



To obtain approval to import or manufacture a pesticide

Send to Environmental Protection Authority preferably by email (HSApplications@epa.govt.nz) or alternatively by post (Private Bag 63002, Wellington 6140)
Payment must accompany application; see our fees and charges schedule for details.

This form should also be used for

- Antifouling paints
- Fumigants
- Plant protection products
- Timber treatments
- Vertebrate Toxic Agents

Name of the substance to be approved

Boxer Gold

Date

27 November 2018. Amended 16 January 2019 to include Section 3.4

Completing this application form

1. This form has been approved under section 28 of the Hazardous Substances and New Organisms (HSNO) Act 1996. It only covers the import or manufacture of pesticides to be released in New Zealand under section 28 of the HSNO Act. If you wish to make an application for another type of substance (such as a veterinary medicine or industrial chemical) or for another type of application (such as emergency, special emergency or containment), a different form will have to be used. All forms are available on our website.
2. It is recommended that you contact an Applications Advisor at the Environmental Protection Authority (EPA) as early in the application process as possible. An Applications Advisor can assist you with any questions you have during the preparation of your application including advising on any consultation requirements.
3. Before submitting this application, you may make an informal Status of Substance (SOS) advice request to the EPA. Further information on this process is available on our website. Please note that this is not mandatory and an SOS request is only informal advice.
4. This application form may be used to seek approvals for more than one hazardous substance, if the substances and their uses are of a similar nature.
5. Please make sure that you obtain all appropriate permissions for the use of any data that you have used or provided in this application form, if you are not the owner of such data.
6. Unless otherwise indicated, all sections of this form must be completed for the application to be formally received and assessed. If a section is not relevant to your application, please provide a comprehensive explanation why this does not apply. If you choose not to provide the specific information, you will need to apply for a waiver under section 59(3)(a)(ii) of the HSNO Act. This can be done by completing the section on the last page of this form.
7. Any extra material that does not fit in the application form must be clearly labelled, cross-referenced, and included with the application form when it is submitted.
8. Please add extra rows or tables where needed.
9. You must sign the form (the EPA will accept electronically signed forms) and enclose the application fee (including GST) unless you are already an approved EPA customer. To be recognised by the EPA as an "Approved customer", you must have submitted more than one application per month over the preceding six months, and have no history of delay in making payments, at the time of presenting an application.
10. Information about application fees is available on the EPA website. If you wish to claim a fee reduction for a reduced-risk-formulated product the appropriate justification must be submitted at the pre-lodgement stage for consideration.
11. All application communications from the EPA will be provided electronically, unless you specifically request otherwise.

Commercially sensitive information

12. The EPA strongly advises applicants to provide as much information relating to the hazard classification and use of their substance as possible to help inform the EPA's assessment as well as for submitters and decision-makers. We expect this information to be publicly available in the application unless there is a genuine argument for it to be considered as commercially sensitive.
13. Commercially sensitive information may be put in a confidential appendix to this form (also available on our website) and be identified as confidential. If you consider any information to be commercially sensitive, please show this in the relevant section of this form providing your detailed reasons for considering it to be commercially sensitive and cross referencing to where that information is located in the confidential section.
14. Any information you supply to the EPA prior to formal lodgement of your application will not be publicly released, unless it has already been made publicly available as part of the consultation process. Following formal lodgement of your application any information in the body of this application form and any non-confidential appendices will become publicly available.
15. Once you have formally lodged your application with the EPA, any information you have supplied to the EPA about your application is subject to the Official Information Act 1982 (OIA). If a request is made for the release of information that you consider to be confidential, your view will be considered in a manner consistent with the OIA and with section 57 of the HSNO Act. You may be required to provide further justification for your claim of confidentiality.

Definitions

Active ingredient	Component of a formulated substance responsible for the pesticidal effect
CAS Number	Chemical Abstracts Service number. This is a unique identifier for a chemical substance
CIPAC Number	Collaborative International Pesticides Analytical Council. The CIPAC code number system is a simple approach for an unambiguous coding of active ingredients and variants used in the area/field of pesticides
Hazardous substance	Any substance with one or more of the following intrinsic properties: <ul style="list-style-type: none"> • Explosiveness • Flammability • A capacity to oxidise • Corrosiveness • Toxicity (including chronic toxicity) • Ecotoxicity, with or without bioaccumulation, or • which on contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased) generates a substance with any one or more of the properties specified in this definition

EINECS	European INventory of Existing Commercial chemical Substances
ELINCS	European List of Notified Chemical Substances
IUPAC	International Union of Pure and Applied Chemistry. The world authority on chemical nomenclature
Pesticide	Substance or mixture of substances intended to be used for preventing, controlling, repelling or mitigating any pest (including vertebrates) in areas such as, but not limited to, agriculture, home and garden, rights of way or industrial areas
Professional and non-professional users	Professional users are using pesticides in the course of their job or business (such as farmers and growers or amenity users). Professional use may include the use of formulated substances in order to deliver services to business or private customers Non-professional users are not using pesticides in the course of their job or business (such as lifestyle block owners, general public using pesticides for domestic use, and so on)
Public register name	Name of the formulated substance to be mentioned in a publicly available register and that can be different from the final marketing name
Relabelling	Action of changing the label of a formulated substance intended to be imported in New Zealand in order to meet the EPA criteria for information content. This action can also occur when the formulated substance is repacked into packaging of different sizes
Repackaging	Movement or transfer of a substance from one container to another without a change in composition of the formulation or the labelling content, for sale or distribution
Status Of Substance (SOS) advice	The advice provided in a SOS advice request will include: <ul style="list-style-type: none"> • Whether or not a substance is hazardous • Whether the substance is covered or not by an existing approval • The hazard classifications of the substance • The potential relevant approval pathway for the substance
Substance	Any of the following: <ul style="list-style-type: none"> • Any element, defined mixture of elements, compounds or defined mixture of compounds, either naturally occurring or produced synthetically, or any mixtures thereof; • Any isotope, allotrope, isomer, congener, radical or ion of an element or compound which has been declared by the Authority, by notice in the Gazette, to be a different substance from that element or compound; • Any mixtures or combinations of any of the above; • Any manufactured article containing, incorporating or including any hazardous substance with explosive properties. <p>(section 2(1) HSNO Act)</p>

1. Applicant details

1.1. Applicant

Company Name: Syngenta Crop Protection Limited

Contact Name: Michelle Hickman

Job Title: CP Regulatory Manager New Zealand

Postal Address (provide only if not the same as the physical): Private Bag 92168, Auckland, 1142

Physical Address: Tower 2, Level 7, 110 Symonds St, Auckland

Phone (office and / or mobile): +61 2 8876 8445

Fax: +61 2 9332 6808

Email: michelle.hickman@syngenta.com

1.2. New Zealand agent or consultant (if applicable)

Company Name:

Contact Name:

Job Title:

Postal Address (provide only if not the same as the physical):

Physical Address:

Phone (office and / or mobile):

Fax:

Email:

1.3. Formal correspondence contact

All formal correspondence will be sent to the contact person for the application identified here

Company Name: Syngenta Crop Protection Limited

Contact Name: Michelle Hickman

Job Title: CP Regulatory Manager New Zealand

Postal Address (provide only if not the same as the physical): Private Bag 92168, Auckland, 1142

Physical Address: Tower 2, Level 7, 110 Symonds St, Auckland

Phone (office and / or mobile): +61 2 8876 8445

Fax: +61 2 9332 6808

Email: michelle.hickman@syngenta.com

1.4. Invoice contact

Only if different from 1.3. Formal correspondence contact - invoice will be sent to the contact person identified here

Company Name: Syngenta Crop Protection Limited

Contact Name: [REDACTED]

Job Title: [REDACTED]

Postal Address (provide only if not the same as the physical):

Physical Address: [REDACTED]

Phone (office and / or mobile): [REDACTED]

Fax: [REDACTED]

Email: [REDACTED]

2. Information about the substance

2.1. Purpose statement or executive summary of the application for the public register

No more than 1,100 characters including the description of the formulated substance to be approved, e.g. Soluble Concentrate 350-400 g active ingredient/L

The purpose of this application is to gain approval for import and release of the herbicide Boxer Gold containing 800 g/L prosulfocarb and 120 g/L S-metolachlor as an emulsifiable concentrate (EC) formulation. Boxer Gold is a short residual, soil applied, pre-emergent herbicide for the control of weeds in potato crops. The product will be applied once per season prior to the emergence of the crop or in the early growth stages by ground based tractor application. The use of the substance will be subject to hazard classifications and controls that are typical of other herbicides that are currently in the market for use in potatoes.

