

Agricultural aviation and the pilot chemical rating

What an operator in the (agricultural aviation) industry needs to know and do to be environmentally safe

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February 2015

Summary

Key aspects:

- Regulatory – CAR Part 61 sub-part P, NZS8409 and Regional Council rules. Also AC61-16 – guidance to facilitate compliance with rule requirements and HSNO/H&SE enforcement. See Appendix 1
- Essential (compulsory) course content
- “Nice to have” course content

Other considerations:

- Size of the market – number of candidates and course providers
- Course cost
- Course “status” and the requirements of regulatory agencies other than CAA. See Appendix 2
- Nature of the agric. aviation industry – geographically scattered and unpredictable work loads

A Risk Management approach - the relationship between hazard, exposure and risk

The pilot chemical rating

Questions

1. What is the prime objective for the chemical rating?
2. How best can the enforcement /regulator/employer and the candidate each be assured that the course content, delivery and assessment are at the required high standard?
3. Should the course content (ie the workbook or manual) be the same for all courses, covering fert, agchem and VTA (see the NPRM which refers to ratings and “authorizations”)
4. How much of the course can be on line, how much “hands on” practical and how much “classroom”?
5. Who should “own” the chemical rating, ie be responsible for checking that it remains relevant?
6. Who should administer the chemical rating – the workbook, the presenter(s) or tutor(s), the assessment the issue of Certificates and the associated database.
7. What relevance if any is the AIRCARE checklist for fertiliser, agchem or VTA application in relation to the scope and extent of topics covered in the workbook?
8. Over what time period should the course be delivered and what prerequisites are there?
9. Should CAA be involved in the revision and/or ongoing delivery of the course for a pilot chemical rating and if so how and what form should the relationship take?

More detail regarding the regulatory and guidance material is given in Appendix 1 and 2 following. Some of this material, notably AC 61-16 is wrong in some details and outdated in other matters while in other cases the roles and responsibilities for collaborating regulatory bodies is not clearly defined eg EPA and WorkSafe NZ or EPA and Workplace Safety

Risk Management

A risk management approach should address the **actual risk** of the situation; provide flexibility in how outcomes are to be achieved and clear performance standards for operators to meet. For agricultural aviation activities, a risk management approach requires a pilot to:

- undertake an assessment of the risk of the task which takes into account the nature of the substance being used and the actual (real time) situation;
- choose appropriate actions to address and minimise the identified risks; follow best practice when undertaking their operations and be able to verify that

Risk assessment management is based on the relationship between hazard, exposure and risk where:

Hazard x Exposure = Risk (level)

Hazard	=	Something that could have or lead to a potential adverse effect.
Exposure	=	The nature and extent of exposure to the hazard.
Risk	=	The combination of the nature of the hazard and level of exposure

An adverse effect from or associated with use of a substance (ie agrichemical, fertiliser or VTA) can result when one or more of the following happens, - the wrong substance is used; or it was in the wrong place at the wrong time, at the wrong rate or the user is inappropriately equipped with PPE or inadequately trained in the use of that substance. Risk management involves establishing what [potential adverse effects](#) exist, and identifying the [exposure pathways](#).

Exposure pathways and management options (see Appendix 2 Table 1)

The exposure pathways for fertilisers, agrichemicals and Vertebrate Toxic Agents (VTA's) can be either

- Indirect – off target drift from discharge
- Direct – application on subject areas or point source discharges (e.g. spillages) during transport, storage or disposal.

As part of aerial application of fertilisers, agrichemicals and Vertebrate Toxic Agents (VTA's) there is generally a need to store these substances, mix them as required and then load them onto the aircraft. These activities have the potential to cause adverse effects if not appropriately managed and the substances contained. There are a number of [HSNO controls](#) that apply with respect to storage and handling of hazardous substances, based on the hazard classifications and [quantity involved](#).

Storage of hazardous substances is also a land use issue managed by Councils. All the information on the hazards of substances and how they should be safely used, stored, transported and disposed of is contained in the [Safety Data Sheet \(SDS\)](#) for that substance. The SDS also describes emergency procedures, such as what to do in the event of a spill or fire. A PSC such as [Haznote™](#) is a one-page document designed to collect all the relevant data on the hazard characteristics for specific agrichemicals. A Haznote™ is an example of a Product Safety Card (PSC see NZS8409:2004).

