should indicate whether the organism functions by altering the physical, chemical, biophysical, biogeochemical or biological environment. This could include pH changes, sulphur reduction or cycling of other biogeochemicals, competition with other organisms, altering the biological environment through changing ecological interactions or some other mechanisms.

4.3.3.4 Description of the procedures for the introduction of the organism (Sched. XIX 3(d))

(i) Method and rate of introduction
Information detailing the means and rate by which the organism will be introduced including the recommended quantity, frequency, and duration of application should be provided.

(ii) Any activities associated with the introduction
Information detailing planned cultivation, habitat modification, harvesting and other practices should be provided. If there are no associated activities, then this should be specified.

(iii) Any recommended procedures for storage and handling of any surplus organism
Information detailing how organisms remaining after the introduction will be stored and handled should be provided. If no procedures are recommended, then this should be specified.

(iv) Any contingency plans for accidental release and any reproductive isolation measures. A description of any existing control and mitigation procedures for handling accidental releases of the organism should be provided. This includes contingency plans, any available control equipment and procedures and criteria for determining when control or mitigation procedures should be initiated. In addition, information detailing any recommended reproductive isolation measures should be provided. If there are no plans or measures, then this should be specified.

(v) Resistance to control agents

The identification of control agents (e.g., pesticides, herbicides, piscicides) to which the species is sensitive, but are not effective for the organism notified, should be provided.

4.3.3.5 Description of any recommended procedures for terminating the introduction of the organism (Sched. XIX 3(e))

Any recommended procedures for removing live organisms from the location of introduction should be provided, and could include any recommended means of killing the organism, such as pesticides, or other means of removal, such as nets or traps. If no procedures are recommended, then this should be specified.

4.3.3.6 Description of procedures for disposal of remaining biomass and residues of the organism (Sched. XIX 3(f))

Notifiers should describe procedures for disposal of remaining biomass and residues, such as material not incorporated into the product or waste products of the organism.

4.3.4 Information in respect of the environmental fate of the organism (Sched. XIX 4)

4.3.4.1 Estimated quantities of the organism in the environment and the estimated population trends (Sched. XIX 4(a))

The notifier should estimate the area or volume that the organism will occupy when introduced into the environment. The number of organisms to be introduced and the frequency of introduction should be based on the information provided in Section 4.3.3.4(i) of these Guidelines. In addition, any estimate of the ability of the organism to increase or decrease in numbers in the environment should be identified. The basis for these estimates should be clearly stated.

4.3.4.2 Description of habitats where the organism may persist or proliferate (Sched. XIX 4(b))

A description of habitats where the organism could potentially persist or proliferate should be provided. This should include reference to the known habitat specificity and known tolerance to habitat extremes of the organism, the conditions required for growth and reproduction, and the likelihood of it reaching suitable habitats for proliferation based on its intended introduction.

4.3.4.3 Identification of other species that are likely to be exposed to the organism and other species that are likely to be affected (Sched. XIX 4(c))

Notifiers should identify other species that could be exposed to the notified organism based on its intended introduction. A detailed taxonomic inventory of these species is not required, but the identification of common and economically important species that could be reasonably inferred to occur at potential locations of the organism's introduction should be provided. This includes any potential grazers, parasites, pathogens, competitors, predators, decomposers and symbionts. The notifier should identify species likely to be affected, adversely or positively, by the introduction of the organism.

4.3.5 Information in respect of the ecological effects of the organism (Sched. XIX 5)

4.3.5.1 Data from a test conducted to determine the pathogenicity, toxicity or invasiveness of the organism (Sched. XIX 5(a))

Data on the toxicity or pathogenicity of the organism toward invertebrate, vertebrate or plant species, or invasiveness in the environment should be provided.

Some appropriate test data may already be available for the notified strain from the scientific literature or other sources.

In those instances, pre-notification consultation with Environment Canada is strongly encouraged for guidance in determining testing requirements and requesting waivers.

A broad range of types of organisms can be notified under this schedule of the Regulations, and therefore, a broad range of types of tests can be conducted. For organisms other than micro-organisms that are microscopic but not micro-organisms according to the definition in the Regulations, refer to Section 4.2.7.1 of these Guidelines.

Notifiers are strongly encouraged to contact Environment Canada to determine whether microcosm or mesocosm tests are appropriate for obtaining the notification data. Data from an appropriately designed microcosm or mesocosm test may be considered on a case-by-case basis, if the test could provide meaningful effects data. However, considerable understanding of the characteristics of the organism and its intended use may be required before a microcosm or mesocosm test system can be properly designed.

Duration of test
The duration of the test should be based upon whether there is a suspicion of adverse effects. For cases of suspected invasiveness, the duration of the test should permit time for colonization and manifestation of effects in the test system.

Control groups
Test organisms subject to treatments with the notified organism should be accompanied by an appropriate untreated (negative) control group of test organisms which are not exposed to the notified organism. Control groups should be used to ensure any observed effects are associated with exposure to the notified organism and should be identical in every

respect to the treated test organisms except for exposure to the notified organism. For example, the control test organisms should be from the same source, be of the same age, and receive the same nutrition and care as the treated test organisms. To prevent bias, test organisms should be randomly assigned to control and treatment groups.

Wherever possible, notifiers should attempt to establish a positive control group with a relevant closely related organism to ensure that the test system is capable of detecting an adverse effect.

Reporting of data
Notifiers should detail all information for a complete and accurate description of the test procedures, and all data, information, and analysis necessary for Environment Canada to reach an independent conclusion. This should include a justification for choosing a particular test species and test method and a statistical analysis of differences between the test group and control groups.

Where adverse effects are found, additional testing over a range of concentrations or doses should be considered in order to establish an effect threshold.

4.3.5.2 Ecological effects of organism residues (Sched. XIX 5(b))

Known information on whether the residues of the organism can have an ecological effect, such as allelopathy, on other organisms should be provided. Notifiers should also provide a description of the types of ecological effects.

4.3.5.3 Potential of the organism to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity (Sched. XIX 5(c))

A brief summary of predicted ecological effects should be provided, including any effects on biodiversity. This should include a description of the expected beneficial or adverse ecological effects that result from the growth of the organism, as well as any other potential ecological effects likely to occur from its introduction.

4.3.6 Potential for the organism to be involved in adverse human health effects, and the most likely route of human exposure to the organism (Sched. XIX 6)

Notifiers should describe the involvement of the organism in any adverse human health effects, including its potential to transmit other organisms which may elicit disease or adverse immunological reactions in humans. Where the organism has been genetically modified, the source of any introduced genetic material and the potential of the donor organism to adversely affect human health should be indicated. In the case of a gene donor for which there is an association with adverse human health effects but where the donated

genetic material is not associated with the effect, information substantiating the lack of association should be provided.

Notifiers should provide an estimate of human exposure to the introduced organism including disclosure of the number of persons potentially exposed in growing, handling, using or disposing of the organism or parts of it and the number of persons potentially exposed in the general population. The most likely routes of exposure during all of these activities should be provided.

4.3.7 Additional Information (Sched. XIX 7)

All other information and data relevant to environmental and health hazard identification should be provided, such as:

- experimental data (including negative results);
- summaries of literature reviews;
- results of searches from databases;
- results of studies of the risk to employees, customers, public, or the environment (e.g., environmental fate modelling) that may result from the use of the organism.

Additional information includes information in the person's possession or to which the person should reasonably have access. "In the person's possession" means information in the company's offices in Canada or, if the notification was submitted by a foreign company through a Canadian agent, the offices in the country where the notification originated. The phrase "to which the person ought reasonably to have access" means information in any of the company's offices worldwide, or other locations where the person can access the information.

Information on possible environmental benefits resulting from the production or use of the organism should also be provided. Examples of such benefits are:

- The organism is a "less toxic" substitute for an existing substance or technology;
- The manufacture or use of the organism will generate less waste than would the manufacture or use of an existing substance.

Any additional information may be provided in the language in which the information was originally prepared.

4.3.8 Other agencies notified (Sched. XIX 8)

Information should be provided of any known circumstances where the import or manufacture of the organism has been notified to another agency or government, and the purpose of such notification. For example, the Ontario Ministry of Labour may have been notified of the import of a new substance for use in an occupational setting, or an American supplier may have notified the United States Environmental Protection Agency under the pre-manufacture notification provisions of the Toxic Substances Control Act (TSCA).

4.3.9 Description of test procedures (Sched. XIX 9)

The conditions and test procedures used to develop and report test data should be described and should be consistent with established procedures. At present, there are no specific guidelines for testing organisms. However, many of the methods that will be applicable are available in standard reference texts or procedures (e.g., food and water testing). The notifier should clearly indicate the test that was used and its source. The notifier should also provide a description of the test procedures followed in developing test data including reference substances and quality control and quality assurance procedures as well as a description of how a test was performed where the test is not a standardized procedure.

4.4 Information Sharing Agreements

Instances will occur where an organism has been notified, but not published on the DSL because the organism does not meet all of the criteria set out in section 112 of CEPA 1999 or because the evaluation or processing of the notification has not been completed. In such cases, a second party intending to manufacture or import that organism will be required to provide a complete notification package. To reduce both duplicate testing and the expense of developing information for a notification, Environment Canada will provide an opportunity to obtain information directly from a previous notifier through an Information Sharing Agreement.

An Information Sharing Agreement starts when a notifier provides Environment Canada with: (1) documentation of intent to import or manufacture a particular organism; and (2) authorization to release the name of the technical contact within the company to any other company that has met these two criteria. An intent to import or manufacture an organism may be either a New Substances Notification or the information described in Section 8.3 of these Guidelines. After receiving and accepting this documentation, Environment Canada will conduct a search for Information Sharing Agreement candidates and, if any exist, simultaneously provide each company with the name, address, and phone number of the technical contact of the other company or companies. Environment Canada's contribution to the process will end at this point, and the companies may negotiate an Information Sharing Agreement. Procedures to indicate willingness to enter into an Information

Sharing Agreement are described in Section 7.3.1 of these Guidelines and box A.8 of the Notification Form in Appendix 3 of these Guidelines.