Prosulfocarb is a new active ingredient for New Zealand but is currently registered for use as a herbicide in field crops in Europe, Australia and Japan. S-metolachlor is an approved active ingredient in New Zealand but is not currently on the market. It is registered as a herbicide for use in corn, soybeans, vegetables and other field crops in major agricultural countries including the USA, Europe, Australia, Canada, China and Brazil.

The two active ingredients in the one product allow for the simultaneous control of a wide range of economically important weeds found in potato crops. As prosulfocarb is a new active ingredient, weed resistance levels to the substance are very low. The combination of the two active ingredients will help to prolong the effectiveness of both actives and is an important resistance management strategy, as is pre-emergent use. The substance will therefore be a valuable tool for herbicide resistance management in New Zealand cropping.

The human and environmental risks arising from the hazards associated with the use of the substance can be adequately controlled and are therefore acceptable.

The benefits of Boxer Gold are:

- New herbicide active ingredients for potato cropping in New Zealand, giving growers greater choice
- Effective herbicide for the management of a wide range of weeds that would potentially reduce the vigour of potato crops and result in lower tuber yields if not adequately controlled
- Increased grower profits and maximisation of use of land assets with flow on benefits for the rural and national economies

- Excellent herbicide resistance management tool for potato cropping

2.2. Type of application

Tick the box(es) that best describe your application

Has 'Status of Substance (SOS) Advice' been obtained from the EPA?

Yes No

If yes, show the SOS reference number:

If yes, is the formulation of the substance different to that submitted at the SOS stage?

(In either case, please provide the composition to the EPA. This may be provided as part of the confidential appendix)

Yes No

Is the product a new active ingredient to New Zealand?

Yes No

Does the product contain any viable new organisms, including GMOs?

Yes No

Does the product contain an ingredient originating from an organism (plant, animal, etc)?¹

Yes No

Does the formulated substance contain any nanomaterial?

Yes No

¹ If you tick 'Yes' and the product is being imported, then include a Biosecurity Clearance from the Ministry for Primary Industries New Zealand. If one has been provided with a previous application and is still valid, this may be referenced.

3. Identity of the substance

Any commercially sensitive information may be provided in the confidential appendix of this form

Provide details on the active ingredient(s) as well as the mixture in this section

3.1. Identity of the active ingredient(s)

1.

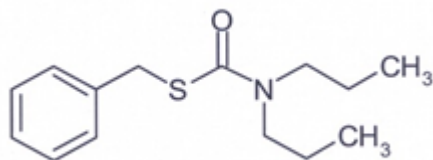
Active ingredient (Common Name): **Prosulfocarb**

Chemical name (IUPAC): **S-benzyl dipropylthiocarbamate**

Chemical name (CA): **S-(phenylmethyl) dipropylcarbamothiate**

Molecular formula: **C₁₄H₂₁NOS**

Structural formula:



Manufacturer development codes: **SC-0574, ICI574, CGA203483**

CIPAC No.: **539**

CAS No.: **52888-80-9**

EEC No. (EINECS or ELINCS): **401-730-6**

Function: **Herbicide**

For plant protection products

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> Herbicide | <input type="checkbox"/> Microbial strain | <input type="checkbox"/> Fungicide |
| <input type="checkbox"/> Insecticide | <input type="checkbox"/> Semiochemical
(pheromone, attractant,
repellent etc.) | <input type="checkbox"/> Plant Extracts |

Other, eg plant growth regulators (specify):

For timber treatments, Vertebrate Toxic Agents (VTA), anti-fouling paints or fumigants, please describe the function: **NA**

FAO Specification (including year of publication):

Prosulfocarb:

Yes Year:

No

Minimum purity of the active ingredient as manufactured (g/kg): 980 g/kg

Note: Any impurities must be provided to the EPA. A certificate of analysis may be included in the confidential appendix. There are no impurities present at a concentration ≥ 10 g/kg or of toxicological concern. See Confidential Appendix for declaration of composition and list of impurities.

2.

Active ingredient (Common Name): S-metolachlor

Chemical name (IUPAC):

Mixture of :

(aRS, 1 S)-2-chloro-N-(6-ethyl-o-tolyl)-N-(2-methoxy-1-methylethyl)acetamide (80-100%)

and:

(aRS, 1 R)-2-chloro-N-(6-ethyl-o-tolyl)-N-(2-methoxy-1-methylethyl)acetamide (20-0%)

Chemical name (CA):

Mixture of :

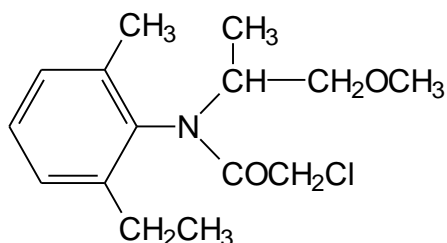
2-chloro-N-(2-ethyl-6-methylphenyl)-N-[(1 S)-2-methoxy-1-methylethyl]acetamide (80-100%)

and:

2-chloro-N-(2-ethyl-6-methylphenyl)-N-[(1 R)-2-methoxy-1-methylethyl]acetamide] (20-0%)

Molecular formula: $C_{15}H_{22}ClNO_2$

Structural formula:



Manufacturer development codes: CGA77102 (S-isomer) and CGA77101 (R-isomer) (Metolachlor CGA24705)

CIPAC No. 607

CAS No.: 87392-12-9 (*S*-isomer), 178961-20-1 (*R*-isomer)

EEC No. (EINECS or ELINCS): not available

Function: Herbicide

For plant protection products

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> Herbicide | <input type="checkbox"/> Microbial strain | <input type="checkbox"/> Fungicide |
| <input type="checkbox"/> Insecticide | <input type="checkbox"/> Semiochemical
(pheromone, attractant,
repellent etc.) | <input type="checkbox"/> Plant Extracts |
| <input type="checkbox"/> Other, eg plant growth regulators (specify): | | |

For timber treatments, Vertebrate Toxic Agents (VTA), anti-fouling paints or fumigants, please describe the function:

NA

FAO Specification (including year of publication):

S-metolachlor: Yes Year: No

Metolachlor: Yes Year: 1992 No

Minimum purity of the active ingredient as manufactured (g/kg): 960 g/kg (content of *S*-isomer minimum 840 g/kg, content of *R*-isomer maximum 130 g/kg)

Note: Any impurities must be provided to the EPA. A certificate of analysis may be included in the confidential appendix. There are no impurities present at a concentration ≥ 10 g/kg or of toxicological concern. See Confidential Appendix for declaration of composition and list of impurities.