The Pilot Chemical Rating

The current course content has the following topic headings

1 Laws and Regulations for the Aerial Operator

- 1.1 Relevant CAA Rules and Regulations
- 1.2 Other legislation
- 1.3 NZS 8409:2004 Management of Agrichemicals

2 Pest Management

- 2.1 Aerial Application
- 2.2 Vegetation and Weeds
- 2.3 Insect and Mite Pests
- 2.4 Plant disease organisms—the disease triangle

3 The Product Label and Pesticide Safety

- 3.1 The Product Label
- 3.2 Priority Identifiers
- 3.3 Secondary Identifiers
- 3.4 Risk
- 3.5 First Aid for Pesticide Exposure
- 3.6 Protective Equipment and Clothing
- 3.7 Employee habits
- 3.8 Dealing with agrichemical emergencies

4 Safe Handling Techniques

- 4.1 Communicating with the ground crew
- 4.2 Transporting and storing agrichemicals
- 4.3 Storing Agrichemicals
- 4.4 Handling agrichemical containers
- 4.5 Mixing and loading

5 Aerial Dispersal Systems

- 5.1 General requirements
- 5.2 Dispersal system components - liquids
- 5.3 Dispersal system components – solids

6 Aerial Application Guidance Systems

- 6.1 Navigation methods**
- 6.2 Differential GPS
- 6.3 Using DGPS for Aerial Application
- 6.4 Computers, Spray Output Controllers, and Sensors
- 6.5 Smoke generators

7 Preparing for an Aerial Application

- 7.1 Understanding the recommendation or work order
- 7.2 Operations Plan
- 7.3 Emergency Information

8 Calibrating Aerial Application Equipment

- 8.1 Why calibration is essential
- 8.2 Calibrating Liquid Sprayers
- 8.3 Pattern Testing a Spray Boom
- 8.4 Calibrating Granule Applicators

9 Aerial Application Technology

- 9.1 Checking the application site
- 9.2 What to watch for during an application
- 9.3 Application methods
- 9.4 Factors influencing aircraft performance during application
- 9.5 Controlling offsite agrichemical drift
- 9.6 Droplet Size

Table 1 Risk management controls for the discharge of agrichemical by aerial application¹

	Risk factors	Information needed	Information able to be used for task verification	Pilot Management
1	Application site (target)	Location and boundaries	GIS co-ordinates, dated photograph Hand-written diagram or map, verbal	Application plan with map detailing location and boundaries
2	Sensitive area	Nature of and location with respect to application area	GIS co-ordinates, dated photograph Hand-written diagram or map Verbal only if task is low risk	Sensitive areas identified and actions taken to avoid adverse effects
3*	Wind direction	Direction (bearing) at the application site at the time	Digital recording wind vane/sensor with time base Hand held vane or equivalent Smoke or other visual indicators	Adjacent to sensitive areas -application only when wind is away from sensitive areas and wind speed is steady
4*	Wind speed	Speed at the application site at the time	Digital recording wind vane/sensor with time base Hand held anemometer or equivalent Smoke or other visual indicators	Adjacent to sensitive areas, no application when wind speed exceeds the limits according to the risk.
5	Particle size	Physical properties of the product being applied	Documented record of particle size and size range, and stability, ie volatility (liquid) or fragmentation (solid)	Adjacent to sensitive areas, physical properties of the product must be such that trajectory after release is predictable
6	Product hazard	HSNO Hazard classifications and controls , HSNO class, Bio-accumulation, water solubility and attributes relevant to potential adverse effects	Product selected according to application task, taking account of HSNO class, efficacy and other attributes and the at-risk sensitive locations, all according to written prescriptions documented	Extra care taken if using Class 6.1 A, 6.1B, 6.1C, 9.1A, 9.2A, 9.3A, 9.4A adjacent to sensitive areas. Choose least hazardous product suitable for the task
7	Effective height of product release	Application method Including lateral spreading vs localised	Application equipment selected to minimise product losses between the point of release and the target all fully documented	Product directed to the target at all times

¹ Equally applicable for fertiliser and VTA

Table 1 Risk management controls for the discharge of agrichemical by aerial application² (cont'd)

8*	Buffer zone	Downwind application free zone	Location of application target and sensitive area known and logged, communication/notification confirmed, product quality, and wind direction known and drift modelling done	Adjacent to sensitive areas, application only when wind is away from sensitive areas and is a steady wind speed
9	Shelter belts	Nature of and location with respect to application area	Location of application target and sensitive area known and logged, communication/notification confirmed, product quality, and wind direction known and drift modelling done	As above but also operation planned to take account of hazards associated with shelter trees and structures.
10*	Humidity	Air temperature	Humidity measured and recorded on site at the time	Specific controls according to the volatility of the product being applied
11*	Atmospheric stability	Inversion layer	Wind and temperature data recorded on site such that no inversion layer, and visual clues e.g. smoke to test for inversion according to the risk	If label information indicates volatility an on-site test for inversion layer should be made.

