



Australian Pesticides &
Veterinary Medicines Authority

**The Reconsideration of Approvals and Registrations
Relating to Carbon Disulfide**

REVIEW SCOPE DOCUMENT

July 2003

**Australian Pesticides &
Veterinary Medicines Authority**

**Canberra
Australia**

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Review Scope Document Carbon Disulfide

SUMMARY

The APVMA has initiated its reconsideration of the registrations of products containing carbon disulfide and the approvals of associated labels. This document defines the scope of the matters of concern to the APVMA and outlines the kinds of information the APVMA requires to conduct a comprehensive scientific assessment of products containing carbon disulfide.

Products containing carbon disulfide and associated labels are being reviewed because of toxicological, occupational health and safety and residue concerns.

The reconsiderations will be made after the APVMA assesses all the data and other information provided to it for this purpose – the assessment process is hereafter referred to as ‘review’. It is anticipated that a draft report of the APVMA’s review will be made available for public comment prior to the APVMA making its decisions.

The APVMA will review the following aspects of product registrations and label approvals for carbon disulfide:

- Toxicology, including:
 - the potential for acute and chronic effects that might pose undue hazards to human health.
- Occupational health and safety, including:
 - the potential for undue hazards to workers.
- Residues in food, including:
 - acute and chronic dietary exposure estimates.
- The adequacy of instructions and warnings on product labels.

A decision on the reconsiderations will be made after the APVMA has reviewed all the data and other information provided to it for this purpose.

1 INTRODUCTION

Section 31 of the Agvet Codes, authorises the APVMA to reconsider: the registration of a chemical product; and

(b) the approval of a label for containers for a chemical product.

The APVMA has decided to reconsider the registrations of products containing carbon disulfide and the approvals of associated labels, based on concerns over toxicology, occupational health and safety (OH&S) and residues.

2 REASONS FOR REVIEW

On 6 December 2002 the APVMA suspended the registration of a product containing carbon disulfide - *Ajax Carbon Disulfide Grain Fumigant Ready-To-Use Liquid*. The basis of the suspension was that the APVMA was not satisfied that use of this product in accordance with the instructions on the approved label would not be an undue hazard to the safety of people exposed to it during its handling and use.

In its advice to the APVMA, the Therapeutic Goods Administration's Office of Chemical Safety (OCS) has noted World Health Organisation (WHO) assessments on carbon disulfide. The advice detailed known and possible acute and chronic toxicological effects of the compound. The association of these effects with agricultural chemical products is not clear, particularly in relation to the likely residue levels in treated grains compared to naturally occurring background levels of carbon disulfide in the environment. Based on this advice and the reasons for suspending the grain protectant product's registration, the APVMA is concerned that the consumption of treated grain and occupational exposure of carbon disulfide would not be likely to have an effect that is harmful to human beings and/or would not be an undue hazard to the safety of people exposed to them during their handling.

On the basis of the available information, the APVMA has decided to review carbon disulfide. Specific details of the concerns that have been raised can be found in Sections 5, 6 and 7 of this document.

3 SCOPE OF THE REVIEW

The scope of the review has been defined taking into consideration the reasons for the nomination of carbon disulfide, the information already available on this chemical and the way in which it is approved for use in Australia.

In light of concerns raised by:

- OCS as detailed in Section 5,
- National Occupational Health and Safety Commission (NOHSC) as detailed in Section 6, and
- APVMA as detailed in Section 7,

it appears that the APVMA might not be able to maintain its satisfaction that the continued use of products containing carbon disulfide in accordance with the recommendations for their use:

- would not be an undue hazard to the safety of people exposed to them during their handling or people using anything containing their residues; and/or
- would not be likely to have an effect that is harmful to human beings.

It should be noted that the APVMA suspended the use of *Ajax Carbon Disulfide Grain Fumigant Ready-To-Use Liquid* on 6 December 2002. The basis of the suspension was that

the APVMA was not satisfied that use of this product in accordance with the instructions on the label would not be an undue hazard to the safety of people exposed to it during its handling and use. Instructions were issued as an interim measure to address the immediate OH&S issues associated with the volatile nature for carbon disulfide when used as a grain fumigant. The review will consider the long-term adequacy of these instructions.

On the basis of these concerns, it is appropriate that the registrations and approvals of carbon disulfide (as set out in Table 1) be subject to reconsideration under Part 2, Division 4, of the Agvet Codes.