3.2. Regulatory status of the active ingredient(s)

Prosulfocarb

Jurisdiction	Regulatory status					Comment*
	Never approved	Pending	Approved	Restricted	Not renewed	
Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Canada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Europe	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Japan	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
New Zealand	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other jurisdictions (specify in comments)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Chile, Saudi Arabia

*For instance, specify here under which regulation(s) or directive(s).

S-metolachlor

Jurisdiction	Regulatory status					Comment*
	Never approved	Pending	Approved	Restricted	Not renewed	
Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Canada	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Europe	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Japan	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
New Zealand	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USA	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other jurisdictions (specify in comments)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Argentina, Chile, China, Brazil, Mexico, Saudi Arabia, South Africa, South Korea

*For instance, specify here under which regulation(s) or directive(s).

When restricted or not renewed, explanations should be provided:

3.3. Identity of the formulated substance

Formulated substance name: **Boxer Gold**

Manufacturer development codes: **A14429B**

Unique names for public register: **Boxer Gold**

Active ingredient(s) and content (g/kg or L and % w/w):

Prosulfocarb 800 g/L, 80.6% w/w

S-metolachlor 120 g/L, 12.0% w/w

3.4. Physical and chemical properties of the formulated substance

Provide as much information as possible on the physical and chemical properties of the substance
(at 20°C and 1 atmosphere unless otherwise stated)

Appearance (colour, odour, physical state and form): **Slightly yellowish to brown liquid**

pH: **4 - 8**

Density: **1.045 g/cm³**

Vapour pressure: **no data**

Boiling/melting point: **no data**

Solubility in water: **no data**

Water/Octanol partitioning co-efficient: **no data**

Emulsion stability: **max. 5mL cream**

Persistent foaming: **max 60 mL**

3.5. Regulatory status of the formulated substance

Jurisdiction	Regulatory status					Comment*
	Never approved	Pending	Approved	Restricted	Not renewed	
Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Canada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Europe	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Japan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
New Zealand	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other jurisdictions (specify in comments)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Chile, Saudi Arabia

*For instance, specify here under which regulation(s) or directive(s).

Has an application been made for an approval under the Agricultural Compounds and Veterinary Medicines Act?

Yes No

3.6. Composition details of the formulated substance

Full composition details for the substance must be provided to the EPA. These may be included in the confidential appendix

The composition details are provided in the confidential appendix.

4. Life cycle of the substance

Manufacturing

Will your formulated substance be manufactured in New Zealand?

Yes No

Importation

Will your formulated substance be imported into New Zealand by air and/or sea?

Sea Air

Will your formulated substance be imported in bulk containers or packaged ready for sale?

Bulk Containers Packaged ready for sale

If your formulated substance will be imported in bulk containers, please describe these containers:

Will repackaging of your formulated substance be carried out in New Zealand?

Yes No

Will relabelling of your formulated product be carried out in New Zealand?

Yes No

Please provide any additional relevant information relating to the importation of your formulated substance:

Transport

Will your formulated substance be transported by road, rail, air and/or sea within New Zealand?

Road Sea Rail Air

Please provide any additional information relating to transport of your formulated substance:

UN Number: 3082

UN Transport Hazard Classes: 9

UN Packing Group Number (UN Model Regulations²): III

Marine Pollutant? (IMDG Code³): yes

Packaging

Pack sizes: 5 L, 10 L, 15 L, 20 L

Type of packaging: HDPE, Fluorinated HDPE, HDPE/PA or PET containers

Type of closure (consider opening size, type of cap, child resistant packaging): tamper proof screw cap

Please provide any additional information relating to the packaging of your formulated substance:

The substance will be packed in robust HDPE or PET plastic containers for the purpose of secure containment during the transport within NZ and storage conditions during the product's life cycle. The containers will be chemically resistant to and physically compatible with this formulation. The retail pack will be packed in multiples onto pallets for ease of transport.

Storage

Provide details of how the substance will be stored, and the facilities it will be stored in:

Upon customs clearance the product will be transported to the designated warehouse designed for the secure storage of agricultural compounds. Bulk transportation is by way of designated trucks and rail designed for the transportation of hazardous goods. The substance may be stored by distributors until sold to the customer.

The appropriate storage and segregation during transport between various locations such as the port of entry, land storage warehouse, retail distributor and end-user facilities will be observed.

The overall management of the substance subsequent to importation for release with controls, in respect of transport, storage, application, use and container disposal will be in compliance with the Code of Practice for the Management of Agrichemicals NZS 8409. The information to facilitate this will include the ready availability of relevant documentation such as the container label and Safety Data Sheet.

Warehouse storage

Provide details of how the formulated substance will be stored: as above

² UN Model Regulations mean Model Regulations annexed to the most recently revised edition of the Recommendations on the Transport of Dangerous Goods published by the UN

³ IMDG Code means that International Maritime Dangerous Goods code, as amended

Containment of spillages: Spills should be absorbed with inert absorbent material such as soil or vermiculite and shovelled into waste containers. Spills must be prevented from entering waterways (including ditches and drains) and sewers. For containment and management of a large spillage, the Fire Service should be informed immediately and then the local health protection officer of the local District Health Board or hospital. Further details of emergency management are outlined in the Safety Data Sheet. There are appropriate statements around containment of spillages on the label.

Decontamination of areas, personnel, vehicles and buildings: Accidental contamination of areas, vehicles or buildings can be dealt with by absorbing the spills with inert absorbent material and placing in suitable disposal containers. Clean up should be with water and detergent followed by rinsing with fresh water. Rinsings should not be allowed to enter drains or water ways. Waste product and contaminated material such as soil and water should be disposed of at an appropriate chemical disposal facility.

If swallowed, DO NOT induce vomiting. For advice, contact the National Poisons Centre 0800 POISON (0800 764 766) or a doctor immediately. If in eyes flush immediately with large amounts of fresh water for at least 15 minutes. Contaminated personnel should remove all clothing and wash it separately or dispose of appropriately.

Spray equipment should be cleaned thoroughly and immediately after use. Rinse three times with clean water until the foam and all traces of the formulation have been removed. Do not allow rinsings to enter waterways or sewers. Further details are outlined in the Safety Data Sheet.

Disposal

Disposal of damaged packaging, contaminated absorbents and other materials: Damaged packaging should be triple rinsed. Rinsate from empty container cleaning should be added to the spray tank if possible, or disposed of at a suitable landfill or approved facility. Rinsate from cleaning of spray equipment should be disposed of at a suitable landfill or chemical disposal facility. Recycle empty container through Agrecovery (0800 247 326, www.agrecovery.co.nz). Otherwise crush and bury in a suitable landfill. Do not reuse the container for any other purpose. Contaminated material such as soil should be disposed of at an appropriate chemical disposal facility.

Detailed instructions for safe disposal of the formulated substance and its packaging: Disposal of waste product and used containers must be in accordance with local by-laws. Do NOT reuse the container for any other purpose. Empty containers must be triple rinsed. Recycle empty, rinsed containers through Agrecovery (0800 247 326, www.agrecovery.co.nz). Otherwise crush and bury in a suitable landfill. Dispose of the left-over product only by using according to the label or at an approved chemical disposal facility. Do not allow to enter waterways or sewers.

Methods other than controlled incineration for disposal: Recycle empty container through Agrecovery (0800 247 326, www.agrecovery.co.nz). Otherwise crush and bury in a suitable landfill. Do not reuse the container for any other purpose.

5. Intended uses of the formulated substance

The information you provide here will be used by the EPA to assess the risks posed by the substance and the controls assigned to manage these risks. You must outline either all the proposed uses of the product or the worst-case scenario for each application method (considering both the application rate and the frequency). **Please use table 5.1 for plant protection products or table 5.2 for all other types of pesticides.** Explanatory notes are below each table.