*** = real time factors ie they can change during the operation**

² Equally applicable for fertiliser and VTA

APPENDIX 1 : CAA REGULATORY FRAMEWORK

1. Extracts from NPRM_09_02 Part 61 in relation to the Pilot Chemical Rating

The qualification required by a pilot to carry out aerial application of fertiliser, agrichemical or VTA is differs in one major respect from all other contract applications (or discharges) of such substances in that there is a clearly defined legal requirement to hold such a qualification. The detail relating to the qualification is set out primarily in Civil Aviation Rule Part 61. These extracts are from a proposed revision of the current Rule and show that in order to gain a pilot chemical rating, holding the qualification is only one of the requirements to be satisfied

(A Rating means an authorisation entered on, or associated with, a licence, certificate, or logbook, and forming part of it, stating special conditions, privileges, or limitations relating to the licence or certificate CAR Rule Part 1)

3.4 Ratings

The current Part 61 has 2 classes of ratings: 'prime' ratings issued by the Director in accordance with section 9 of the Act as aviation documents, and 'other' ratings issued by flight instructors and flight examiners as certifications in a pilot logbook.

A 'prime' rating (currently an instrument rating, a flight instructor rating, or a flight examiner rating) must be endorsed on the pilot's licence and is based on ICAO requirements specified in Annex 1. 'Other' ratings are specific activities that require an appropriately qualified flight instructor or flight examiner to certify, in the pilot's logbook, the pilot's competence in the activity before the privileges of the rating can be exercised.

The CAA believes that 'other' ratings should be referred to as authorisations because they are managed quite differently to the so-called 'prime' ratings, and are not aviation documents for the purpose of the Act. The rule amendments therefore propose that all piloting activities, associated with the use of a pilot licence, that have significant public interest and safety considerations be called ratings.

In this NPRM, the activities that are proposed to be 'ratings' issued as aviation documents are:

- (1) all flight instructor ratings:
- (2) all flight examiner ratings:
- (3) all agricultural ratings (grade 1 and grade 2):
- (4) an aerobatic rating:
- (5) instrument ratings:
- (6) co-pilot instrument rating- helicopter

61.7 Requirement for a rating

(b) The Director may issue the following ratings for a pilot licence in accordance with this Part:

- (1) flight instructor rating category A, B, C, D, and E - Aeroplane: - Helicopter:
- (2) flight instructor rating category F - Balloon:
- (3) airline flight instructor rating - Aeroplane:
- (4) flight examiner rating - Airline: - General aviation: Balloon: - Agricultural:
- (5) agricultural rating grade 1 - Aeroplane: - Helicopter:
- (6) agricultural rating grade 2 - Aeroplane: - Helicopter:
- (7) aerobatic flight rating - Aeroplane:
- (8) instrument rating - Aeroplane: - Helicopter:
- (9) co-pilot instrument rating - Helicopter

(d) An aircraft type rating and the following authorisations for a holder of a pilot licence may be issued under this Part by a flight instructor, a flight examiner, or a person authorised to do so by the holder of an aviation recreation organisation certificate:

- (1) glider tow authorisation:
- (2) tow authorisation:
- (3) parachute-drop authorisation:
- (4) aid to night vision authorisation:
- (5) helicopter external load authorisation:
- (6) aerial topdressing authorisation:
- (7) aerial spraying authorisation:
- (8) aerial vertebrate toxic agent (VTA) authorization

Aerial Topdressing Authorisation

61.741 Eligibility requirements

To be eligible for an aerial topdressing authorisation a pilot must—

- (1) hold at least a current Grade 2 agricultural rating for the appropriate category of aircraft; and
- (2) satisfactorily complete a training course consisting of both ground training and flight instruction, in aerial topdressing operations, conducted under the authority of an aviation training organisation certificate issued by the Director under the Act and Part 141 or an agricultural aircraft operator certificate issued by the Director under the Act and Part 137 if the certificate authorises the holder to conduct aerial topdressing training courses; and
- (3) demonstrate competence in aerial topdressing operations to a holder of a Category E flight instructor rating operating under the authority of an aviation training organisation certificate issued by the Director under the Act and Part 141 or an agricultural aircraft operator certificate issued by the Director under the Act and Part 137 if the certificate authorises the holder to conduct aerial topdressing authorisation competency assessments.