Section 5 Waiver of Information Requirements

Under subsection 106(8) of the *Canadian Environmental Protection Act, 1999*, notifiers may submit a request to Environment Canada to waive the requirement for any of the prescribed information. The decision to grant a waiver will be made on a case-by-case basis by Environment Canada and Health Canada officials, based on whether at least one of three criteria have been met. The statutory criteria for a waiver of information identified in subsection 106(8) of CEPA 1999 are:

(a) in the opinion of the Ministers, the information is not needed in order to determine whether the living organism is toxic or capable of becoming toxic;

(b) a living organism is to be used for a prescribed purpose or manufactured at a location where, in the opinion of the Ministers, the person requesting the waiver is able to contain the living organism so as to satisfactorily protect the environment and human health; or

(c) it is not, in the opinion of the Ministers, practicable or feasible to obtain the test data necessary to generate the information.

A waiver request must be submitted in writing as part of a notification package and should include a well-documented rationale to support it. Rejection of a waiver request will delay the assessment (see Section 9.1 of these Guidelines). To avoid delays, it is recommended that notifiers discuss the proposed waiver request with appropriate officials at Environment Canada and Health Canada before submitting the notification (see Section 6 of these Guidelines).

If the government has granted a waiver of information, then the particulars of the waiver will be published in the *Canada Gazette* according to subsection 106(9) of CEPA 1999. The waiver notice will contain the name of the person (or company) to whom the waiver is granted, and the type of information to which it relates. The notice will not specify the organism to which the waiver applies.

Organisms for which waivers have been granted under paragraphs 106(8)(a) or 106(8)(c) of CEPA 1999 will be eligible for entry onto the DSL if the criteria under subsection 112(1) of CEPA 1999 have been satisfied. Because inclusion on the DSL without an indication that the SNAC provisions apply may permit unrestricted use, any organism for which waivers have been granted on the basis of limited exposure under paragraph 106(8)(b) of CEPA 1999 may not be entered onto the DSL, because the criterion under paragraph 112(1)(a) of CEPA 1999 will not have been satisfied.

5.1 Waivers Requested under Paragraph 106(8)(a) of the Canadian Environmental Protection Act, 1999

Any of the information requirements may be waived if it can be established that the information is unnecessary to determine whether the organism is toxic or capable of becoming toxic. Notifiers are encouraged to consult with appropriate officials at Environment Canada and Health Canada for guidance in requesting waivers before the notification is submitted. Each request for a waiver will be considered based on the scientific rationale supplied and will place particular emphasis on the familiarity of the organism, the known hazards associated with it and the potential for its exposure to susceptible biota.

5.2 Waivers Requested under Paragraph 106(8)(b) of the Canadian Environmental Protection Act,1999

Waiver requests may be accepted under this provision if it can be established that either criteria specified in subsection 106(8) can be satisfied:

1. that the living organism is to be used for a prescribed purpose, or

2. manufactured at a location where the person requesting the waiver is able to contain the living organism so as to satisfactorily protect the environment and human health.

If a request for a waiver is to be granted based on the organism being used for a prescribed purpose, regulations must have been made under paragraph 114(1)(f) of CEPA 1999. This "prescribed purpose" regulation will specify the information requirement(s) being waived and prescribe the uses that permit the waiver(s) to be granted. If the organism is to be used in a manner not specified in the "prescribed purpose" regulation, the company must either request an amendment to that regulation or supply the waived information.

Organisms with a purpose prescribed by a regulation under Paragraph 114(1)(f) are not eligible to be included on the DSL and, therefore, will continue to be "new" for the purposes of notification under CEPA 1999. Consequently, a second party planning to manufacture or import that organism will be required to provide all the information prescribed in the New Substances Notification Regulations[1]. However, if the second party intends to use the organism in a manner identical to the prescribed purpose, they may also benefit from the waivers granted in the "prescribed purpose" regulation.

If a request for a waiver is to be granted based on the organism being manufactured at a location where the person requesting the waiver is able to contain the living organism so as to satisfactorily protect the environment and human health, it must be established that the

organism will be contained throughout its life cycle (manufacture, transportation and handling, processing, storage, intended use, and disposal). Waivers based on meeting this criteria are limited to organisms proposed for manufacture. Organisms proposed for importation are excluded from the scope of this portion of paragraph 81(8)(*b*).

The structure of Part II.1 of the Regulations already reflects the spirit of this portion paragraph 106(8)(b) of CEPA 1999. Contained manufacture of micro-organisms meeting the criteria for exemption specified in section 29.1 of the Regulations and organisms other than micro-organisms meeting the criteria for exemption specified in sections 29.16 and 29.19 of the Regulations are not required to notify. Schedule XVI of the Regulations further recognizes the requirement for a reduced information set for micro-organisms that will be contained throughout their life cycle. Consideration of each request for a waiver will be based on the information supplied and will place particular emphasis on the containment of the organism.

5.3 Waivers Requested under Paragraph 106(8)(c) of the Canadian Environmental Protection Act, 1999

Many of the potential waivers that can be requested under Paragraph 106(8)(c) relate to instances where it is technically arduous or impossible to perform the required tests using conventional technology because of the characteristics of the organism.

The use of alternative protocols or data to fulfil the information requirement should be considered before it is judged not to be feasible or practicable to provide certain information.

The cost of obtaining data cannot be used as a reason for the infeasibility or impracticability of providing the prescribed information.

Section 6 Pre-notification Consultation

To consult with Environment Canada and/or Health Canada during the planning or preparation of a notification, individuals should call the NSN Information Line (see page i of these Guidelines). These discussions can clarify notification procedures or information requirements, and help determine appropriate schedules for notification and the acceptability of waiver requests or test protocols.

Discussions will take place after a preliminary package has been submitted that contains sufficient information to allow an informed response to the question at hand. Every effort will be made to respond to a query within a period equivalent to the assessment period for that organism.

Officers from Environment Canada and Health Canada will give opinions based on the information package submitted at the time of the pre-notification dialogue. The professional opinions of assessment officers expressed during the pre-notification dialogue are not an official commitment, since technical conclusions may differ after more indepth study of the final notification package.

In addition to pre-notification consultations, discussions are encouraged to clarify any other issues related to the New Substances Notification program.

Section 7 Preparing a New Substances Notification: Organisms

7.1 The Notification Form

The New Substances Notification (NSN) form (see Appendix 3) is intended to help notifiers comply with the New Substances Notification Regulations of CEPA 1999 for the notification of micro-organisms and organisms other than micro-organisms. The notification form is divided into two sections: Part A, Administrative and Substance Identity Information; and Part B, Technical Information. It is important to note that for the notification to be complete, it must contain the information requirements of Part A and Part B, and all laboratory reports, waiver justifications, and other attachments necessary to fulfil the requirements set by regulation. Information must be provided in one of the two official languages (English or French). Two copies of the complete notification should be sent by mail or courier to:

Mailing address:

Director, New Substances Branch
Environment Protection Service
Environment Canada
Ottawa, Ontario
K1A 0H3

Courier deliveries:

14th Floor, Place Vincent Massey
351 St. Joseph Blvd.
Hull, Quebec
J8Y 3Z5

Environment Canada will confirm receipt of the notification and provide a NSN Reference Number (see Section 9.1.2 of these Guidelines) to be used in all further correspondence concerning that notification.

7.2 Proprietary Information

Any information submitted to Environment Canada may be claimed as confidential (see Section 8 of these Guidelines).

7.2.1 Organism identity

When a person intends to import an organism or mixture of organisms, the identity of which the foreign supplier considers to be proprietary, the importer must determine whether any components are notifiable. If the foreign supplier indicates that a product contains notifiable organisms, the importer must submit a notification, minus the proprietary information, and indicate that this information will be provided by the supplier. The identity of the organism will be kept confidential from the importer. The importer should give the supplier the NSN Reference Number to submit proprietary information directly to Environment Canada.

7.2.2 Data

Foreign suppliers may also consider certain data to be proprietary. In such cases, the importer must submit the incomplete notification and ask the supplier to provide the outstanding proprietary information directly to Environment Canada. The notification assessment period will not begin until all the required information has been received (see Section 9.1.1 of these Guidelines). Any third party proprietary information will be kept confidential from the importer.

7.3 Completing the Notification Form

To help notifiers complete the NSN form, explanations of the various administrative information requirements are provided. The alpha-numeric character associated with each explanation corresponds with the appropriate block on the NSN form. Explanatory notes on many of the technical information requirements are given in Section 4 of these Guidelines.

7.3.1 Part A - Administrative information and organism identity

A.1 Certification Statement

The person named in this block as providing information is considered to be the notifier and must sign the certification statement. The signature is the notifier's affirmation that the information and the statements provided in this notification are accurate and true to the best of his/her knowledge. If the notifier is not a Canadian resident, the Canadian agent must also sign this statement. All signatures must be original.

A.2 Corporate Headquarters

Provide the name of the corporation and the address of its corporate headquarters regardless of its location. If the corporate headquarters is not located in Canada, the notifier must also provide the name and address of a Canadian agent (A.4).

A.3 Proposed Site of Manufacture or Port of Entry

If the notified organism is to be manufactured in Canada, provide the name of the manufacturer and the location of the manufacturing site(s). For imported organisms, provide the name of the corporation importing the organism and the planned port(s) of entry into Canada. If there is more than one site of manufacture or import, provide an attachment.

A.4 Canadian Agent

The name and address of a Canadian agent must be provided only if the corporate headquarters is located outside Canada (an agent is not required if the corporate headquarters is within Canada). In these circumstances, the Canadian agent[1] is legally responsible for the import of the organism and for providing the notification to Environment Canada. Consequently, any notice or correspondence regarding the notification will be sent to the agent at the address specified in this block. However, as described in Section 8.2 of these Guidelines, if the foreign notifier considers any information to be proprietary, the agent must submit a notification without the proprietary information, and the foreign notifier must submit the remaining information directly to Environment Canada. The proprietary information will be kept confidential from the agent.

If the corporate headquarters is not in Canada and the name and address of an agent has not been provided, the notification will be considered incomplete and will be returned.