5.1. Intended uses for plant protection products

You must outline either all the proposed uses of the product or the worst case scenario for each application method (considering both the application rate and frequency)

Crop and/or situation (a)	Product Code	F G or I (b)	Pest or group of pests controlled (c)	Formulation		Application				Application rate per treatment			PHI (days) (l)	Remarks (m)
				Type (d-f)	Conc of as (i)	Method kind (f-h)	Growth stage and season (j)	Number min max (k)	Interval between applications (min)	Kg as/hL min max	Water L/ha min max	Kg as/ha min max		
Potato	A14429B	F	Various broad leaf and grass weeds	EC	Prosulfocarb 800 g/L + S-metolachlor 120 g/L	Tractor driven boom spray	Up to BBCH 09	1	n/a	Prosulfocarb 800 - 2670 g/hL, S-metolachlor 120 – 400 g/hL	150 - 500L/ha	Prosulfocarb: 3.2 to 4 S-Metolachlor: 0.48 to 0.60	Not required	Applied pre-emergent or early post emergent



- (a) For crops, the EU and Codex classifications (both) should be used; where relevant, the use situation should be described (eg fumigation of a structure)
- (b) Outdoor or field use (F), glasshouse application (G) or indoor application (I)
- (c) eg biting and suckling insects, soil born insects, foliar fungi, weeds
- (d) eg wettable powder (WP), emulsifiable concentrate (EC), granule (GR)
- (e) GCPF Codes - GIFAP Technical Monograph No 2, 1989
- (f) All abbreviations used must be explained
- (g) Method, eg high volume spraying, low volume spraying, spreading, dusting, drench
- (h) Kind, eg overall, broadcast, aerial spraying, row, individual plant, between the plants - type of equipment used must be described
- (i) g/kg or g/l
- (j) Growth stage at last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, season at time of application
- (k) The minimum and maximum number of applications possible under practical conditions of use must be provided
- (l) PHI - minimum pre-harvest interval
- (m) Remarks may include: extent of use, economic importance and restrictions

5.2. Intended use for pesticides not used as plant protection products (eg timber treatments, Vertebrate Toxic Agents (VTA), anti-fouling paints or fumigants)

You must outline either all the proposed uses of the product or the worst case scenario for each application method (considering both the application rate and frequency)

User (a)	Area of Use (b)	Pest or group of pests controlled (c)	Application			Application rate per treatment (f)	Remarks (g)
			Method (d)	Number min max (e)	Interval between applications - days (minimum)		

- (a) Professional/non professional
- (b) Domestic/commercial/industrial
- (c) e.g. biting and suckling insects, soil born insects, foliar fungi, weeds
- (d) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench
- (e) The minimum and maximum number of applications possible under practical conditions of use must be provided
- (f) g/kg and g/l or others
- (g) Remarks may include; extent of use, economic importance and restrictions



6. HSNO hazard classifications of the formulated substance

The information you provide here will form the basis of your substance's HSNO classification.

Please consider each of the hazardous properties in the table below and provide information on those properties that trigger any threshold level for your substance. Use the justification column to record the reason for your classification. If your substance is a mixture, you can apply mixture rules to the hazardous components of the mixture. If you do this, you will need to provide information on the hazardous properties of each hazardous component of the mixture, and show your workings. See [Assigning A Product to an HSNO Approval](#) on our website for more information.

Please use the following abbreviations if needed.

NA: Not Applicable – For instance when testing is technically not possible: testing for a specific endpoint may be omitted, if it is technically not possible to conduct the study as a consequence of the properties of the substance: eg very volatile, highly reactive or unstable substances cannot be used, mixing of the substance with water may cause danger of fire or explosion or the radio-labelling of the substance required in certain studies may not be possible.

ND: No Data or poor quality data (according to Klimisch criteria) – where there is a lack of data.

No: Not Classified based on actual relevant data available for the substance – the data is conclusive and shows the threshold for classification is not triggered.

Study data is confidential, references are detailed in the Confidential Appendix and have been provided in full to the EPA for evaluation.

Hazard Class/Subclass	Boxer Gold classification	Justification
Class 1 Explosiveness	Not triggered	Substance is not explosive (Ref. 35)
Class 2, 3 & 4 Flammability	Not triggered	Substance is not flammable (Ref. 37)
Class 5 Oxidisers/Organic Peroxides	Not triggered	Substance is not an oxidiser (Ref. 36)
Subclass 8.1 Metallic corrosiveness	Not triggered	Substance is not corrosive to tin plate, galvanised sheet metal, sheet steel or stainless steel. (Ref. 39)
Subclass 6.1 Acute toxicity (oral)	6.1E (oral)	Substance oral LD ₅₀ > 2000 mg/kg bw, rat (Ref. 62)
Subclass 6.1 Acute toxicity (dermal)	6.1E (dermal)	Substance dermal LD ₅₀ > 2000 mg/kg bw, rat (Ref. 63)
Subclass 6.1 Acute toxicity (inhalation)	6.1D (inhalation)	No data for substance. Derived inhalation LC ₅₀ >4.78 mg/L air based on ingredients. Prosulfocarb LC ₅₀ >4.72 mg/L air, rat (Ref. 42), S-metolachlor LC ₅₀ >2.91 mg/L air, rat (Ref. 48)
Subclass 6.1 Aspiration hazard	Not triggered	Substance contains hydrocarbon solvents however the content is below the trigger value of $\geq 10\%$.
Subclass 6.3/8.2 Skin irritancy/corrosion	6.3B	Substance is mildly irritant to skin, mean scores 1.75 (erythema) and 1 (oedema) in rabbit (Ref. 64)
Subclass 6.4/8.3 Eye irritancy/corrosion	Not triggered	Substance is slightly irritant to eyes. Mean scores at 72h: corneal opacity 0.42, iritis 0.00, reddening 1.75, chemosis 1.5; all effects fully reversed in 14 days in rabbit (Ref. 65)
Subclass 6.5A Respiratory sensitisation	ND	Ingredients are not respiratory sensitizers, substance was negative in skin sensitisation test therefore not triggered.
Subclass 6.5B Contact sensitisation	Not triggered	Substance is not a skin sensitizer in the Buehler test, guinea pig. (Ref. 66)
Subclass 6.6 Mutagenicity	ND	Prosulfocarb: studies show it is not mutagenic (Ref. 67-71, 118). S-metolachlor: studies show it is not mutagenic (Ref. 72-75, 119, 120). The inert ingredients are not classified for mutagenicity.

Subclass 6.7 Carcinogenicity	ND	Prosulfocarb: studies show it is not carcinogenic (Ref. 160-163.) S-metolachlor: studies show it is not carcinogenic (Ref. 164-172). Inert ingredients are not classified for carcinogenicity.
Subclass 6.8 Reproductive or developmental toxicity	ND	Prosulfocarb: reproduction study - no effects in rat (Ref. 145, 146). Developmental toxicity studies - some delayed foetal growth effects in the rat at the mid and high dose in conjunction with maternal toxicity but no teratogenicity at any dose level. Maternal effects in the rabbit but no teratogenicity (Ref. 147-151). S-metolachlor: studies show it is not a reproductive or developmental toxicant (Ref. 152-157). Inert ingredients are not classified.
Subclass 6.8 Reproductive or developmental toxicity (known, presumed or suspected)	ND	The active ingredients and inert ingredients are not known, presumed or suspected to cause reproductive or developmental toxicity.
Subclass 6.8 Reproductive or developmental toxicity (via lactation)	ND	Studies on the active ingredients show they are not reproductive or developmental toxicants via lactation. The inert ingredients are not classified.
Subclass 6.9 Target organ systemic toxicity ⁴	6.9B (repeat dose systemic)	Studies on the substance and active ingredients show no specific target organ toxicity after single or repeated exposure. Both prosulfocarb and S-metolachlor produced general systemic toxicity particularly in the liver and haematological effects in short term repeat dose oral studies at high doses, and also the kidney for prosulfocarb only. (Ref. 128-138) One of the inert ingredients is classified for single target organ toxicity but content is below the threshold of 1%.
Subclass 9.1 Aquatic ecotoxicity	9.1A	Triggered by study with the substance in <i>Daphnia magna</i> EC ₅₀ = 0.56 mg/L. (Ref. 416). Active ingredients also toxic to algae and aquatic plants.