61.743 Issue

(a) If the flight instructor who conducted the competency demonstration required by rule 61.741(3) is satisfied that the pilot complies with rule 61.741, the flight instructor may issue the aerial topdressing authorisation by entering the following statement in the pilot's logbook under rule 61.29:

I certify that on [date of assessment] [name of pilot and licence number] satisfied the requirements of Civil Aviation Rule Part 61 for the issue of an aerial topdressing authorisation for (aeroplanes) (helicopters)*. [enter the date, full name, signature, and licence number of the flight instructor issuing the authorisation].*

** delete as applicable*

(b) A pilot who holds a current agricultural rating (grade 1 or grade 2) that was issued or deemed to have been issued under this Part that was in force immediately before [date rules comes into force]—

- (1) is deemed to comply with rule 61.741(1) and (2); and
- (2) on successfully completing the demonstration of competency required by rule 61.747(a) may be issued with an aerial topdressing authorisation under paragraph (a).

61.745 Privileges and limitations

(a) Subject to the privileges and limitations of the holder's pilot licence, a holder of a current agricultural rating and a current aerial topdressing authorisation may act as pilot-in-command of an appropriate category of aircraft performing an aerial topdressing operation.

(b) A pilot who holds a current agricultural rating (grade 1 or grade 2) that was issued or deemed to have been issued under this Part that was in force immediately before [date rules comes into force] may exercise the privileges specified in paragraph (a) without holding an aerial topdressing authorisation issued under rule 61.743 until the expiry of the currency period for that agricultural rating as specified in rule 61.707(a) that was in force immediately before [date rules come into force].

61.747 Currency requirements

(a) Except as provided in paragraph (b), a holder of an aerial topdressing authorisation must not exercise the privileges of the authorisation unless within the previous 12 months the holder has demonstrated under rule 61.741(3); and the flight instructor who conducted the competency demonstration has certified the successful completion of the demonstration in the holder's logbook under rule 61.29.

(b) A pilot who completes the competency demonstration required by paragraph (a) within 60 days before the date on which it is required, is deemed to have completed the demonstration on the required date.

Aerial Spraying Authorisation

61.749 Eligibility requirements

To be eligible for an aerial spraying authorisation a pilot must—

(1) hold at least a current Grade 2 agricultural rating for the appropriate category of aircraft; and

(2) satisfactorily complete a training course consisting of both ground training and flight instruction, in aerial spraying operations, conducted under the authority of an aviation training organisation certificate issued by the Director under the Act and Part 141 or an agricultural aircraft operator certificate issued by the Director under the Act and Part 137 if the certificate authorises the holder to conduct aerial spraying authorisation training courses; and

(3) demonstrate competence in conducting agricultural aircraft operations on aerial spraying to a holder of a Category E flight instructor rating operating under the authority of an aviation training organisation certificate issued under the Act and Part 141 or an agricultural aircraft operator certificate issued under the Act and Part 137 if the certificate authorises the holder to conduct aerial spraying authorisation competency assessments.

61.751 Issue

(a) If the flight instructor who conducted the competency demonstration required by rule 61.749(3) is satisfied that the pilot complies with rule 61.749, the flight instructor may issue the aerial spraying authorisation by entering the following statement in the pilot's logbook under rule 61.29:

I certify that on [date of assessment] [name of pilot and client number] satisfied the requirements of Civil Aviation Rule Part 61 for the issue of an aerial spraying authorisation for (aeroplanes) (helicopters)*.*

[enter the date, full name, signature, and licence number of the flight instructor issuing the authorisation].

**delete as applicable*

(b) A pilot who holds a current agricultural rating (grade 1 or grade 2) that was issued or deemed to have been issued under this Part that was in force immediately before [date rules comes into force]—

(1) is deemed to comply with rules 61.749(1) and (2); and

(2) on successfully completing the demonstration of competency required by rule 61.755(a) may be issued with an aerial spraying authorisation under paragraph (a).