A.5 Technical Contact

Provide the name of an individual familiar with the content of the notification and who can assist in the resolution of issues pertaining to ambiguous, incomplete, or missing information. Identify this person by name, position, company, address, and telephone and facsimile numbers. The technical contact need not be a resident of Canada.

A.6 Notifiable Activity

Indicate whether the activity relates to manufacture or import.

A.7. Organism Information - Summary

Information provided here is intended to be a check that the notification of the micro-organism or organism other than a micro-organism to Environment Canada is appropriate and that the notification group is correct. Check the appropriate boxes. A notifier

[1] If a foreign company has contracted more than one agent, please provide their names and addresses and a description of the responsibilities of each agent.

submitting a notification under subsections 29.11(1) or 29.14(1), or sections 29.16 or 29.19 of the Regulations must propose an explicit biological name (see Appendix 4 of these Guidelines). Where the explicit biological name is claimed as confidential, the notifier must propose a masked name (see Section 8.2.2 of these Guidelines).

A.8 Information Sharing Agreement

Where a notifier is willing to enter into an Information Sharing Agreement (see Section 4.4 of these Guidelines), the agreement authorization must be signed. If authorization is denied, strike a line through box A.8 and do not sign the statement.

A.9 Correspondence

Indicate the preferred official language of correspondence.

7.3.2 Part B - Technical data

This section lists the prescribed information items for all notification groups. Consult the appropriate schedule in the Regulations for the specific items that apply to the notified organism.

Notifiers must address each of the information items required in the Regulations in order to avoid the notification being deemed incomplete. Each information item in Part B of this form should be marked with one of the following codes. These data codes will allow government officials to quickly identify the type of information provided, and whether a request for waiver of information is being submitted. Explanatory notes for the data codes are provided below:

D = Test data;

S = Surrogate organism, that is, data or other information in respect of an organism closely related to the organism being notified (scientific rational should be provided). The taxon of the surrogate organism should be specified. Consultation with Environment Canada and Health Canada is recommended before deciding to provide data or information on a surrogate organism;

O = Other information, including peer-reviewed literature, unpublished reports and descriptive information;

W = Waiver requested. A request for a waiver of information should be accompanied by a justification that satisfies one of the criteria in Subsection 106(8) of CEPA 1999;

NONE = Information in itself. An example of the correct use of this code would be to indicate NONE where no patent or patent application exists;

P = Previous notification. This code is to be used if the notifier has already provided the information item to Environment Canada in a previous New Substances Notification or a notice under section 70 of CEPA 1999. Enter the applicable NSN or CEPA 1999 section 70 reference number in the attachment column.

Confidential Information:

Notifiers must enter either C to indicate that the information item is considered confidential, or N to indicate that the information is not considered confidential. If the information is considered confidential, the notifier should attach supplementary information specified in Section 8 of these Guidelines. Use square brackets, [ ], to indicate the specific text or figure considered confidential.

Attachments:

Indicate a reference for Attachments, (e.g., Appendix), so they may be readily located within the notification package. Where an information item is addressed in more than one Attachment, all Attachments must be referenced in the notification form.

Section 8 Confidential Information

Under section 313 of CEPA 1999, any person who provides information to the government in support of a New Substances Notification may, at the same time, submit a written request that information be treated as confidential. This ensures that genuine confidential business information (CBI) is protected from public disclosure. The degree of protection given to information claimed to be confidential will be consistent with the provisions of the *Access to Information Act* and sections 314 to 321 of CEPA 1999.

8.1 Claiming Confidentiality

The confidentiality privileges described in section 313 of CEPA 1999 can be claimed by indicating on the New Substances Notification form which particular information is confidential (see Section 7 of these Guidelines) and by providing the supplementary information detailed in Section 8.2.1 of these Guidelines.

8.2 Information Supplemental to a Confidentiality Claim

8.2.1 General confidentiality claims

Each claim for confidentiality in a New Substances Notification must be accompanied by supplementary information, including substantiation that the information claimed as confidential meets each of the following criteria:

1. The information is confidential to the company (or person);

2. The company has taken, and intends to continue to take, measures that are reasonable in the circumstances to maintain the confidentiality of the information;

3. The information is not, and has not been, reasonably obtainable by third persons through legitimate means, except with the consent of the company;

4. The information is not available to the public;

5. Disclosure of the information may reasonably be expected to cause substantial harm to the competitive position of the company; and

6. Disclosure of the information may reasonably be expected to result in a material financial loss to the company or a material financial gain to its competitors.

If these six criteria are met, a claim must be indicated on the notification form, and the Certification Statement in box A.1 of the notification form must be signed. The Certification Statement includes the following phrase:

> I hereby certify to the best of my information, knowledge, and belief ... the information for which confidentiality is claimed, meets the criteria for determining confidentiality as outlined in Section 8 of the *Guidelines for the Notification and Testing of New Substances: Organisms.*

Environment Canada will review each confidentiality claim and the supplementary information to substantiate the claim to determine whether or not it is valid. Notifiers will be advised if their request for confidentiality is unacceptable and given an opportunity to provide additional substantiation for their claim. If the supplementary information is not supplied, the confidentiality claim may not be respected, or alternatively, the company may choose to withdraw the notification.

8.2.2 Confidential organism identity claims

An "explicit biological name" is used to uniquely describe a living organism for the purposes of publication in the *Canada Gazette* (see Appendix 4). Publication of a masked name in place of the explicit biological name is required under section 113 of CEPA 1999 if publication of the explicit biological name would result in the release of confidential business information. Therefore, when claiming confidentiality for explicit biological name, the notifier must, in addition to the certification and supplementary information described in Section 8.2.1 of these Guidelines, provide the following information:

1. a proposed masked name developed according to the Masked Name Regulations (see Section 8.2.2.1 of these Guidelines);

2. where the proposed masked name involves the masking of more than one descriptive element, justification for masking each descriptive element (see Section 8.2.2.1 of these Guidelines), and

3. the following information:

    - the detrimental effects to the competitive position of the company that would result from the identity of the organism appearing on the Domestic Substances List or in any other publication;

    - the manner in which a competitor could use the identity of the organism;

    - an indication of whether the identity of the organism has been kept confidential to the extent that competitors do not know it is being manufactured, imported, or used;

- an indication of whether the organism has been patented and, consequently, disclosed through the patent;

- an indication of whether it is public knowledge (e.g., publications in technical journals or trade publications) that the organism is being manufactured, imported, or used for commercial purposes;

- the measures taken to prevent undesired disclosure of organism identity and the extent of any disclosures to date;

- an indication of whether the organism is, or will be, in an effluent, emission, or waste entering the environment;

- an indication of whether the organism is, or will be, in a product available to the public, and whether the organism can be identified by analysis of the product;

- an indication, to the best of your knowledge, of whether Environment Canada, Health Canada, another federal agency, a provincial agency, or the agency of a foreign government has ever determined that this organism:

    (i) has or may have an immediate or long-term effect on the environment or its biological diversity;
    (ii) constitutes, or may constitute, a danger to the environment; or
    (iii) constitutes, or may constitute, a danger to human life or health (if such a determination has been made provide details).

Masked names are published on the confidential portion of the DSL (Part II - Substances Assigned to a Confidential Substance Identity Number).

8.2.2.1 Masking the explicit biological name

A masked name must be proposed where the explicit biological name is claimed as confidential. The procedures for generating a masked name are prescribed in the Masked Name Regulations, which were published in the *Canada Gazette, Part II* on April 6, 1994 and can be obtained by calling the NSN Information Line (see page i of these Guidelines). The masking of an explicit biological name does not constitute the elimination or exclusion of a piece of information. Rather, it involves simply replacing a distinctive element of an explicit biological name with a non-descriptive or generic term to form a masked name. Section 8 of the Masked Name Regulations lists the following distinctive elements that may be replaced to form a masked name:

(a) genus name;
(b) species name;
(c) strain name;

(d) common biological name;
(e) source;
(f) culture history;
(g) phenotypic or genotypic characteristics;
(h) use; or
(i) any other pertinent descriptive information.

Masking an explicit biological name will only be acceptable to the extent necessary to disguise the full identity of the organism. In most cases, masking one distinctive element of an explicit biological name should be sufficient, although multiple masking is acceptable if it can be justified. Two examples are provided below to illustrate the degree of masking which may be acceptable to Environment Canada.

Example 1 - Species name

Bacillus subtilis may be suitably masked by describing the organism as "*Bacillus* species." Although the species name would still be provided to Environment Canada, any publication of the organism name would appear as "*Bacillus* species". Furthermore, if the organism name were to appear on the DSL, it would appear on the confidential portion of the DSL.

Example 2 - Genotypic characteristics

Where a micro-organism is genetically engineered to contain the "lacZY" gene, this could be masked by indicating that the micro-organism was "genetically engineered by the addition of a marker gene." Although the specifics of the modification would still be required to be reported to Environment Canada, any publication of the micro-organism would simply indicate that it was genetically engineered by addition of a marker gene.

If the claim for confidentiality of the explicit biological name is acceptable, the proposed masked name will be evaluated to determine whether or not it is consistent with the Masked Name Regulations. If judged consistent with these Regulations, the masked name will be available in the DSL. If not, inconsistencies will be indicated to the notifier and an alternative name requested. Environment Canada will try to reach a consensus with the company on a masked name. If a consensus is not reached, the government will publish a masked name that, in its opinion, will respect the confidentiality claim of the company while retaining the generic identity of the organism. Alternatively, the company may choose to withdraw the notification.

8.3 Determining the Presence of Confidential Substances on Lists

Organisms listed on the confidential portion of the DSL are published under masked names. Any person who intends to manufacture or import an organism believed to be

listed on the confidential portion of one of these lists may seek confirmation from Environment Canada. The micro-organism or organism other than a micro-organism must be described in sufficient detail for the search to be conducted. Environment Canada will only respond to a request to conduct a search if the person provides Environment Canada with documentation attesting to a bona fide intent to manufacture or import the organism.

To document a bona fide intent to manufacture or import, the proponent must supply the following information to Environment Canada at the address on page i of these Guidelines:

1. the explicit biological name;

2. a statement, signed by a Canadian resident, declaring that the person intends to manufacture or import the organism and that the organism would be subject to the New Substances Notification Regulations if it is not listed on the DSL;

3. the intended use of the organism;

4. if imported, a description of the manufacturing history of the organism in international commerce (if known).