Subclass 9.2 Soil ecotoxicity	9.2A	Triggered by studies with terrestrial plants for substance and active ingredients (Ref. 495 – 500)
Subclass 9.3 Terrestrial vertebrate ecotoxicity	ND	Studies with the active ingredients show low toxicity to birds (Ref. 507 - 516). Other ingredients not classified.
Subclass 9.4 Terrestrial invertebrate ecotoxicity	Not triggered	Active ingredients are not toxic to bees - Prosulfocarb bee acute oral LD ₅₀ > 213 µg/bee, acute contact LD ₅₀ > 80 µg/bee (Ref. 518-519); S-metolachlor bee acute oral LD ₅₀ > 85 µg/bee, acute contact LD ₅₀ > 200 µg/bee (Ref. 520)

Other values – prosulfocarb

	Value (mg/kg bw/d)	NOAEL (mg/kg bw/d)	Safety factor
ADI (applicant)	0.02	1.9	100
AOEL (applicant)	0.0675	9	100
ARfD (applicant)	0.4	40	100

Other values – S-metolachlor (Metolachlor)

	Value (mg/kg bw/d)	NOAEL (mg/kg bw/d)	Safety factor
ADI (applicant)	0.08	7.5	100
AOEL (applicant)	0.15	15	100
ARfD (applicant)	3	300	100
Metolachlor MAV ^{drinking water} NZ DeptHealth	0.01	3.5 (LOAEL)	1000

7. Risks, costs and benefits

These are the positive and adverse effects referred to in the HSNO Act. It is easier to regard risks and costs as being adverse (or negative) and benefits as being positive. In considering risks, cost and benefits, it is important to look at both the likelihood of occurrence (probability) and the potential magnitude of the consequences, and to look at distribution effects (who bears the costs, benefits and risks).

⁴ identify classification for single and/or repeat dose target organ toxicity for oral, dermal or inhalation routes

You will need to consider the effects on the environment and human health and welfare, including any social effects.

In each section below, set out the information under the following three sub-headings:

- Costs and benefits which can be stated in monetary (dollar) terms
- Non-monetary risks and costs
- Non-monetary benefits.

You must fully complete this section, referencing supporting material. You will need to provide a description of where the information in the application has been sourced from, e.g. from; in-house research, independent research, technical literature, community or other consultation, and provide that information with this application.

7.1. Identify all of the potential risks, costs and benefits of the substance(s)

Identification is the first step in assessing risks, costs and benefits. It is important to think about the source of the risk, i.e. the way in which the risk is created (the exposure pathway), and then the consequences and likelihood of exposure.

You should try to think as widely as possible about every potential risk, cost and benefit and give a brief description.

Identification of Risks

Based on the proposed EPA hazard classifications using in-house data for the substance and active ingredients the potential risks to human health are 6.1D acute toxicity (oral (6.1E), dermal (6.1E) and inhalation (6.1D)), 6.3B mild skin irritation and 6.9B target organ systemic toxicity. The potential risks to the environment are 9.1A aquatic ecotoxicity, 9.2A soil ecotoxicity and 9.3C terrestrial vertebrate toxicity. The occurrence and source of these risks are outlined in the following table:

Lifecycle activity	Source of risk
Transport	Spillage from transport accident or incident on road or rail, or during handling in relation to this, resulting in consequent exposure to the substance with adverse effects to humans, the aquatic environment or terrestrial organisms.
Storage	Damage to containers during stacking and storage at warehouse and retail premises leading to spills and potential exposure resulting in adverse effects to humans and the environment. Inadequate storage and security in industrial or amenity warehouses resulting in misuse, access by unauthorized persons including children, resulting in adverse effects on human health and the aquatic environment.
Use	Incidents such as spills during opening of container, measurement and loading of liquid contents when preparing spray, lack of protective clothing worn by users, incorrect use

	of the substance including spray drift or spills of concentrate or diluted spray resulting in adverse effects on human health and the environment.
Disposal	Inadequate, incorrect or unlawful disposal of substance residue, spills of waste or unrinsed empty containers resulting in environmental contamination particularly of waterways.

Identification of Costs

In-house assessment shows that direct costs include the purchase price of the substance to the user and costs associated with its use in the field eg PPE. There are no additional direct costs likely in relation to the overseas manufactured substance imported into NZ for commercial release. Indirect costs that could be attributable to the substance would arise as a consequence of management of spills from transport or storage accidents or inappropriate use of the substance or disposal of remaining substance and container causing contamination.

Identification of Benefits

Boxer Gold is a short residual, soil applied, pre-emergent herbicide that is absorbed by the roots and shoots (coleoptile) of germinating weed seedlings causing inhibition of growth in the meristematic region. Foliar uptake is possible but of lower effect. Upstream translocation in the plant occurs but movement in the phloem is very unlikely.

Boxer Gold contains two active ingredients that together provide residual control of many broadleaf and some grass weeds that commonly grow in potato crops. Best weed control occurs by applying the product before or shortly after the germination of target weeds. Early management of weeds is essential for successful potato production, as weeds compete for light, water and nutrients and can harbour diseases and pests. Thus weeds inhibit crop growth and significantly reduce tuber yield potential. The use of Boxer Gold will therefore assist growers in achieving maximum yields.

Prosulfocarb is a member of the thiocarbamates chemical group and S-metolachlor is a member of the chloroacetamides group of herbicides. The product thus has the inhibitors of fat synthesis and inhibitors of cell division / inhibitors of very long chain fatty acids modes of action. Boxer Gold will provide two alternative modes of action for weed control in potatoes and is thus an excellent resistance management tool and can be used as part of an integrated weed management program that also uses mechanical, cultural and biological weed control methods.

7.2. Provide an assessment of those risks, costs, and benefits identified in Section 7.1

This section excludes risks, costs, and benefits which relate specifically to Māori taonga or to international agreements. See Sections 7.3 and 7.4 for those aspects.

A full assessment must be provided of all the risks, costs and benefits identified in Section 7.1. For the risk assessment our preferred format is quantitative, however, you may also provide a qualitative assessment if you can justify this. If you are providing your risk assessment in supporting documentation with this application you can provide a summary of all the risks this in this section.

Please note that if you do not complete a full assessment of all risk, costs and benefits this may result in the EPA requesting further information from you, which will mean that your application takes longer to process.