61.753 Privileges and limitations

(a) A holder of a current agricultural rating and a current aerial spraying authorisation may act as pilot-in-command of an appropriate category of aircraft performing an agricultural aircraft operation on aerial spraying, if authorised under the holder's pilot licence.

(b) A pilot who holds a current agricultural rating (grade 1 or grade 2) that was issued or deemed to have been issued under this Part that was in force immediately before [date rules comes into force] may exercise the privileges specified in paragraph (a) without holding an aerial spraying authorisation issued under rule 61.751 until the expiry of the currency period for that agricultural rating as specified in rule 61.707(a) that was in force immediately before [date rules come into force].

61.755 Currency requirements

(a) Except as provided in paragraph (b), a holder of an aerial spraying authorisation must not exercise the privileges of the authorisation unless within the previous 12 months the holder has demonstrated under rule 61.749(3) and the flight instructor who conducted the competency demonstration has certified the successful completion of the demonstration in the holder's logbook under rule 61.29.

(b) A pilot who completes the demonstration required by paragraph (a) within 60 days before the date on which it is required, is deemed to have completed the demonstration on the required date.

Aerial VTA Authorisation

61.757 Eligibility requirements

To be eligible for an aerial VTA authorisation a pilot must—

(1) hold at least a current Grade 2 agricultural rating for the appropriate category of aircraft; and

(2) satisfactorily complete a training course in aerial VTA operations consisting of both ground and flight instruction, conducted under the authority of an aviation training organisation certificate issued under the Act and Part 141 or an agricultural aircraft operator certificate issued under the Act and Part 137, if the certificate authorises the holder to conduct aerial VTA authorisation training courses; and

(3) demonstrate competence in aerial VTA operations to a holder of a Category E flight instructor rating operating under the authority of an aviation training organisation certificate issued under the Act and Part 141 or an agricultural aircraft operator certificate issued under the Act and Part 137 if the certificate authorises the holder to conduct aerial VTA authorisation competency assessments.

61.759 Issue

(a) If the flight instructor who conducted the competency demonstration required by rule 61.757(3) is satisfied that the pilot complies with rule 61.757, the flight instructor may issue the aerial VTA authorisation by entering the following statement in the pilot's logbook under rule 61.29:

I certify that on [date of assessment] [name of pilot and client number] satisfied the requirements of Civil Aviation Rule Part 61 for the issue of an aerial VTA authorisation for (aeroplanes) (helicopters)*.[enter the date, , full name, signature, and licence number of the flight instructor issuing the authorisation].*

**delete as applicable*

(b) A pilot who holds a current agricultural rating (grade 1 or grade 2) that was issued or deemed to have been issued under this Part that was in force immediately before [date rules comes into force]—

(1) is deemed to comply with rules 61.757(1) and (2); and

(2) on successfully completing the demonstration of competency required by rule 61.763(a), may be issued with an aerial VTA authorisation under paragraph (a).

61.761 Privileges and limitations

(a) Subject to the privileges and limitations of the holder's pilot licence, a holder of a current agricultural rating and a current aerial VTA authorisation may act as pilot-in-command of an appropriate category of aircraft performing an agricultural aircraft operation on aerial VTA.

(b) A pilot who holds a current agricultural rating (grade 1 or grade 2) that was issued or deemed to have been issued under this Part that was in force immediately before [date rules comes into force] may exercise the privileges specified in paragraph (a) without holding an aerial VTA authorisation issued under rule 61.759 until the expiry of the currency period for that agricultural rating as specified in rule 61.707(a) that was in force immediately before [date rules come into force].

61.763 Currency requirements

(a) Except as provided in paragraph (b), a holder of an aerial VTA authorisation must not exercise the privileges of the authorisation unless within the previous 12 months the holder has demonstrated competency under rule 61.757(3) and the flight instructor who conducted the competency demonstration has certified the successful completion of the demonstration in the holder's logbook under rule 61.29.

(b) A pilot who completes the competency demonstration required by paragraph (a) within 60 days before the date on which it is required, is deemed to have completed the demonstration on the required date

2.
05 August 2014

AC61-16 Revision 3 Pilot Licences and Ratings – Pilot Chemical Rating

See <http://www.caa.govt.nz/rules/ACs.htm> for a copy

General

Civil Aviation Authority advisory circulars contain information about standards, practices, and procedures that the Director has found to be an acceptable means of compliance with the associated rule. An acceptable means of compliance is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate advisory circular.