The APVMA will review the following aspects of product registrations and label approvals for carbon disulfide:

- Toxicology, including:
 - the potential for acute and chronic effects that might pose undue hazards to human health.
- Occupational health and safety, including:
 - the potential for undue hazards to worker safety.
- Residues in food, including:
 - acute and chronic dietary exposure estimates.
- The adequacy of instructions and warnings on product labels.

Registrants will be required to undertake certain actions aimed at securing relevant data that might address these matters. However, the public is invited to make submissions to the APVMA regarding any of the matters raised in this scope document (see Section 9).

4 REGULATORY STATUS AND USE OF CARBON DISULFIDE IN AUSTRALIA

4.1 Products

At the commencement of the review, there was one suspended and one registered product containing carbon disulfide (Table 1). These products will be considered in this review.

Table 1

Product Number	Product Name	Registrant	Label Approval Number
41130	<i>C.S.S.P. Phosphorous Pig Poison (Registered)</i>	F.H. Treweeke Pty Ltd	*
41185	<i>Ajax Carbon Disulfide Grain Fumigant Ready-To-Use Liquid (Suspended)</i>	Asia Pacific Specialty Chemicals Limited	*

* Labels transitioned from the States and so not having an approval number

It should be noted that any active constituent approvals and product registrations that occur after the commencement of the review would be made subject to the outcomes of the review.

4.2 Current Use Patterns

C.S.S.P. Phosphorous Pig Poison is registered in Queensland and the Northern Territory. It contains 50.8 g/kg carbon disulfide and 40 g/kg yellow phosphorus as its active constituents. The approved label includes instructions for the control of feral pigs.

Ajax Carbon Disulfide Grain Fumigant Ready-To-Use Liquid is 100% carbon disulfide (1260 g/L) and was registered (prior to suspension) in NSW for the control (by way of fumigation) of pests in stored grain. The product is used for on-farm fumigation of bulk grains in grain silos, bagged grain stored in sheds and bulk gains stored in sheds. On 6 December 2002, the APVMA suspended the registration of *Ajax Carbon Disulfide Grain Fumigant Ready-To-Use Liquid* as it was not satisfied that use of this product in accordance with the instructions on the label would not be an undue hazard to the safety of people exposed to it during its handling and use. The continued supply and use of this product has been authorised by the APVMA, provided that the product is only used in accordance with instructions that the APVMA has issued (available at the APVMA website: www.apvma.gov.au/chemrev/carbondis.pdf).

5 TOXICOLOGICAL ISSUES

In its advice to the APVMA, the OCS has identified concerns relating to potential acute (short-term) and chronic (long-term) hazards to the public through consumption of grain treated with carbon disulfide and to workers during use of products containing carbon disulfide.

The acute toxicity of carbon disulfide at sub-lethal doses is characterised by dizziness, headache, nausea, vomiting and psychiatric disturbances (IPCS 2000). Effects on the nervous and respiratory system have also been observed. Deaths have been reported following respiratory exposure to $>15,000 \text{ mg/m}^3$ or ingestion of 18 grams of the compound. In these cases, the central nervous system was depressed, followed by respiratory paralysis (WHO 2002).

The WHO assessment (WHO 2002) of chronic toxicity was based predominantly on studies of textile workers (where carbon disulfide is commonly used in the manufacture of rayon). It was concluded that the nervous system (commonly the peripheral nervous system, but also the central nervous system) appeared to be the critical target for carbon disulfide-induced toxicity. Effects on the nervous system are typically characterised by reduced conduction velocity in motor and, in some cases, sensory nerves. The assessment also indicated that there was evidence to suggest that chronic exposure carbon disulfide increased the risk of cardiovascular and heart disease and adverse ophthalmological effects. Other than some limited evidence of decreased libido in males exposed occupationally at high levels, there was no evidence of other reproductive effects in humans. No evidence of carcinogenicity in humans has been found from epidemiological studies on occupationally exposed people or in chronic animal studies.

Having regard to matters identified during the APVMA's suspension of the grain fumigant product and those presented by the OCS, the APVMA is concerned that continued use of products containing carbon disulfide might have an effect that is harmful to people and/or pose an undue hazard to human health. It is anticipated that a hazard assessment will require review of current first aid instructions and hazard warning statements for product labels.

6 OCCUPATIONAL HEALTH AND SAFETY ISSUES

Carbon disulfide is a highly flammable and highly volatile compound. In liquid form it is sensitive to static discharge, has the potential to ignite spontaneously on contact with hot surfaces, is known to react violently with oxidants causing fire and is an explosion hazard producing toxic fumes of sulfur dioxide (IPCS 2000). The APVMA is concerned that the potential consequences resulting from the handling a product and use of inherently explosive and flammable nature, might present an undue hazard to people exposed to this product. These concerns relate specifically to *Ajax Carbon Disulfide Grain Fumigant Ready-To-Use Liquid*, a liquid product that is 100% carbon disulfide.

In addition, the APVMA is concerned that the use of products containing carbon disulfide might expose workers to potential toxicological effects (discussed in Section 5), there posing an undue hazard to the safety of workers.

Having regard to matters identified during the APVMA's suspension of the grain fumigant product and concerns regarding toxicological effects of carbon disulfide, the APVMA is concerned that continued use of products containing carbon disulfide (generally) be an undue hazard to workers. It is anticipated that a hazard assessment will require review of current instructions regarding personal protective equipment for product labels.

7 RESIDUE ISSUES

The residues assessment of carbon disulfide would be limited to the product used for grain fumigation purposes and would focus primarily on acute and chronic dietary estimates. These estimates will have regard to public health standards including the Acceptable Daily Intake (ADI) and the Acute Reference Dose (ARfD), should these standards be established by the OCS (Refer Section 10 – Data Assessment and Possible Outcomes).

8 INTERNATIONAL REGULATORY STATUS OF CARBON DISULFIDE

The predominant use of carbon disulfide in agriculture is as a fumigant for the protection of stored grains. However, registration for this purpose has been withdrawn in most countries (CICAD 46). For example, The United States Environment Protection Agency (US EPA) required applicants provide data to support the ongoing registration of carbon disulfide as a grain fumigant. As a consequence of a data call-in, all pesticide products containing carbon disulfide lapsed or were cancelled at the request of registrants. It appears to the APVMA that the last known use of carbon disulfide as a grain fumigant in the US was in 1987. In addition, the Commission of European Communities no longer recognises carbon disulfide as an active substance for the purpose of plant protection.

9 SUBMISSIONS FROM THE PUBLIC INVITED

Interested parties are invited to provide information or data relevant to the issues raised in this scope document. These must reach the APVMA by no later than **12 August 2003**. Submissions can be sent either by email to chemrev@apvma.gov.au or by mail to:

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10 DATA ASSESSMENT AND POSSIBLE OUTCOMES

The Office of Chemical Safety, the National Occupational Health and Safety Commission and the APVMA will conduct the technical assessment of data submitted for the review of carbon disulfide. These agencies will advise the APVMA regarding the concerns raised in Sections 5 and 6.

The data might lead agencies that provide expert advice to the APVMA to consider setting appropriate public health standards, which in this case might involve:

- the OCS revising the ADI;
- the OCS establishing an ARfD;
- the National Drugs and Poisons Scheduling Committee (NDPSC) revising the existing poisons schedule;
- the APVMA revising or establishing Maximum Residue Limits (MRLs).

The APVMA will have regard to the appropriate public health standards in its reconsideration of approvals and registrations.

Depending on the findings of the technical assessment, a review can result in one of three broad outcomes.

- The APVMA is satisfied that products containing carbon disulfide continue to meet the conditions to which registration or approval are currently subject and confirms the registration and approvals; or
- The APVMA is satisfied that the conditions to which the registration or approval is currently subject can be varied in such a way that the requirements for continued registration or approval will be complied with, and varies the conditions of approval or registration; or
- The APVMA is not satisfied that the conditions continue to be met and suspends or cancels the registration or approvals.

11 CONSULTATION THROUGHOUT THE REVIEW PROCESS

From initiation of the review through to the implementation of the review outcomes, the APVMA will consult with relevant stakeholders and interested parties. Prior to finalisation of any report, comments from key stakeholders and the public will be sought.

The draft of the review summary along with proposed recommendations is intended to be made available to the stakeholders and public through the APVMA website or direct communication. A period will be allowed for the stakeholders and the public to comment on the draft.

REFERENCES

1. International Chemical Safety Card 0022 – Carbon Disulfide. International Programme On Chemical Safety (IPCS) 2000. International Labour Organisation website: http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/_icsc00/icsc0022.htm
2. Concise International Chemical Assessment Document 46 – Carbon Disulfide (CICAD 46). World Health Organisation, Geneva 2002. World Health Organisation website: http://www.who.int/pcs/cicad/full_text/cicad46_carbon_disulfide.pdf