Assessment of Risks

An assessment of the level of risks associated with the use of the substance with EPA default controls in place is summarised in the table below:

Exposure route	Potential effect	Occurrence likelihood	Magnitude of effect	Level of risk
Storage near ignition sources	Combustion	Highly improbable (not highly flammable)	Minor	Negligible
Spillage during transport or storage	Harmful effects to humans (acute toxicity)	Highly improbable	Moderate - major	Low
	Death or adverse effects on aquatic organisms if spilled into waterways, harmful effects to terrestrial and soil organisms	Very unlikely	Minor (localised, reversible and contained effects)	Negligible
Use: Spillage during use, spray drift to non-target plants or waterways, accidental overspray onto waterways	Harmful effects to humans (acute toxicity)	Highly improbable	Moderate – major	Low
	Harmful effect on aquatic, terrestrial and soil organisms including non-target plants	Unlikely	Minor (localized, reversible and contained effects)	Low
Incorrect Disposal eg into waterways	Harmful effect on aquatic organisms	Very unlikely	Minor (localised, reversible and contained effects)	Negligible

Boxer Gold and the active ingredients prosulfocarb and S-metolachlor have been intensively studied in a range of toxicology, ecotoxicology and environmental fate studies (in-house data). Most of the in-house studies for the active ingredient S-

metolachlor were submitted to and assessed by the EPA and/or ACVM for the original registration of Dual Gold in 1998. A range of new studies have been conducted by Syngenta to satisfy evolving regulatory requirements in other countries such as the EU. Studies not previously assessed by the EPA are provided with this submission. A complete dossier of required studies on prosulfocarb and the formulated substance Boxer Gold are provided with this submission. Details of the submitted studies are provided in the Confidential Appendix.

A detailed assessment of the risks to humans and the environment is provided below.

Toxicity to humans:

EPA classification is triggered for acute toxicity (6.1D), mild skin irritancy (6.3B) and target organ systemic toxicity (6.9B) based on animal studies. Boxer Gold triggers acute toxicity 6.1E by the oral and dermal routes and 6.1D by the inhalation route. The substance also triggers 6.9B for systemic toxicity due to potential general toxicity effects from repeated exposure via the oral route. Operators may be exposed during mixing and loading of the concentrated product, during spraying of the diluted product and during clean-up and disposal. Re-entry workers may be exposed if entering fields within a short period of time after spraying, although the level of exposure would be very low as the substance is applied to soil or the very early growth stage of the crop. Bystanders may be exposed from spray-drift or accidental release eg. during transport accidents.

An assessment of the risks to operators, re-entry workers and bystanders following the use of the Boxer Gold in potatoes has been conducted by the applicant. The risks were found to be acceptable when the product is used according to the label directions and with suitable water volumes when wearing gloves during mixing, loading and application. The human exposure risk assessment is included with this submission.

The results of mutagenicity tests with the active ingredients were negative. For four metabolites of S-metolachlor, a positive result was found in one *in vitro* study for each, but two other *in vitro* and the *in vivo* studies were all negative, thus the overall result is that the metabolites are not mutagenic. Thus the risk of mutagenic effects from short or long term exposure to the product is negligible.

Long-term rat and mouse carcinogenicity studies were conducted with the active ingredients and the results show that they are not carcinogenic.

Prosulfocarb and S-metolachlor have been assessed for reproductive toxicity in multi-generation studies in rats and in developmental toxicity studies in rats and rabbits. There was no evidence of reproductive toxicity in the rat or developmental toxicity in either the rat or rabbit.

Thus the substance is not classified for any long term toxicity hazards.

Controls for the use of Boxer Gold will include warning statements, safety directions and first aid instructions on labels and provision of Safety Data Sheet.

The hazard profile and controls for Boxer Gold are similar to other herbicides currently on the market for use in potatoes in New Zealand.

The product will be available to approved handlers only. Commercial users must be adequately trained in the handling of agricultural chemicals and ensure control of this product follows NZS 8409 / Growsafe practices. PPE must be worn when using the product including gloves and face shield or goggles. The product will not be available to the general public and must be stored in a locked place away from unauthorized people and children. Clean-up and disposal must comply with EPA controls.

In summary the use of the substance according to the label directions and EPA controls will not result in unacceptable risks to operators, re-entry workers or bystanders from either acute, short term or long term exposure.

Ecotoxicity:

Aquatic organisms

The EPA classification 9.1A for aquatic ecotoxicity is triggered. In house data on the substance shows that *Daphnia magna* (aquatic invertebrates) are the most sensitive freshwater organisms. The substance and active ingredients are also toxic to fish and highly toxic to certain species of algae and aquatic plants. Aquatic organisms and plants may potentially be exposed to the substance through spray drift, run-off and drainage from the application site into adjacent waterways (including ditches, streams, rivers, lakes etc) or by incorrect disposal of waste substance into waterways.

An aquatic risk assessment was conducted by the applicant for the use of Boxer Gold in New Zealand using default spray-drift values and higher tier environmental concentrations estimated with AgDRIFT modelling. The results showed that the acute and chronic risks to all indicator aquatic species including algae are acceptable even with a zero no-spray zone.

Bioaccumulation studies with Prosulfocarb and S-metolachlor show that they will not bioaccumulate or bioconcentrate in fish. The bioconcentration factors were well below the trigger values.

Thus the risks to aquatic organisms following the use of the substance according to the label directions are acceptable.

Soil ecotoxicity

The substance Boxer Gold triggers soil toxicity 9.2A. This is due to the toxicity of the substance and active ingredients to some terrestrial plants, which is to be expected for a herbicide. As the active ingredients are selective herbicides some plants are more sensitive than others. Thus controls for the protection of non-target plants are required. The environmental risk assessment conducted by the applicant shows that a 5m no-spray zone reduces the risk to an acceptable level and is protective of sensitive non-target plants.

Prosulfocarb degrades rapidly in soil, although the degradation rates vary according to the conditions. The mean half-life in laboratory studies was 15 days and in field studies was 10 days. Only one metabolite is detected in soil, which

forms at low levels and also continues to rapidly degrade. The active ingredient and metabolite are very unlikely to accumulate in soil.

S-metolachlor degrades relatively quickly in soil with a mean half-life of 32 days. It has a complex degradation pattern and forms a large number of metabolites, some at significant levels. Consequently additional environmental and mammalian toxicity studies have been conducted with the metabolites. In these studies the metabolites were found to be on the whole less toxic than the parent or in a couple of studies of equivalent toxicity. Ecotoxicity studies with the metabolites are provided with this submission.

The acute toxicity levels of the active ingredients to earthworms and other soil invertebrates are below the EPA trigger levels. Hence the risk of adverse effects on the soil environment from the proposed use of Boxer Gold is very low. Suitable controls will be included in the use instructions of the substance for the protection of sensitive non-target plants.

Terrestrial vertebrates

The EPA classification for terrestrial vertebrates is not triggered. A higher tier avian risk assessment has been conducted by the applicant for the use of Boxer Gold in New Zealand and shows that at the proposed label rates the risks to birds are acceptable.

Terrestrial invertebrates

The EPA classification for terrestrial invertebrates is not triggered. Studies on the active ingredients showed that it is of low toxicity to bees.

A range of studies are available on the effects of prosulfocarb on non-target arthropods with varying results. It is concluded that there may be high risk to certain non-target arthropod species in-field, however due to the rapid degradation of prosulfocarb in the environment and the timing of the product application, the mid to long term effects on population levels are expected to be minimal.

Based on the reported mortality levels of a range of non-target arthropod species in studies with S-metolachlor the in-field and off-field risks were all found to be acceptable.

One study was conducted for the substance BOXER GOLD in *Aphidius rhopalosiphi*. The in-field hazard quotient for BOXER GOLD to *Aphidius rhopalosiphi* was found to be high. However the off-field risk was well below the level of concern. Given that the determined in-field risks from S-metolachlor were all low, this result for BOXER GOLD most likely reflects effects caused by prosulfocarb. As stated above the rapid degradation of prosulfocarb in the environment means that mid to long term effects on population levels of non-target arthropods in-field would be minimal. In addition exposure to non-target arthropods will be very low as the substance is used very early in the cropping cycle. Therefore it is concluded that the overall risks to non-target arthropods from the use of Boxer Gold in potatoes is low.