This advisory circular also includes guidance material to facilitate compliance with the rule requirements. Guidance material must not be regarded as an acceptable means of compliance.

Purpose

The advisory circular provides information on the course that is acceptable to the Director for meeting the Civil Aviation Rule requirements for the issue of a pilot chemical rating.

Related Rules This advisory circular relates specifically to Civil Aviation Rule Part 61 Subpart P – Pilot Chemical Rating.

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Rule 61.751 Eligibility Requirements

Training course

Rule 61.751 states that to be eligible for a pilot chemical rating, a person shall satisfactorily complete a training course in agricultural chemical application, with assessment, that is acceptable to the Director.

A person would satisfy this requirement if they:

- (a) hold a New Zealand Qualifications Authority National Certificate in Agricultural Chemical Application (Aerial) and have satisfactorily completed a GROWSAFE® pilot chemical rating course, or (b) have satisfactorily completed the pilot chemical rating course offered by Adroit Solutions

Limited, or

(c) satisfactorily completed the pilot chemical rating course previously offered by the Open Polytechnic of New Zealand, covering the syllabus in Appendix I of this advisory circular.

Rule 61.753 Issue

Logbook endorsement

Rule 61.753 states the requirements for the issue of a pilot chemical rating. The person operating must be satisfied that the eligibility requirements of Rule 61.751 have been met before issuing the pilot chemical rating.

All relevant details must have been instructed, completed, and checked either orally, in writing, or in practice to the satisfaction of the certifying person. The entry in the logbook must be made in accordance with Rule 61.29(a)(3) including the:

(a) purpose of the flight

(b) date of the flight

(c) expiry date of the flight test, flight review, competency demonstration or check

(d) name, client number, and signature of the person conducting the flight test, flight review, competency demonstration, or check.

Rule 61.757 Currency Requirements

Refresher course

Rule 61.757 requires successful completion of a refresher course that is acceptable to the Director.

The following courses meet this requirement:

(a) a GROWSAFE® pilot chemical rating refresher course, or

(b) an Adriot Solutions Limited pilot chemical rating refresher course

Appendix I - Chemical Rating Syllabus³

Agricultural Chemicals

The functional and chemical classifications of agricultural chemicals

General characteristics of insecticides

Fungicides, herbicides and animal poisons

Formulations and their properties

Solutions, suspensions, emulsions, dispersions, dusts, pellets, and granulated materials

Application and Spraying

Methods of application and spraying

Dusting and fogging techniques

Operational methods and practices

Selection of air strips

Use of loading tables

Swath width

Low flying

Ground effect

Corrosive properties of agricultural chemicals

³ This syllabus is taken from the latest edition of the AC but it is vague and outdated, and in some cases irrelevant.

Drift of agricultural chemicals and the hazards associated with drift outside target area
Drift spraying techniques
Environmental considerations
Calculations
Area treated relative to time
Quantities of materials to give required acid equivalent applications
Delivery rates of solids and sprays
Equipment
Types of equipment commonly in use
Calibration
Decontamination
Pressure systems
Hazards associated with poorly performing or maintained equipment
Airworthiness requirements
Standards
New Zealand Standard NZS8409
Agrichemical User's Code of Practice
Toxicity
The toxicology of agricultural chemicals classified as insecticides, herbicides and fungicides and of animal poisons, including routes of absorption. Particular attention should be given to the organochlorine and organophosphorous insecticides, and the dinitro herbicides.
Candidates should have an understanding of the fungicides and animal poisons including 1080.
Candidates should have an understanding the value of medical surveillance.
Candidates should have an understanding of the symptoms of poisoning together with appropriate emergency and first aid measures.
Protective measures for personnel handling poisonous substances
Personal hygiene, protective clothing and equipment including its maintenance
Significance of labeling and storage
Significance of disposal of materials and containers
Operation rules
Legislation
The Pesticides Regulations 1983
Pesticides (Vertebrate Pest Control) Regulations 1983
Toxic Substances Regulations 1983
Freshwater Fisheries Regulations 1983
Hazardous Substances and New Organisms Act 1996
Health and Safety in Employment Act 1992
Noxious Substances Regulations 1954 (incl. Amd 1 - 1981)
Noxious Substance Notices (1958 and 1959)
Pesticides Act 1979
Relevant parts of The Health Act 1956
Resource Management Act 1991
or any legislation superseding any of those listed.