If an importer is unable to supply all of the required information because the foreign supplier considers this information confidential, the foreign supplier may submit the information directly to Environment Canada. After the proponent has provided documentation of a bona fide intent to manufacture or import the organism, Environment Canada will search the confidential portion of the DSL. Environment Canada will respond to a written inquiry into confidential listings within 30 days of receipt of complete documentation and will indicate whether or not the organism is on the DSL.

Section 9 Processing a Notification

This section describes the government's administrative procedures and responsibilities when a New Substances Notification (NSN) is received.

9.1 Receipt of a New Substances Notification

9.1.1 Assessment time clock

The assessment time clock refers to the allotted time (calendar days) the government has to assess a NSN (see Section 3.3 of these Guidelines).

Day 1 of an assessment period is the day the NSN is received by the New Substances Division of Environment Canada. The assessment time clock may be affected by missing or incomplete information. For example:

1. If a notification package is grossly inadequate or incomplete, the entire package will be returned and the assessment will begin when a corrected package is received.

2. If information in the NSN is found to be erroneous and the assessment in progress is invalidated, the assessment will be terminated and reset at Day 1 when the correct information is received.

3. If information in the NSN is found to be erroneous, but does not invalidate the assessment in progress, the assessment time clock will be stopped at Day *X* and will continue at Day *X* + 1 when the correct information is received.

4. If minor information is found to be missing or erroneous, the assessment period will continue, provided the correct information is supplied by a date specified by an assessment officer.

5. If proprietary information is being sent directly to Environment Canada by a foreign supplier, the time clock will start when all the required information has been received.

9.1.2 New Substances Notification Reference Number

When a New Substances Notification (NSN) is received by Environment Canada, an NSN Reference Number will be assigned. This number will appear on all correspondence issued by the government concerning that notification and should be used in any subsequent communications regarding that notification.

9.2 Correspondence

Official correspondence between Environment Canada and the notifier or Canadian agent will occur throughout the assessment process. When speed of communication is important, facsimile transmission will be used, with the original following by mail. However, Environment Canada will not send confidential business information (CBI) by facsimile and also advises notifiers not to send CBI by facsimile. The types of correspondence a notifier may receive include:

9.2.1 Acknowledgment

After receipt and preliminary screen of the NSN, an acknowledgment will be issued specifying the start date of the assessment period and the NSN Reference Number. Acknowledgment indicates that the administrative information is satisfactory and that all required information has been received but not yet reviewed.

9.2.2 Notice of interruption or rejection

A rejection or interruption notice will be issued if the NSN contains significant omissions or errors in the mandatory information requirements. These notices will describe all deficiencies in the NSN. Original documentation may be returned.

A rejection notice will be issued if the NSN contains erroneous information that invalidates the assessment in progress. In this case, the assessment will be terminated and reset at Day 1 when the correct information is received.

If the erroneous information does not invalidate the assessment, an interruption notice will be issued indicating that the assessment time clock was stopped at Day *X* (e.g., Day 14 of a 90-day assessment period). Upon receipt of the correct information, the assessment will continue with the time clock set at Day *X* + 1 (e.g., Day 15).

Evaluators will attempt to contact the notifier by telephone to resolve difficulties before issuing a rejection or interruption notice.

9.2.3 Notice of extension of assessment period

When additional time is required to complete an assessment, as permitted under subsection 108(4) of CEPA 1999, the notifier will be advised of an extension before the end of the initial assessment period. The government may extend the assessment period only once, for a length of time not exceeding the initial assessment period.

9.2.4 Statement of assessment conclusions

Before the end of the assessment period, the notifier will be advised in writing whether the government suspects that the organism is toxic or capable of becoming toxic, and what action, if any, will be taken (see Section 9.4 of these Guidelines).

9.2.5 Notice of termination of assessment period

In some cases the risk assessment of the organism may be completed in advance of the expiry of the prescribed period for assessing the information. Subsection 108(6) of CEPA 1999 allows the Minister to terminate the prescribed period for assessing the information provided. This will allow the notifier to commence import, manufacture of an organism, subject to the outcome of the assessment, provided the assessment has been completed. If this provision is utilized, the notifier will be advised in writing before the end of the prescribed assessment period.

9.3 Assessment of the Notification

9.3.1 Information review

Environment Canada and Health Canada evaluators will assess the notification package to determine the acceptability of identification of the micro-organism or organism other than a micro-organism, proposed explicit biological name (where applicable) or masked name (where applicable), claims for confidential business information, test protocols and procedures, test data, rationales for requests for waivers of information, and effects and exposure information. Deficiencies in the submitted information that cannot be easily resolved may result in the rejection of the notification or interruption of the assessment (see Section 9.2.2 of these Guidelines).

9.3.2 Assessment for toxic

The purpose of the New Substances Notification assessment process is to determine whether or not the organism is suspected of being toxic or capable of becoming toxic as defined in section 64 of CEPA 1999:

> …a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that
>
> (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity;
>
> (b) constitute or may constitute a danger to the environment on which life depends; or

(c) constitute or may constitute a danger in Canada to human life or health.

Consequently, determining whether an organism is, or is suspected of being toxic or capable of becoming toxic involves assessing the potential for exposure to humans and components of the environment, and the potential for adverse effects of the organism on humans, the environment or biological diversity (including other living organisms, interacting natural systems, and the abiotic components of the environment).

An organism may be suspected of being toxic or capable of becoming toxic if there is concern about either the adverse effects of the organism or the potential exposure to the organism. For example, organisms with considerable potential for exposure because of continuous release in high quantities, or persistence in the environment, may be suspected of being toxic although there may be uncertainty regarding a biological or environmental hazard from the information available for the assessment. When an assessment has led to a "suspicion of CEPA toxic," CEPA 1999 has a unique provision under subsection 109(1), that permits the government to undertake one of several control measures (see Section 9.4.1 of these Guidelines).

9.4 Action Taken after an Assessment

After the assessment, the notifier will be advised whether there is suspicion the organism is toxic or capable of becoming toxic. If there is no suspicion, the notifier may proceed with import or manufacture after the assessment period has expired.

9.4.1 Control measures

When the government suspects that the organism is toxic or is capable of becoming toxic, control measures may be applied to minimize any risk to human health, the environment or biological diversity. The following control measures under section 109 of CEPA 1999 may be taken:

(a) permit any person to manufacture or import the living organism subject to any conditions that the Ministers may specify;

(b) prohibit any person from manufacturing or importing the living organism for a period not exceeding two years (this prohibition lapses at the end of this two-year period unless a notice of proposed regulation under section 114 of CEPA 1999 is published in the *Canada Gazette* before the end of this period); or

(c) Prohibit the manufacture or import of the substance until supplementary information or test results have been submitted to the government and assessed (the assessment period for this supplementary information expires 120 days after

receipt of the information, or at the end of the original assessment period, whichever is later).

The government must take measures under section 109 of CEPA 1999 before the assessment period expires. The notifier must either comply with these measures or withdraw the notification.

When a condition or prohibition is issued or altered, a notice must be published in the *Canada Gazette* describing the action and the organism to which it applies. For the purposes of publication, the notifier will be contacted to propose an explicit biological name (see Appendix 4 of these Guidelines), if one has not already been proposed. The name of the notifier is not included in this notice. If the publication of the explicit biological name would result in the release of confidential business information, a masked name will be published (see Section 8.2.2.1 of these Guidelines).

9.4.2 Significant New Activities

In some cases, the Minister(s) may suspect that a significant new activity (SNAc) in relation to the living organisms may result in the living organism becoming toxic activity (see section 2.4.2 of these Guidelines). In these cases, section 110, and subsections 112(3) and 112 (4) of CEPA 1999 provide the government authority to impose terms of use to which a manufacturer, importer or user of the organism must adhere. These terms of use are intended to minimize any risk to human health, the environment or biological diversity.

Where the living organism is eligible for inclusion on the Domestic Substances List (DSL) in accordance with subsection 112(1), the Minister will add the living organism to the DSL within 120 days with an indication that the SNAc provision applies (subsection 106(3) of CEPA 1999).

Where the living organism is not eligible for inclusion on the DSL, the Minister will publish a notice in the *Canada Gazette, Part I,* within 90 days after the expiry of the assessment period, a notice indicating that the SNAc provision applies (subsection 106(4) of CEPA 1999).

Subsections 110(3) and 112(4) specify other information that must be included in the *Canada Gazette* notice or DSL amendment respectively including:

1. the significant new activity (specified by inclusion or exclusion) in relation to the living organism in respect of which subsection 106(3) or 106(4) applies;

2. the information to be provided to the Minister;

3. the date before which the information must be provided to the Minister;

4. the period for assessing the information provided.

Alternatively, a regulation prescribing the information specified in items 2, 3, and 4 above may be made under paragraphs 114(c), (d) and (g) of CEPA 1999.

9.4.3 Additions to the Domestic Substances List

Under subsection 112(1) of CEPA 1999, Environment Canada is obliged to add an organism to the DSL if it meets all of the following criteria:

(a) Environment Canada has been provided with the information prescribed in section 106 or 107 of CEPA 1999 and any additional information required under subsection 109(1). Because inclusion of an organism on the DSL may permit unrestricted use, any substance for which the full complement of information requirements was reduced as a result of limited exposure (i.e., notification groups specified in 29.11 (2), (4), (5) or (6) of the Regulations), or for which waivers were granted under paragraph 106(8)(b) of CEPA 1999, may not have satisfied this criterion;

(b) the Ministers are satisfied that the living organism has been imported or manufactured by the notifier[2];

(c) the period for assessing the information has expired; and

(d) no conditions specified under paragraph 109(1)(a) of CEPA 1999 remain in effect.

Organisms that were suspected of being toxic in the assessment can only be placed on the DSL if they are controlled under section 114 of CEPA 1999.

For the purposes of listing on the DSL, the explicit biological name provided in the notification form (see Section 7.3.1 of these Guidelines, item A.7) will be used where an organism identity has not been claimed as confidential. Where organism identity has been claimed as confidential, the masked name will be published on the DSL (see Section 8.2.2.1 of these Guidelines).