In summary the risks to the environment associated with the use of Boxer Gold are acceptable. The ecotoxicity hazard profile and controls for Boxer Gold are

very similar to other herbicides currently on the market for use in potatoes in New Zealand.

Assessment of Costs

The costs associated with the substance are the same as those relating to other herbicides currently available, ie cost of purchase and use of the substance and the cost of clean-up of spills and disposal. Under normal conditions of use the cost of disposal is minimal, as any left-over substance should be added to the spray tank and used in field according to label directions. Thus the overall costs associated with the substance are minimal.

Assessment of Benefits

Potatoes are an important crop for New Zealand with over 10,000 hectares planted per year. The farm-gate values was NZ\$143 million in 2013 (Ref. Potato NZ website: potatoesnz.co.nz/about). The majority of the harvest (approximately 50%) is for the domestic processed market, with a significant proportion (approximately 33%) processed for export. There is also some export of fresh produce. (Ref. USDA Foreign Agricultural Service, Global Agriculture Information Network – NZ Potato Sector Report 2014. [USDA NZ potato sector report 2014.pdf](#))

It is recognised that for best management, weeds should be controlled early in the crop cycle. Boxer Gold is designed specifically for this purpose and has been shown in in-house studies to provide effect early control of a wide range of common weeds in potato, with a short-term residual effect that inhibits continuing germination of weeds for some weeks. This allows for the healthy establishment of the crop and subsequent development of tubers. Thus Boxer Gold is a cost-effective tool which can be used in conjunction with other best management practices to maximise tuber yields. Maximising yields leads to increased grower profits and flow-on benefits for rural and national economies. It also helps to ensure efficient use of arable land assets.

Potato yield can be negatively affected by the presence of weeds through competition for available light, water and nutrients. In addition, weeds can hinder harvest operations and act as hosts for pests and disease. Tripathi et al. (1989) showed that potato yield was reduced by 16% to 76% through poor weed control. Furthermore, Nelson and Thoreson (1981) reported a 12% decrease in yield for each 10% increase in weed biomass as a result of annual weeds, whereas Michel et al., (2015) reported poor weed control resulted in a 15% yield reduction in Canterbury New Zealand.

Weed resistance to key modes of action is rising dramatically. While growers understand the need to rotate and mix modes of action in order to slow the spread of resistance, their choices continue to narrow and weeds continue to adapt. In New Zealand options for selective dicot and grass weed control in potatoes that are suitable for use during early crop development are limited to only a few modes of action groups and are dominated by Group C, inhibitors of photosynthesis at photosystem II (see Table below).

Active ingredients, mode of action, weed spectrum and application window of agrichemicals registered in New Zealand for weed control in the early stages of potato development

Active Ingredient	Mode of Action Group	Weed Spectrum	Application Window
quizalofop-p-ethyl	A	annual grass	post emergent
linuron	C	annual grass and dicots	pre-emergent
metribuzin	C		pre- and early post emergent
prometryn	C		early post emergent
methabenzthiazuron	C		pre-emergent
cyanazine	C		early post emergent
terbutryn	C		pre-emergent
bentazone	C		pre-emergent
terbuthylazine	C		pre-emergent
sulfentrazone	E		pre-emergent
clomazone	F		pre-emergent

Thus for potato producers, new active ingredients are essential to provide options for resistance management, to broaden the spectrum of weeds controlled and to provide choice and adaptability.

Boxer Gold contains two active ingredients with different modes of action. Combining two modes of action in one application is a recommended herbicide resistance management option, reducing the resistance risk from high to moderate. (Ref. HRAC website, <http://hracglobal.com/prevention-management/best-management-practices>). In addition, Boxer Gold is intended for pre-emergent use, which is generally associated with slower development of resistance (Ref. Somerville, G.J., Powles, S.B., Walsh, M.J., Renton, M. (2017), Pest Management Science, 73, 844-851). Thus Boxer Gold represents an excellent tool for the management of herbicide resistance in potato cropping and can be used as part of an integrated weed management program that also uses mechanical, cultural and biological weed control methods. This will bring long-term benefits to New Zealand cropping by ensuring the continued efficacy of both active ingredients into the future.

7.3. Provide an assessment of any risks, costs and benefits which arise from the kaitiaki relationship of Māori and their culture to the environment

Please note that consultation with Māori may be appropriate for this application. Please refer to the EPA policy 'Engaging with Māori for applications to the EPA' which can be found on the EPA website (www.epa.govt.nz) or contact the EPA for advice.

An example of the issues to consider include whether the substance poses any risk to native or valued species, or waterways.

Risks

As outlined above, the normal use of the substance Boxer Gold with EPA controls will result in negligible to low risks for humans. The risk assessment for bystanders showed that the level of exposure is well below the acceptable exposure levels that do not cause concerns of toxicity. As a herbicide there is a risk of damage to sensitive plants from spray drift. This risk can be managed with the use of a 5m no-spray zone between sprayed fields and non-target plants. This will also reduce any potential risk of spray drift onto culturally important forage plants that may be harvested near potato fields, or other valued flora in the vicinity.

The risk assessment for aquatic organisms show that the risks arising from the use of the substance to aquatic invertebrates and fish, including tuna and inunga, is acceptable. Use of the substance will be by approved handlers. As the active ingredients degrade in the environment and do not accumulate, long-term effects will be negligible both in-field and off-field. The substance will be used in a similar manner as other herbicides for use in potatoes currently in the market and there are no new application techniques or equipment required by users. No effects on ancestral land, water or sites or unacceptable risks to the kaitiaki relationship of Maori and their culture to the environment from the release of the substance are expected.

Costs

There are no expected costs to Maori and their culture from the use of the substance Boxer Gold according to the label directions and with EPA controls.

Benefits

The use of the substance will provide benefits to potato growers, in particular higher yields and more efficient use of arable land assets. This will have flow-on benefits to the national economy. No additional benefits to Maori culture are anticipated.

Overall it is considered that the risks, costs and benefits of Boxer Gold to Maori and their culture will be the same as other herbicides already in the market for use in potatoes and that the risks are manageable with the EPA controls.

7.4. Provide an assessment of any risks, costs or benefits to New Zealand's international obligations

Please show if approving or declining the substance would have any impact upon New Zealand's international obligations

The ingredients in the substance are not subject to any international treaties such as Persistent Organic Pollutants or the Rotterdam Convention. Residue levels of the active ingredients in exported potatoes and potato commodities will be below levels of detection. Thus approval of the substance is not expected to have any impact upon New Zealand's international obligations.

7.5. Provide information on the proposed management of the substance

Please outline how the risks of the substance will be managed. This may include default controls triggered by the hazardous property classification(s) and reference to Codes of Practice or to standard operating procedures that will be followed

Identification

- The priority identifiers for toxic substances required to be available within 2 seconds such as Warning - Keep out of reach of children, will be prominently displayed on the container label.
- The secondary identifiers required to be available within 10 seconds will include a description of the hazardous substance, the hazard risks, safety and health warnings (PPE requirements etc) and precautions, first aid, and disposal of the empty container. These will be prominently displayed on the container label. The name, address and phone numbers etc for the NZ contact will also be printed on the label.
- The container will be labeled before supply, sale and dispatch to the end-user with a label durable for outdoor conditions, firmly affixed to the container, with text in English that is easily read and understood. The label will have good contrast between background colour and typeface clarity. The major components of the substance will be described. The directions for use and conditions under which it is to be applied will be expressed on the label.
- The specific workplace information required within 10 minutes by personnel involved in transportation, storage, supply, end-use and emergency management is the NZ Safety Data sheet. The data sheet will include information and controls required for the identification, description, emergency management and disposal requirements of the substance. The product will be stored where signage already exists for the storage of agricultural chemicals with the appropriate HAZCHEM rating code.