APPENDIX 2: Other relevant legislation

1. HSNO Act

The CAA is responsible for enforcement of the hazardous substances provisions of the HSNO Act in or on any aircraft. All dangerous goods that are exempt from Rule Part 92, but which are carried on an Aircraft, if identified as a hazardous substance, may be covered by the HSNO Act.

2. HSE Act

The CAA's administration of the HSE Act involves providing to employers, employees, self-employed-people and others, who have responsibilities and duties to maintain effective safety mechanisms, applicable to the CAA HSE designation, information, education and advice on occupational safety and health issues, undertaking compliance audits, inspections, and investigations, and may involve issuing notices and taking enforcement actions.

3. Resource Management Act

Both regional councils and territorial authorities have responsibilities for preventing or mitigating the adverse effects of the storage, use disposal or transportation of hazardous substances under the RMA as well as discharges of contaminants, which includes agrichemicals, fertilisers and VTAs discharged to air, onto or into land where it may enter water, or directly to water. Regional plans often include permitted activity rules to enable discharges of these substances, subject to conditions and/or performance standards – in that context, reference is usually made to NZS 8409 2004, Management of Agrichemicals

Table 1 Risk management approach for aerial application of agrichemicals

Potential adverse effects	Risk factors	Exposure pathway	Pilot Management options ⁴	Options for plan provisions and consent conditions)
<p>Health effects caused or possible:</p> <ul style="list-style-type: none"> • Allergic reactions • Irritations • Toxic poisoning • Exposure to carcinogens and teratogens 	<ul style="list-style-type: none"> • Hazard class of chemical being used and exposure (Class 6 and 9) 	<p>Indirect:</p> <ul style="list-style-type: none"> • Off target drift <p>Direct:</p> <ul style="list-style-type: none"> • Applicator 	<p>Indirect:</p> <ul style="list-style-type: none"> • Minimising potential for drift technical options • Notification (drift hazard) <p>Direct:</p> <ul style="list-style-type: none"> • PE 	<ul style="list-style-type: none"> • Require operator risk assessment to ensure use of appropriate technical options • Classify dwellings, educational facilities and public places as sensitive areas • Require notification if application is adjacent to sensitive areas
<p>Contamination of crops and plants including sensitive crops and organically farmed properties.</p> <p>Effects include:</p> <ul style="list-style-type: none"> • Growth and quality of the crop • Contamination to levels in excess of residue levels • Threatens organic registration 	<ul style="list-style-type: none"> • Chemical type (herbicide, insecticide, fungicide etc.) • Excessive residue levels • Timing of application – crop stage • Application rate (calibration) 	<p>Indirect:</p> <ul style="list-style-type: none"> • Off target drift 	<ul style="list-style-type: none"> • Minimising potential for drift – technical options 	<ul style="list-style-type: none"> • Require operator risk assessment to ensure use of appropriate technical options including identification of sensitive crops and methods to avoid drift onto those areas • Classify crops and non-target plants as sensitive areas • Require notification to greenhouse operations in the area
<ul style="list-style-type: none"> • Contamination of domestic or commercial water supplies where it renders the drinking water non-potable 	<ul style="list-style-type: none"> • Chemical type and hazard class 	<p>Indirect:</p> <ul style="list-style-type: none"> • Off target <p>Direct:</p> <ul style="list-style-type: none"> • Discharges 	<ul style="list-style-type: none"> • Minimising potential for drift – technical options 	<ul style="list-style-type: none"> • Require operator risk assessment to ensure use of appropriate technical options • Classify water supplies as sensitive areas • Conditions to avoid direct applications over

⁴ (see [Technical Information relating to the Agricultural Aviation Industry](#))

Potential adverse effects	Risk factors	Exposure pathway	Pilot Management options ⁴	Options for plan provisions and consent conditions)
				such areas
<ul style="list-style-type: none"> Contamination of indigenous flora and fauna, habitat areas and reserves where the inherent values of the areas are damaged 	<ul style="list-style-type: none"> cotoxicity of substance 9.3A and 9.4A oor or no target identification pray quality 	<ul style="list-style-type: none"> Indirect: <ul style="list-style-type: none"> ff target drift Direct: <ul style="list-style-type: none"> pplications 	<ul style="list-style-type: none"> minimising potential for drift technical options arget site ID azard classification eg 9.3 and 9.4 	<ul style="list-style-type: none"> Require site identification as part of risk assessment Require operator risk assessment Classify as sensitive areas Controls by hazard classification (eg 9.3 and 9.4)
<p>Contamination of wetlands, surface water body and coastal and marine environments where it causes:</p> <ul style="list-style-type: none"> Death of flora, fish or other fauna Water takes affected leading to un-potable water or damage to crops and animals 	<ul style="list-style-type: none"> Chemical type and hazard class 9.1A, 9.3A or 9.4A .1A, 6.1B or 6.1C Concentration of chemical and application rates ocation of application in proximity to water take points Inappropriate disposal oor or no target identification o ID of at-risk water bodies on-point spray quality 	<ul style="list-style-type: none"> Indirect: <ul style="list-style-type: none"> pplications adjacent to water bodies – off target drift or overland flow isposal adjacent to water Direct: <ul style="list-style-type: none"> pplications into water pillages/ overflows at mixing sites isposal to water 	<ul style="list-style-type: none"> minimising potential for drift – technical options arget site ID (GPS) ontrols by hazard classification eg 9.3 and 9.4. anagement measures of mixing sites – NZS8409 Sec 5.3.2 and App R anagement of disposal – NZS8409 Sec 6 and App 6 	<ul style="list-style-type: none"> Require reasonable measures be taken to avoid discharges to surface water bodies unless for intended aquatic use and operator risk assessment undertaken to establish reasonable measures and ensure use of appropriate technical options Classify water bodies as sensitive areas Ensure that label requirements are followed. It may be appropriate to include conditions to avoid direct applications over such areas Use of substances approved for aquatic use and HSNO controls.
<ul style="list-style-type: none"> Contamination of 	<ul style="list-style-type: none"> Concentration of 	<ul style="list-style-type: none"> Direct: <ul style="list-style-type: none"> 	<ul style="list-style-type: none"> anagement 	<ul style="list-style-type: none"> Require compliance with NZS8409 Sec 6

Potential adverse effects	Risk factors	Exposure pathway	Pilot Management options ⁴	Options for plan provisions and consent conditions)
groundwater	chemicals and application rates • oil type – highly permeable and chemicals that are mobile	pillages/ overflows at mixing sites Indirect: • leaching through soil Direct and indirect: • inappropriate disposal of unwanted agrichemicals and surplus spray mix	measures of mixing sites – bundled etc. NZS8409 Sec 5.3.2 App R • appropriate rate, concentration, gradient, soil profile (GROWSAFE calculator) • methods of disposal NZS8409 Sec 6 and App S	and App S and Sec 5.3.2 and App R

• Contamination of soils/ land	• Use of substances that persist and accumulate in the soil – e.g. copper 9.2A • inappropriate application rates • inadequate containment at storage and mixing sites	Direct: • frequency and rate of application of persistent chemicals 9.2A Indirect: • permeability – includes water source to move through the soil profile	• ROWSAFE calculator • NZS8409 App F Fate processes • mixing sites and storage NZS8409 Sec 4 App L	• Meet label requirements • Require that NZS8409 Sec 4 and App L are met.
• Amenity values Offensive and/or objectionable effects such	• Proximity of people – timing and location •	Direct: • exposure if in public areas at	• Minimising potential for drift – technical	• Classify amenity areas as <i>sensitive areas</i> • Plan

<p>as:</p> <ul style="list-style-type: none"> • Limiting access to public areas • Off target drift other than health and vegetation damage • Excessive noise 	<ul style="list-style-type: none"> • Chemical – volatility and toxicity class A • Aircraft and machinery operating 	<ul style="list-style-type: none"> • time of application • Off target drift • Noise – aircraft and machinery 	<ul style="list-style-type: none"> • options • Mitigation (drift hazard) 	<p>provisions relating to reverse sensitivity in rural areas – including noise, odour, spray drift to benchmark what is to be reasonably expected in the rural area</p>
<ul style="list-style-type: none"> • All potential adverse effects 			<ul style="list-style-type: none"> • Competent to carry out risk assessment for operation. 	<ul style="list-style-type: none"> • Require pilot competency through Pilots Agrichemical Rating issued by CAA and the operator to be AIRCARE™ accredited for agrichemicals.