Organisms notified under the New Substances Notification Regulations will remain new organisms (and thus notifiable for a second party) until they are added to the DSL in the *Canada Gazette.* Amendments to the DSL will be published in accordance with the time frames specified in subsection 112(1) of CEPA 1999 . Quarterly updates to the DSL will also be available on CD-ROM through the Canadian Centre for Occupational Health and Safety.

[2] An amendment to the NSNRs must be in place in order for an organism to be added to the DSL pursuant to subsection 112(1) of CEPA 1999.

Section 10 Post-notification Responsibilities

10.1 Correction of Information

Anyone who has submitted information to support a notification and later determines that the information is erroneous must immediately notify Environment Canada of that fact and submit the necessary correction.

This requirement relates only to information that existed when the notification was submitted. Information generated after a notification that reasonably supports the conclusion that the organism is toxic, or capable of becoming toxic, must be provided to Environment Canada under the provisions of section 70 of CEPA 1999 (see Section 10.2 of these Guidelines).

10.2 Section 70 of the Canadian Environmental Protection Act, 1999

After an organism has been notified, a notifier may obtain new information that reasonably supports the conclusion that the organism is, or is capable of becoming toxic. In that case, the notifier is obliged under section 70 of CEPA 1999 to provide that information to Environment Canada without delay. This information must be provided unless the notifier has actual knowledge that Environment Canada already has the information. For guidance as to what circumstances necessitate the submission of a CEPA 1999 section 70 notice, please contact:

Section 70 Program Administrator
Existing Substances Branch
Pollution Prevention Directorate
Environment Canada
14th Floor, Place Vincent Massey
Hull, Quebec
K1A 0H3

Telephone: (819) 953-1673
Facsimile: (819) 953-4936

There may be instances when a CEPA 1999 section 70 notice has been provided for an organism that is subsequently the subject of a New Substances Notification. In these cases, the notifier can either resubmit this information or refer to the CEPA 1999 section 70 correspondence containing the submission.

Appendix 1 Environment Canada Regional Offices

General information on the New Substances Notification Regulations is also available from the regional offices of Environment Canada.

For residents of Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick:

Environmental Protection Branch - Atlantic
Environment Canada
45 Alderney Drive
Dartmouth, Nova Scotia
B2Y 2N6

Telephone: (902) 426-9674
FAX: (902) 426-3897

For residents of Québec:

Environmental Protection - Québec
Environnement Canada
105 McGill Avenue
4th Floor
Montréal, Québec
H2Y 2E7

Telephone: (514) 283-7303
FAX: (514) 496-6982

For residents of Ontario:

Environmental Protection - Ontario
Environment Canada
4905 Dufferin St.
Downsview, Ontario
M3H 5T4

Telephone: (416) 739-5892
FAX: (416) 739-4405

For residents of Manitoba, Saskatchewan, Alberta, Northwest Territories and Nunavut:

Environmental Protection - Prairie and Northern
Environment Canada
4999-98th Avenue, #200
Edmonton, Alberta
T6B 2X3

Telephone: (403) 951-8766
FAX: (403) 495-2758

For residents of British Columbia and the Yukon:

Environmental Protection - Pacific and Yukon
Environment Canada
224 West Esplanade
North Vancouver, British Columbia
V7M 3H7

Telephone: (604) 666-2732
FAX: (604) 666-6800

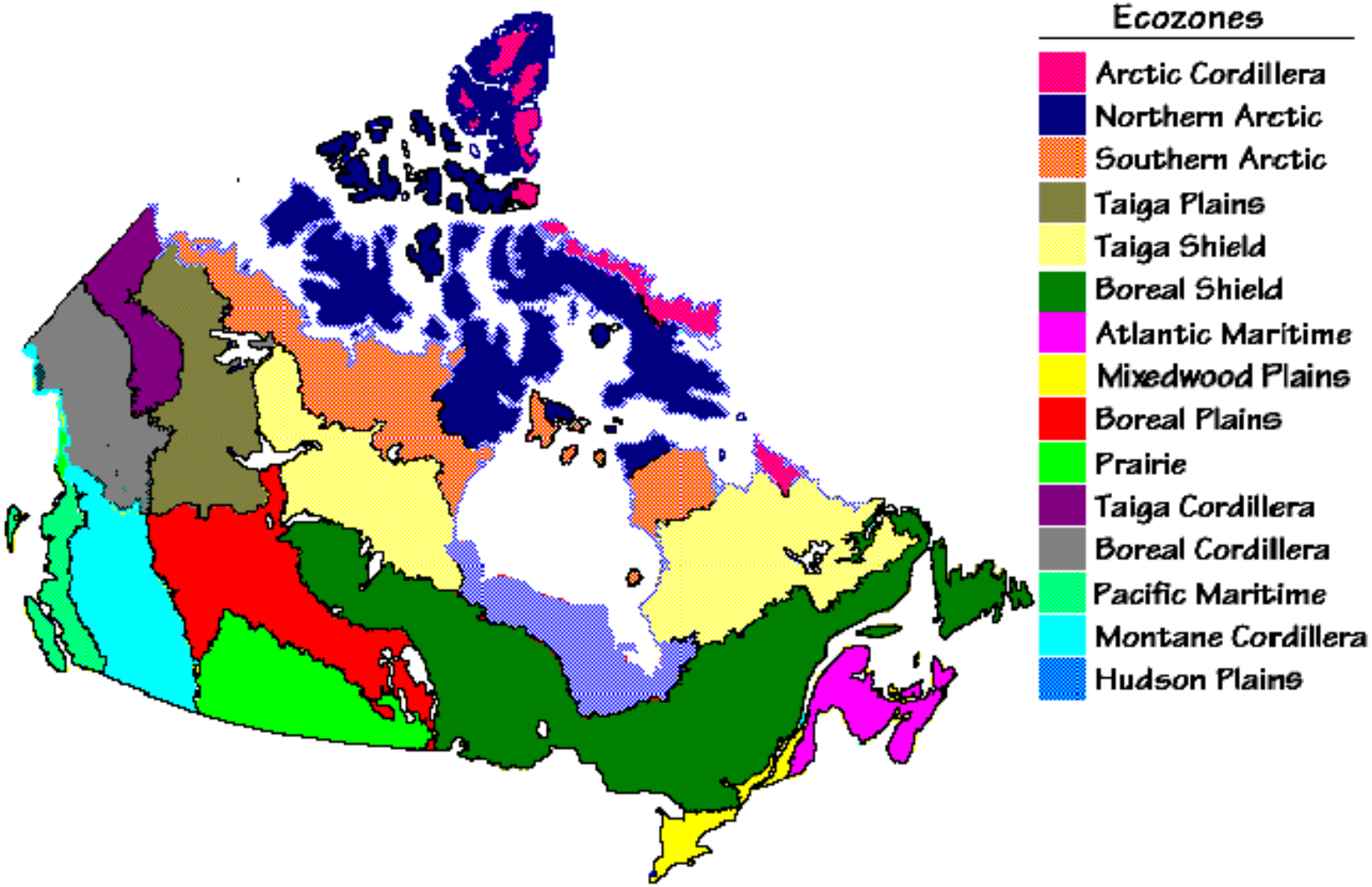
Appendix 2 Map of the Ecozones of Canada

The NSNRs refer to the map entitled Land Ecozones and Ecoregions, Canada, 1994 dated 26 August 1994 and having Catalogue number CAS005. This map can be obtained from:

Eastern Cereal and Oilseeds Research Centre (ECORC)
Agriculture and Agri-Food Canada (AAFC)
Rm. 1135, Neatby Bldg.,
960 Carling Avenue
Ottawa, Ontario
K1A 0C6

Tel: (613) 759-1874
Fax: (613) 759-1937
Email: schutp@em.agr.ca

The map in this appendix is a reduced version of the map referred to in the definition of ecozone in the Regulations and is intended to provide general guidance only. The map can also be viewed on the internet at http://res.agr.ca/CANSIS/NSDB/ECOSTRAT/_overview.html. Notifiers are advised to consult the map and database referred to in the Regulations in the determination of the appropriate ecozone in which to notify.


Ecozones
Arctic Cordillera
Northern Arctic
Southern Arctic
Taiga Plains
Taiga Shield
Boreal Shield
Atlantic Maritime
Mixedwood Plains
Boreal Plains
Prairie
Taiga Cordillera
Boreal Cordillera
Pacific Maritime
Montane Cordillera
Hudson Plains

Appendix 3 New Substances Notification Form : Organisms

Environment Canada Environnement Canada Health Canada Santé Canada

NEW SUBSTANCE NOTIFICATION

This form is to be used for fulfilling the information requirements prescribed in the New Substances Notification Regulations of the *Canadian Environmental Protection Act, 1999*.

Notifications must be submitted to:

Mailing Address:

Chief, Notification Processing and Client Services Division
New Substances Branch
Environment Protection Service
Environment Canada
Ottawa, Ontario K1A 0H3

Courier Deliveries:

14th Floor, Place Vincent Massey
351 St. Joseph Blvd.
Hull, Quebec
J8Y 3Y5

Department Use Only
NSN Reference No.
Date Received:

Total number of pages:

INSTRUCTIONS FOR COMPLETING THE NOTIFICATION FORM

The New Substances Notification (NSN) Form serves as an aid for complying with the New Substances Notification Regulations Part II.1 of the *Canadian Environmental Protection Act (1999)*. Detailed guidance for fulfilling prescribed information requirements and completing this notification form is provided in the *Guidelines for the Notification and Testing of New Substances: Organisms*. The Guidelines may be obtained from Environment Canada by contacting the NSN Information Line at (800) 567-1999 or, for callers outside Canada, (819) 953-7156.

This form consists of Parts A and B. Part A is used for administrative and identity information while Part B is mainly for technical information. Notifiers may reproduce this form, or portions thereof, for notification purposes.

Before completing Part B of the form, you should ensure that you are providing information that is appropriate for the notification group under which the organism you intend to import or manufacture is being notified (see *Guidelines for the Notification and Testing of New Substances: Organisms*, particularly Section 3).

Although care has been taken to ensure that this notification form accurately reflects requirements prescribed in the *Canadian Environmental Protection Act* and the New Substances Notification Regulations, notifiers are advised that, should any inconsistencies be found, the Act and the Regulations will prevail.

Cette publication est aussi disponible en français.

PART A

A.1. Certification Statement:
I hereby certify to the best of my information, knowledge and belief: (1) the information provided in Part A and B of this form, as well as any attachments to the form, by the person or corporation identified in block A.2 is accurate and true; and (2) the information for which confidentiality is claimed, meets the criteria for determining confidentiality as outlined in Section 8 of the Guidelines for the Notification and Testing of New Substances.

Name and Title of the Person Providing Information	Signature	Date D M Y
Name of the Agent (if applicable)	Signature	Date D M Y

A.2. Corporate Headquarters: Corporation			**A.3. Proposed Site of Manufacture or Port of Entry** Corporation		
Street			Street		
City	Province	Postal Code	City	Province	Postal Code
Telephone No.:	Facsimile No.:	E-mail:	Telephone No.:	Facsimile No.:	E-mail:
A.4. Canadian Agent (if applicable): Name			**A.5 Technical Contact:** Name		
Street			Street		
City	Province	Postal Code	City	Province	Postal Code
Telephone No.:	Facsimile No.:	E-mail:	Telephone No.:	Facsimile No.:	E-mail:

A.6 Activity

Manufacture ☐ Import ☐

Date of Import or Manufacture:
D M Y ____ ____ ____

A.7 Substance Information - Summary

Transitional ☐ Post-Transitional ☐ New ☐

Is the organism/use regulated under any other federal act ? Yes ☐ No ☐

If yes, provide the name of the act: _____

Type of organism: Bacterium ☐

Fungus ☐

Protist ☐

Archea ☐

Consortium ☐

Virus, virus-like particle, or sub-viral particle ☐

Culture plant or animal cell ☐

Organism other than micro-organism ☐

Specify: _____

PART A (Continued)

A.7 Substance Information - Summary (continued)

Proposed explicit biological name (required only for notification under subsection 29.11(1) or 29.14(1) or section 29.16 or 29.19 of the Regulations). If supplementary information is provided, please provide an attachment and indicate the attachment number below.

_____

_____

Proposed masked name if the explicit biological name has been claimed as confidential (see Section 8.2.2 of the *Guidelines for the Notification and Testing of New Substances: Organisms*). If supplementary information is provided, please provide an attachment and indicate the attachment number below.

_____

_____

Was there a pre-notification consultation? Yes ☐ No ☐

Date:_____

Government Contact:_____

Corporate Contact:_____

For micro-organism only:

For a micro-organism that is imported to or manufactured in a contained facility and that is not for introduction outside the facility:

R & D Substance Yes ☐ No ☐

Containment level of facility I ☐ II ☐ III ☐ IV ☐

Quantity imported or manufactured

☐ < 50 ml or 50 g

☐ < 250 L

☐ < 1000 L

Was a permit obtained under the Human Pathogen Importation Regulations? Yes ☐ No ☐

Notification Group:

☐ Anywhere in Canada

☐ In one ecozone where not indigenous

☐ With the confinement procedures

☐ In one ecozone where indigenous

☐ In a contained facility or for export only

☐ In an experimental field study

☐ At same site from where isolated

Is the micro-organism indigenous to the ecozone? Yes ☐ No ☐

If claim of "indigenous to ecozone" is made based on being indigenous to the adjacent (within 10 km) ecozone, provide justification (appendix #) _____

Information provided:

☐ Schedule XV

☐ Schedule XVI

☐ Schedule XVII

☐ Schedule XVIII

☐ Other information as specified in 29.11(2) or 29.14(2) of Regulations

Is the micro-organism a know pathogen?	Yes ☐	No ☐

PART A (Continued)

A.7 Substance Information - Summary (continued)

For organisms other than micro-organism only:

Is the organism an R & D Substance? Yes ☐ No ☐

Will the organism be imported to or manufactured in a facility such that there is no release into the environment of the organism, its genetic material or material, involved in toxicity? Yes ☐ No ☐

Schedule XIX provided ☐

A.8 Information Sharing Agreement Authorization

I hereby grant the Minister of the Environment permission to release the name, address and phone number of the technical contact indicated in Box A.5 of this form to any person who has provided the Minister of the Environment with: (1) documentation of intent to manufacture or import the substance described in Part B of this form; and, (2) a statement granting the Minister of the Environment permission to release the name, address and phone number of their technical contact.

Name and Title:	Signature	Date D	M	Y

A.9 Preferred language of correspondance

English ☐ French ☐

Part B

This section identifies the information items required for each notification group. Refer to section 29.11 or 29.14 of the Regulations in order to determine the appropriate notification group. This list functions only as a checklist; it is expected that the information will be provided as attachments.

DATA CODES

Each information item in this form should be marked with one of the following codes. These codes will allow government officials to quickly identify the type of information provided and whether a request for a waiver of information is being submitted. Explanatory notes for the codes are provided below:

D = Test data;

S = Surrogate organism, that is, data or other information in respect of an organism closely related to the organism being notified (scientific rationale should be provided). The taxon of the surrogate organism should be specified. Consultation with Environment Canada and Health Canada is recommended before deciding to provide data or information on a surrogate organism;

O = Other information, including peer-reviewed litterature, unpublished reports and descriptive information;

W = Waiver requested. A request for a waiver of information should be accompanied by a justification that satisfies one of the criteria in subsection 106(8) of CEPA 1999;

NONE = Information in itself. An example of the correct use of this code would be to indicate NONE where no patent or patent application exists;

P = Previous notification. This code is to be used if the notifier has already provided the information to Environment Canada in a previous New Substances Notification or a notice under section 70 of CEPA 1999. Enter the applicable NSN or CEPA 1999 section 70 reference number in the attachment column.

Confidential Information: Notifiers should enter either a C to indicate that the information item is considered confidential or an N to indicate that the information is not considered confidential. If the information is considered confidential, the notifier should attach supplementary information specified in Section 8 of the *Guidelines for the Notification and Testing of New Substances: Organisms*. Use square brackets [ ] to indicate the specific text or figure that is considered confidential.

Attachments: Indicate a reference for attachments (e.g. Appendix #), so they may be readily located within the notification package. Where an information item is addressed in more than one attachment, all attachments must be referenced.

Part B (Continued)

	DATA CODE	ATTACHMENTS	PAGE #
SCHEDULE XV: Information required in respect of micro-organisms			
1. The following information in respect of the micro-organism: (*a*) the identification and the information substantiating ...			
(*b*) the synonyms and common and superseded names			
(*c*) the strain history			
(*d*) a description of any modifications to the micro-organism including (i) the purpose of the modifications			
(ii) the methods and steps taken to make the modifications			
(iii) the phenotypic and genotypic changes that resulted ...			
(iv) the stability of the changes			
(v) the nature, source and function of any inserted genetic material			
(*e*) a description of the methods that can be used to distinguish and detect the micro-organism			
(*f*) a description of the biological and ecological characteristics of the micro-organism including (i) the life cycle[1]			
(ii) the infectivity, pathogenicity to non-human species, toxicity and toxigenicity			
(iii) the resistance to antibiotics and tolerance to metals and pesticides[1]			
(iv) the involvement in biogeochemical cycling[1]			
(v) the conditions required for, and conditions that limit, survival, growth and replication			
(vi) the mechanisms of dispersal of the micro-organism ...			
(*g*) a description of the mode of action ...			
(*h*) the identification of any patent ...			

[1] Not required for notifications under paragraph 29.11(2)(c) of the Regulations

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(*i*) the dispersal by gene transfer of traits of pathogenicity ... including a description of: (i) the genetic basis for pathogenicity to non-human species, toxigenicity and resistance to antibiotics[2]			
(ii) the capability to transfer genes[2]			
(iii) the conditions that might select for dispersal of traits of pathogenicity to non-human species[2]			
(*j*) a description of the geographic distribution of the micro-organism			
2. The following information in respect of the manufacture and importation of the micro-organism: (*a*) the identification of trade names and manufacturers, importers and vendors			
(*b*) the identification of locations of manufacture in Canada			
(*c*) the physical state of the formulation			
(*d*) the concentration of the micro-organism in the formulation			
(*e*) the identification and concentration of other ingredients and of any contaminants in the formulation			
(*f*) the viability of the micro-organism in the formulation			
(*g*) a description of any recommended storage and disposal procedures			
(*h*) an estimation of the quantity of the micro-organism that was or will be imported or manufactured in Canada ...			
(*i*) a description of the equipment and methods of manufacture ...			
(*j*) a description of the location of manufacturing facilities in Canada			
(*k*) a description of the nature of potential releases of the micro-organism from the manufacturing facilities ...			
(*l*) a description of the procedures for the treatment and disposal of wastes containing the micro-organism ...			
3. The following information in respect of the introduction of the micro-organism: (*a*) the intended and potential uses			

[2] Not required for notification under paragraph 29.11(2)(c) of the Regulations

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(*b*) the history of use			
(*c*) a comparison of the natural habitat of the micro-organism to the habitat at the potential locations of introduction ...			
(*d*) a description of the procedures for the introduction of the micro-organism including (i) the method of application			
(ii) the quantity, frequency and duration of application			
(iii) any activities associated with the introduction			
(*e*) a description of any contingency plans for accidental release			
(*f*) a description of any recommended procedures for terminating the introduction of the micro-organism			
4. The following information in respect of the environmental fate of the micro-organism: (*a*) the identification of the plant and animal species likely to be exposed ...			
(*b*) a description of habitats where the micro-organism may persist or proliferate			
(*c*) the estimated quantities of the micro-organism in the air, water and soil ...			
(*d*) any other information on the environmental fate of the micro-organism			
5. The following information in respect of the ecological effects of the micro-organism: (*a*) the data from tests conducted to determine the effects of the micro-organism on (i) aquatic plant, invertebrate and vertebrate species likely to be exposed[3]			
(ii) terrestrial plant, invertebrate and vertebrate species likely to be exposed[3]			
(*b*) the involvement of the micro-organism in adverse ecological effects			
(*c*) the potential of the micro-organism to have adverse environmental impacts that could affect ... biological diversity			

[3] Not required for notifications under paragraph 29.11(2)(a), (b), or (c) of the Regulations.

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
6. The following information in respect of the human health effects of the micro-organism: (*a*) any documented involvement of the micro-organism in adverse human health effects ...			
(*b*) the data from tests of antibiotic susceptibility			
(*c*) the data from tests of pathogenicity[4] ...			
(*d*) the potential for adverse immunologic reactions in persons exposed ...[4]			
(*e*) the estimated number of persons that may become exposed .			
7. All other information and test data in respect of the micro-organism that are relevant ...			
8. The identification of other government agencies ... notified ...			
9. A description or specification of the test procedures followed in developing the test data ...			
The identification of the ecozone of intended introduction[5]			
Data from tests conducted to determine the effects of the micro-organism on plant, invertebrate and vertebrate species likely to be exposed[6]			
A description of those confinement procedures and their effectiveness in restricting the dispersal ...[7]			
Data that demonstrates that the micro-organism is indigenous to that ecozone[8]			

[4] Not required for notifications under paragraph 29.11(2)(b) of the Regulations.

[5] Required only for notifications under paragraph 29.11(2)(a) or (c) of the Regulations.

[6] Required only for notifications under paragraph 29.11(2)(a) of the Regulations.

[7] Required only for notifications under paragraph 29.11(2)(b) of the Regulations.

[8] Required only for notifications under paragraph 29.11(2)(c) of the Regulations.

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
SCHEDULE XVI: Not for introduction outside a contained facility or for export only			
1. The following information in respect of the micro-organism: (*a*) the identification and the information substantiating ...			
(*b*) the synonyms and common and superseded names			
(*c*) the strain history			
(*d*) description of any modifications to the micro-organism including (i) the purpose of the modifications			
(ii) the methods and steps taken to make the modifications			
(iii) the phenotypic and genotypic changes that resulted ...			
(iv) the stability of the changes			
(v) the nature, source and function of any inserted genetic material			
(*e*) a description of the methods that can be used to distinguish and detect the micro-organism			
(*f*) a description of the biological and ecological characteristics of the micro-organism including (i) the infectivity, pathogenicity to non-human species, toxicity and toxigenicity			
(ii) the conditions required for, and conditions that limit, survival, growth and replication			
(*g*) a description of the known mode of action ...			
(*h*) the identification of any patent ...			
2. The following information in respect of the manufacture and importation of the micro-organism: (*a*) the identification of trade names and manufacturers, importers and vendors			
(*b*) the identification of locations of manufacture in Canada			
(*c*) the containment level for each manufacturing facility in Canada...			

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(*d*) an estimation of the quantity of the micro-organism that was or will be imported or manufactured in Canada ...			
(*e*) a description of the equipment and methods of manufacture .			
(*f*) a description of any recommended storage procedures ...			
3. The following information in respect of the introduction of the micro-organism: (*a*) the intended and potential uses			
(*b*) the history of use			
4. The following information in respect of the human health effects of the micro-organism: (*a*) any documented involvement of the micro-organism in adverse human health effects ...			
(*b*) the data from tests of antibiotic susceptibility			
5. All other information and test data in respect of the micro-organism that are relevant ...			
6. The identification of other government agencies ... notified ...			
7. A description or specification of the test procedures followed in developing the test data ...			

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
SCHEDULE XVII: Introduction in an experimental field study			
1. The following information in respect of the micro-organism: (*a*) the identification and the information substantiating ...			
(*b*) the synonyms and common and superseded names			
(*c*) the strain history			
(*d*) a description of any modifications to the micro-organism including (i) the purpose of the modifications			
(ii) the methods and steps taken to make the modifications			
(iii) the phenotypic and genotypic changes that resulted ...			
(iv) the stability of the changes			
(v) the nature, source and function of any inserted genetic material			
(*e*) a description of the methods that can be used to distinguish and detect the micro-organism			
(*f*) a description of the biological and ecological characteristics of the micro-organism including (i) the infectivity, pathogenicity to non-human species, toxicity and toxigenicity			
(ii) the conditions required for, and conditions that limit, survival, growth and replication			
(iii) the life cycle[9]			
(iv) the resistance to antibiotics and tolerance to metals and pesticides[9]			
(v) the involvement in biogeochemical cycling[9]			
(vi) the mechanisms of dispersal of the micro-organism ...			
(*g*) a description of the known mode of action ...			
(*h*) the identification of any patent ...			

[9] Required only where the micro-organism is not indigenous.

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(*i*) the dispersal by gene transfer of traits of pathogenicity ... including a description of (i) the genetic basis for pathogenicity to non-human species, toxigenicity and resistance to antibiotics[10]			
(ii) the capability to transfer genes[10]			
(iii) the conditions that might select for dispersal of traits of pathogenicity to non-human species[10]			
(*j*) a description of the geographic distribution of the micro-organism			
2. The following information in respect of the manufacture and importation of the micro-organism: (*a*) the identification of trade names, manufacturers, importers and vendors			
(*b)* the physical state of the formulation			
(*c*) the concentration of the micro-organism in the formulation			
(*d*) the identification and concentration of other ingredients and of any contaminants in the formulation			
(*e*) the viability of the micro-organism in the formulation			
(*f*) a description of any recommended storage and disposal procedures			
(*g*) an estimation of the quantity of the micro-organism that was or will be imported or manufactured in Canada ...			
(*h*) a description of the equipment and methods of manufacture			
(*i*) a description of the location of manufacturing facilities in Canada			
(*j*) a description of the nature of potential releases of the micro-organism from the manufacturing facilities ...			
(*k*) a description of the procedures for the treatment and disposal of wastes containing the micro-organism ...			
3. The following information in respect of the site of the experimental field study: (*a*) the location and a map			
(*b*) the size			
(*c*) the distance to populated areas			

[10] Required only where the micro-organism is not indigenous.

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(*d*) the distance to any protected areas			
(*e*) a description of the geological landscape at the site and surrounding the site			
(*f*) a description of the biological diversity found at the site and surrounding the site, including (i) the identification of the endangered or threatened species			
(ii) where infectivity, pathogenicity to non-human species, toxicity and toxigenicity ... the identification of the receptor species			
(*g*) a comparison of the natural habitat of the micro-organism to the habitat at the site of the experimental field study ...			
(*h*) data to demonstrate that it is indigenous[11]			
4. The following information in respect of the experimental field study: (*a*) the objectives of the experimental field study			
(*b*) the history of use of the micro-organism			
(*c)* the start date and duration			
(*d*) a description of the procedures for transporting the micro-organism to and from the site of the experimental field study			
(*e*) a description of the procedures ... including (i) the method of application of the micro-organism			
(ii) the quantity, frequency and duration of application of the micro-organism			
(iii) any activities associated with the experimental field study			
(*f*) a description of any procedures for monitoring the micro-organism and its ecological effects at the site of the experimental field study ...			
(*g*) a description of the security measures at the site of the experimental field study			
(*h*) a description of any contingency plans for accidental release			
(*i*) a description of any recommended procedures for terminating the experimental field study			

[11] Required only where it is claimed that the micro-organism is indigenous.

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(*j*) a description of any confinement procedures and biosafety conditions for the micro-organism at the site of the experimental field study ...			
5. The following information in respect of the environmental fate of the micro-organism: (*a*) a description of habitats where the micro-organism may persist or proliferate			
(*b*) the estimated quantities of the micro-organism in the air, water and soil ...			
(*c*) any other information on the environmental fate of the micro-organism			
6. The following information in respect of the ecological effects of the micro-organism: (*a*) the involvement of the micro-organism in adverse ecological effects			
(*b*) the potential of the micro-organism to have adverse environmental impacts that could affect ... biological diversity			
7. The following information in respect of the human health effects of the micro-organism: (*a*) any documented involvement of the micro-organism in adverse human health effects ...			
(*b*) the data from tests of antibiotic susceptibility			
(*c*) the estimated number of persons that may become exposed			
8. All other information and test data in respect of the micro-organism that are relevant ...			
9. The identification of other government agencies ... notified ...			
10. A description or specification of the test procedures followed in developing the test data ...			

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
SCHEDULE XVIII: Introduction into the site from which they were isolated			
1. The following information in respect of the micro-organism: (*a*) the identification and the information substantiating ...			
(*b*) the infectivity, pathogenicity to non-human species, toxicity and toxigenicity			
(*c*) a description of the reasonably expected by-products following introduction			
2. The following information in respect of the manufacture of the micro-organism: (*a*) data to demonstrate that the micro-organism was isolated from the site of introduction			
(*b*) the viability of the micro-organism in the formulation			
(*c*) an estimation of the quantity of the micro-organism that was or will be manufactured ...			
(*d*) a description of the equipment and methods of manufacture			
(*e*) a description of the procedures for the treatment and disposal of wastes containing the micro-organism			
3. The location and a map of the site of introduction			
4. The following information in respect of the introduction of the micro-organism: (*a*) the intended use			
(*b*) the start date and duration			
(*c*) a description of the procedures for the introduction of the micro-organism, including (i) the method of application			
(ii) the quantity, frequency and duration of application			
(iii) any activities associated with the introduction			
(*d*) a description of any confinement procedures and biosafety conditions for the micro-organism			
5. The following information in respect of the human health effects of the micro-organism: (*a*) any documented involvement of the micro-organism in adverse human health effects ...			

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(*b*) the estimated number of persons that may become exposed			
6. All other information and test data in respect of the micro-organism that are relevant ...			
7. The identification of other government agencies ... notified ...			
8. A description or specification of the test procedures followed in developing the test data ...			

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
SCHEDULE XIX: Information required in respect of organisms other than micro-organisms			
1. The following information in respect of the organism: (*a*) the identification, or current taxonomic name to species or subspecies level ...			
(*b*) the strain history			
(*c*) a description of any modifications to the organism including (i) the purpose of the modifications			
(ii) the methods and steps taken to make the modifications			
(iii) the phenotypic and genotypic changes that resulted ...			
(iv) the genetic stability of the changes			
(v) the nature, source and function of any introduced genetic material			
(*d*) a description of the methods that can be used to distinguish and detect the organism			
(*e*) a description of the biological and ecological characteristics of the organism including (i) the life cycle			
(ii) the reproductive biology ...			
(iii) the involvement in adverse ecological effects			
(iv) a description of the geographic distribution and habitat ...			
(v) the potential for dispersal of traits by gene transfer			
(vi) the locations and situations where the organism has caused adverse ecological effects			
(vii) the involvement in biogeochemical cycling			
(viii) the interactions with other organisms in the environment			
(ix) the conditions required for survival, growth, reproduction and overwintering			
(x) the capability of the organism to act as a vector for agents involved in adverse effects			

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(xi) the mechanisms of dispersal of the organism			
(*f*) the identification of any patent ...			
2. The following information in respect of the manufacture and importation of the organism: (*a*) the identification of manufacturers, importers and vendors			
(*b*) a description of the locations of manufacture in Canada			
(*c*) a description of the product containing the organism			
(*d*) a description of any recommended procedures for the storage and disposal of the organism			
(*e*) an estimation of the quantity of the organism that was or will be imported or manufactured in Canada ...			
(*f*) a description of the methods of manufacture ...			
3. The following information in respect of the introduction of the organism: (*a*) the history of use			
(*b*) the intended and potential uses of the organism ...			
(*c*) a description of the mode of action ...			
(*d*) a description of the procedures for the introduction of the organism, including (i) the method and rate of introduction			
(ii) any activities associated with the introduction			
(iii) any recommended procedures for storage and handling of any surplus organism			
(iv) any contingency plans for accidental release			
(v) the resistance to control agents			
(*e*) a description of any recommended procedures for terminating the introduction of the organism ...			
(*f*) a description of procedures for disposal of remaining biomass and residues of the organism			
4. The following information in respect of the environmental fate of the organism: (*a*) the estimated quantities of the organism in the environment ...			
(*b*) a description of habitats where the organism may persist or proliferate			

Part B (continued)

	DATA CODE	ATTACHMENTS	PAGE #
(*c*) the identification of species that are likely to be exposed to the organism ...			
5. The following information in respect of the ecological effects of the organism: (*a*) the data from a test conducted to determine the pathogenicity, toxicity ...			
(*b*) the ecological effects of organism residues			
(*c*) the potential of the organism to have adverse environmental impacts that could affect ... biological diversity			
6. The potential for the organism to be involved in adverse human health effects ...			
7. All other information and test data in respect of the organism that are relevant ...			
8. The identification of other government agencies ... notified ...			
9. A description or specification of the test procedures followed in developing the test data ...			

Appendix 4 Explicit Biological Name

The explicit biological name is used to uniquely describe a living organism for the purposes of publication in the *Canada Gazette*.

Part A.7 of the notification form (see Appendix 3) requires that a notifier submitting a notification under subsections 29.11(1) or 29.14(1), or sections 29.16 or 29.19 of the Regulations propose an explicit biological name. This is for the purposes of listing on the DSL should the criteria in subsection 112(1) of CEPA 1999 be met (refer to Sections 9.4.3 and 10.3 of these Guidelines).

In some cases, a valid taxonomic name to the species level will be sufficient to uniquely describe the organism and can be used as an explicit biological name. In cases where a taxonomic name is not provided or is not sufficient to uniquely describe the organism, this deficiency must be supplemented by one or more of the following categories of information, in sufficient detail to uniquely describe the organism:

1. History: may include a historical record of product development, including isolation procedures, selection procedures, developmental procedures, genetic modifications, culturing and storage procedures or any other step in developing the organism from its original isolation through to the final product.

2. Source: may include culture collection number, original isolator, and original location where the micro-organism was isolated.

3. Characteristics: may include a description of ranges and optima for environmental parameters such as pH, temperature, salinity, oxygen and nutrient requirements pertaining to growth, survival and replication of the organism. The information may also include a description of the life cycle or morphology of the organism, its ability to produce toxins, and the presence of specific resistance factors. Genotypic characteristics such as the presence of extrachromosomal genetic elements, mobile genetic elements and the presence or absence of specific DNA sequences may be included. Spore-forming ability, means to survive environmental stresses or other phenotypic characteristics may also be listed. Results of testing using automated identification systems such as "Biolog" or "API" may also be included;

4. Use: may include application of the organism to specific processes or functions.

If the proposed explicit biological name is acceptable, this name will be available for publication in the *Canada Gazette*. If not, the reasons for the rejection of the proposed name will be indicated to the notifier and an alternative name requested. Environment Canada will try to reach a consensus with the company on a explicit biological name. If a

consensus is not reached, the government may publish an explicit biological name that, in its opinion, will uniquely describe of the organism.

Appendix 5 Glossary

Assessment period means the number of calendar days the government has to assess the information submitted by a notifier under the New Substances Notification Regulations.

Biotechnology means the application of science and engineering in the direct or indirect use of living organisms or parts or products of living organisms in their natural or modified forms.

Confinement procedures means any physical, chemical, operational or biological control, or combination thereof, to restrict the exit or dispersal of a micro-organism.

Contained facility means an enclosed building with walls, floor and ceiling, or an area within such a building, where the containment is in accordance with the physical and operational requirements of a level set out in the *Laboratory Biosafety Guidelines* established by the Department of National Health and Welfare and the Medical Research Council of Canada, or Appendix K of the *Guidelines for Research Involving Recombinant DNA Molecules* (NIH Guidelines) June 1994 published by the United States Department of Health and Human Services, in the Federal Register (United States), Vol. 59, No. 127, on July 5, 1994, as amended from time to time.

Domestic Substances List (DSL) means the list compiled by the Minister of the Environment under section 66 of the CEPA 1999, as amended from time to time by the Minister under subsection 105(1) or subsection 112(1) of the Act.

Ecozone means one of the ecozones which are illustrated on the map entitled Land Ecozones and Ecoregions, Canada, 1994 dated 26 August 1994 and having Catalogue Number CAS005, the boundaries of which are more particularly described in the National Soil Data Base (NSDB) of the Canada Soil Information System (CanSIS), developed by the Department of Agriculture and Agri-Food Canada and the Department of Environment, as amended from time to time.

Experimental field study means a study of a research and development substance that is a micro-organism, which study uses the minimum area, up to a maximum of 100 hectares, and the minimum quantity of the substance required to meet the objectives of the study.

Explicit biological name means the item of information used to uniquely describe a micro-organism or an organism other than a micro-organism for the purposes of publication in the *Canada Gazette*.

Indigenous means in respect of a micro-organism, occurring naturally in the ecozone into which the micro-organism is intended to be introduced.

Infectivity means the capability of a micro-organism to become established within a host species.

In the person's possession means information in the company's offices in Canada or, if the notification was submitted by a foreign company through a Canadian agent, the offices in the country where the notification originated.

Living organism means a substance that is an animate product of biotechnology.

Micro-organism means a microscopic living organism that is:

(a) classified in the Bacteria, the Archaea, the Protista, which includes protozoa and algae, or the Fungi, which includes yeasts;

(b) a virus, virus-like particle or sub-viral particle;

(c) a cultured cell of an organism not referred to in paragraphs (a) and (b), other than a cell used to propagate such organism; or

(d) any culture other than a pure culture.

Minister means the Minister of the Environment; whereas, Ministers means the Ministers of the Environment and Health.

Pathogenicity means the capability of a micro-organism to infect a host and cause disease.

Receptor species means any species which is susceptible to the hazardous properties of a particular micro-organism.

Regulations means the New Substances Notification Regulations under the *Canadian Environmental Protection Act, 1999*.

Research and development substance means a substance that is undergoing systematic investigation or research, by means of experimentation or analysis other than test marketing, the primary objective of which is:

(a) to create or improve a product or process; or

(b) to determine the technical viability or performance characteristics of a product or process.

Significant new activity is defined in section 104 of CEPA 1999 in respect of a living organism:

any activity that results or may result in

(a) the entry or release of the living organism into the environment in a quantity or concentration that, in the Ministers' opinion, is significantly greater than the quantity or concentration of the living organism that previously entered or was released into the environment; or

(b) the entry or release fo the living organism into the environment or the exposure or potential exposure of he environment to the living organism in a manner and circumstances that, in the Ministers' opinion, are significantly different from the manner and circumstances in which the living organism previously entered or was released into the environment or of any previous exposure or potential exposure of the environment to the living organism.

Substance is defined in section 3 of CEPA 1999 as:

any distinguishable kind of organic and inorganic matter, whether animate or inanimate, and includes

(a) any matter that is capable of being dispersed in the environment or of being transformed in the environment into matter that is capable of being so dispersed or that is capable of causing such transformations in the environment;

(b) any element or free radical;

(c) any combination of elements of a particular molecular identity that occurs in nature or as a result of a chemical reaction; and

(d) complex combinations of different molecules that originate in nature or are the result of chemical reactions but that could not practicably be formed by simply combining individual constituents.

And, except for the purposes of sections 66, 80 to 89 and 104 to 115, includes

> (e) any mixture that is a combination of substances and does not itself produce a substance that is different from the substances that were combined;
>
> (f) any manufactured item formed into a specific physical shape or design during manufacture and has, for its final use, a function or functions dependent in whole or in part on its shape or design; and,
>
> (g) any animate matter that is, or any complex mixtures of different molecules that are, contained in effluents, emissions or wastes that results from any work, undertaking or activity.

Toxic is defined in section 64 of CEPA 1999 in reference to a substance including a living organism:

a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that

> (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity;
>
> (b) constitute or may constitute a danger to the environment on which life depends; or
>
> (c) constitute or may constitute a danger in Canada to human life or health.

Toxicity means the capacity of any substance to cause injury to humans, animals, plants or micro-organisms.

Toxigenicity means the capability of a micro-organism to produce a toxin.

Transitional period means the period between January 1, 1987 and June 30, 1994.

To which the person ought reasonably to have access means information in any of the offices of the company worldwide or other locations where the person can access the information (see also **In the person's possession**).