Packaging

- The substance will be packed in robust HDPE plastic containers for the purpose of secure containment during the transport by sea, road and rail within NZ and storage conditions during the product life cycle.
- The containers will be chemically resistant to and physically compatible with the formulation, as demonstrated in storage stability studies.

Emergency Management

- The information required for managing the risk of exposure is outlined in the label under Precautions, First Aid and Container Disposal. Additional information relating to contamination from spillage is contained in the Safety Data Sheet (SDS).
- The information required to manage any risk during storage and transportation, in addition to the container label, will be on the SDS.
- The information required for warehouse and other storage facilities will have the appropriate signage relative to the quantities stored including the

HAZCHEM rating. The emergency response plan for each storage facility will be that approved by the appropriate body for the storage of hazardous substances. This could include the local Regional Authority and requirements under the Resource Management Act.

Disposal

- The substance is used dispersed in water. The disposal of the rinsed empty container is outlined on the label and conforms to the general requirements currently accepted for chemical products.
- The national AgRecovery program is in operation for the regular and periodic collection and recycling of empty and rinsed plastic containers.
- Additional information and documentation on the disposal of any of the liquid substance from spillage or expiry is outlined in the SDS.

Spillage

- Spills should be absorbed with inert absorbent material such as soil or vermiculate and shovelled into waste containers. Spills must be prevented from entering waterways (including ditches and drains) and sewers. Disposal of waste and waste containers must be in accordance with local by-laws. Further details are outlined in the Safety Data Sheet and label for containment and management of spillages.

Protection of human health

- The control of operator exposure will be by statements displayed on the label. The product is intended for use only by approved handlers who must use the substance in accordance with HSNO controls and NZS 8409 / Growsafe practices.
- Operators will be advised to use PPE, including impervious gloves, waterproof hat, coat and trousers, with specific instructions clearly shown on the product label. First aid and emergency instructions will also be shown on the label and SDS.

Protection of the environment

- The control of exposure to aquatic environments will be by statements displayed on the label including instructions to ensure that spray drift does not contaminate waterways and for clean-up and disposal. This will include the use of ground application only.
- The label will include warning statements for the protection of non-target plants. The applicant recommends a 5m no-spray zone to down-wind non-target plants as a management control for this risk.
- The product is intended for use only by approved handlers who must use the substance in accordance with label directions and with NZS 8409 / Growsafe practices.

Summary:

- The overall management of the substance subsequent to importation for release with controls, in respect of transport, storage, application/use and container disposal will be in compliance with the Code of Practice for the

Management of Agrichemicals NZS 8409 and is consistent with other EPA approved herbicides. The information and documentation to facilitate this will include the documentation such as the container label and Safety Data Sheet.

7.6. Provide an overall evaluation of the combined impact of all of the risks, costs and benefits set out in sections 7.2, 7.3 and 7.4

Please express a view on the relative importance of the different risks, costs and benefits and how they should be brought together in making a decision

Management of all risks will be in compliance with the Code of Practice for the Management of Agrichemicals NZS 8409 and HSNO default controls and any additional controls applied by EPA. The product will only be applied by ground-based equipment. The label will include warning statements for the protection of waterways and non-target plants. The product is intended for use only by approved handlers, eg suitably trained professional growers or contractors. Operators should wear PPE with instructions clearly shown on the product label and Safety Data Sheet. Specific precautionary statements and warnings regarding protection of human health and the environment will be located on the product label.

The costs associated with the substance are predominantly the direct cost of purchase and use. Indirect costs for example disposal and management of spills are expected to be very low.

The benefits of Boxer Gold as a pre-emergent or early post-emergent herbicide in potatoes include control of potentially damaging weeds that reduce yield potential and impede harvesting, as well as providing a valuable tool for herbicide resistance management. Maximising yields not only leads to higher grower profits but also helps to ensure the most efficient use of arable land assets.

No effects on ancestral land, water or sites or unacceptable risks to the kaitiaki relationship of Maori and their culture to the environment from the release of the substance are expected. No implications for New Zealand's international obligations are foreseen from the release of the substance.

It is therefore concluded that overall the benefits of the import and release of Boxer Gold outweigh the risks and costs.

8. Pathway determination and rapid assessment

Under the HSNO Act, applications may be processed under different pathways, including a rapid assessment. The pathway for your application will be determined after its formal receipt, based on the data provided in this application form. If you would like your application to be considered for rapid assessment (as per the criteria below), we require you to complete the attached statutory declaration and provide a signed hard copy.

Please note that the EPA will not be able to proceed with the rapid assessment without the statutory declaration.

8.1. Rapid assessment

Under the HSNO Act, a hazardous substance may be approved under a rapid assessment if one of the three following options is satisfied. Please show the section that is relevant to your application.

<p>A substance having a similar composition and similar hazardous properties has been approved</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If Yes, please give the name of the reference substance:</p>
<p>The substance has one or more hazardous properties and each has the least degree of hazard for that property; or</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>The substance has been formulated so that one or more of its hazardous properties has a lesser degree of hazard than any substance that has been approved under the Act.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If Yes, please give the name of the reference substance:</p>

8.2. Statutory Declaration

I [full name], of [address], [occupation/position], being the applicant or authorised to do so on behalf of the applicant, verify that the information contained in this application for [substance name] is true and correct. I make this solemn declaration conscientiously believing the same to be true and by virtue of the Oaths and Declarations Act 1957.

Signature

Declared at _____ on this _____ day of _____, 20____ before me.

Witness signature

[name] Barrister or Solicitor of the High Court of New Zealand

[or Justice of the Peace, Notary Public, or other person authorised to take a statutory declaration]

9. Checklist

This checklist is to be completed by the applicant

Application	Comments/justifications	
All sections of the application form completed or you have requested an information waiver under section 59 of the HSNO Act	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (If No, please discuss with an advisor to enable your application to be further processed)	
Confidential data as part of the confidential form. Please note the EPA strongly encourages applicants to provide as much information as possible in the main body of the application form unless there is a genuine argument that it is commercially sensitive.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Supplementary optional information attached:		
<ul style="list-style-type: none"> Copies of additional references 	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Not required in addition to confidential data
<ul style="list-style-type: none"> Letter(s) of access 	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<ul style="list-style-type: none"> Relevant correspondence 	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<ul style="list-style-type: none"> Draft label 	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<ul style="list-style-type: none"> Draft Safety Data Sheet (SDS) 	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Administration		
Are you an approved EPA customer?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes are you an: Applicant: <input checked="" type="checkbox"/> Agent: <input type="checkbox"/>	
If you are not an approved customer, payment of fee will be by:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Payment to follow <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Payment to follow	
Electronic signed copy of application e-mailed to the EPA	<input checked="" type="checkbox"/> Yes	

Physical copy of signed statutory declaration sent to the EPA, (rapid assessment only)

Yes

Not applicable – not suitable for rapid assessment.

Signature of applicant or person authorised to sign on behalf of applicant

- I am making this application, or am authorised to sign on behalf of the applicant or applicant organisation.
- I have completed this application to the best of my ability and, as far as I am aware, the information I have provided in this application form is correct.

M. Hickman

27 November 2018

Signature

Date

Request for information waiver under section 59 of the HSNO Act

- I request for the Authority to waive any legislative information requirements (i.e. concerning the information that has been supplied in my application) that my application does not meet (tick if applicable).

Please list below which section(s) of this form are relevant to the information waiver request: