

Section A7.5.1.2 Earthworm, acute toxicity test
Annex Point IIIA XIII 3.2

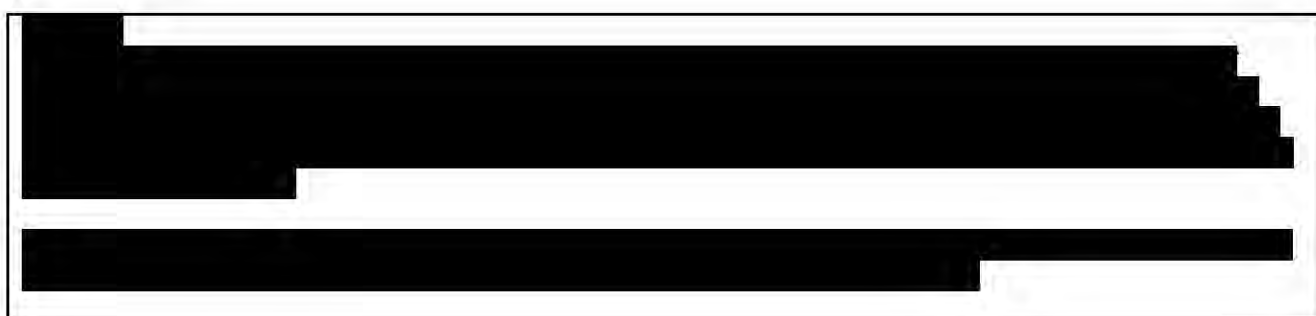
dried pulverised cast samples from each plot was measured with a CHN analyzer. Inorganic C content was measured using HCL digestion and a carbonate carbon analyser. The organic content of the casts was measured by subtracting the inorganic C from the total C.

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| 5.2 | Results and discussion | Cast production over 1 year was 35% greater in elevated carbon dioxide compared to ambient. Elevated CO ₂ had no influence on the seasonality of earthworm activity. There was correlation between soil water content and cast production. No correlation was found between activity and soil temperature or plant biomass productivity. No CO ₂ related differences were found in total N and organic carbon concentration of surface casts. The increase in earthworm activity corresponded to a 30% increase of the amount of N and organic carbon egested by the worms. There is an indirect stimulatory effect of elevated atmospheric carbon dioxide on earthworm activity which may have effects on ecosystem function and plant community structure in the long term. |
| 5.2.1 | LC ₀ | Not reported |
| 5.2.2 | LC ₅₀ | Not reported |
| 5.2.3 | LC ₁₀₀ | Not reported |
| 5.3 | Conclusion | This report does not look at toxicity of carbon dioxide to earthworms however it gives an indication of effects of increased CO ₂ levels on their activity. |
| 5.3.1 | Other conclusions | |
| 5.3.2 | Reliability | 3 |
| 5.3.2 | Deficiencies | Yes This study was not carried out to Guideline C.8 in Annex V of Directive 67/548/EEC or to to OECD Guideline 207. Rather than looking at acute toxicity <i>per se</i> , this report investigates the effects on cast production of an increased level of carbon dioxide. It should be noted that the use of carbon dioxide by Rentokil Initial would not increase the normal atmospheric concentrations of carbon dioxide in the locality. |

Section A7.5.1.2 Earthworm, acute toxicity test
Annex Point IIIA XIII 3.2

| Evaluation by Competent Authorities | |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <i>Use separate "evaluation boxes" to provide transparency as to the comments and views submitted</i> |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Materials and methods | <i>Adopt applicant's version or include revised version. If necessary, discuss relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.</i> |
| Results and discussion | <i>Adopt applicant's version or include revised version. If necessary, discuss relevant deviations from applicant's view referring to the (sub)heading numbers</i> |
| Conclusion | <i>Adopt applicant's version or include revised version</i> |
| Reliability | <i>Based on the assessment of materials and methods include appropriate reliability indicator (the text in section 4.4.2.5.1 gives guidance on this point)</i> |
| Acceptability | <i>Acceptable / not acceptable</i> <i>(give reasons if necessary, e.g. if a study is considered acceptable despite a poor reliable indicator. Discuss the relevance of deficiencies and indicate if repeat is necessary.)</i> |
| Remarks | |
| COMMENTS FROM | |
| Date | <i>Give date of the comments submitted</i> |
| Materials and Methods | <i>Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.</i> <i>Discuss if deviating from view of rapporteur member state</i> |
| Results and discussion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Reliability | <i>Discuss if deviating from view of rapporteur member state</i> |
| Acceptability | <i>Discuss if deviating from view of rapporteur member state</i> |

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| Section A7.5.1.3 Annex Point / TNsG Annex IIIA XIII 3.4 | Acute Toxicity to Plants Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
| JUSTIFICATION FOR NON-SUBMISSION OF DATA <i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i> <i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i> | | Official use only |
| Other existing data | <input type="checkbox"/> | Technically not feasible <input type="checkbox"/> Scientifically unjustified <input type="checkbox"/> |
| Limited exposure | <input checked="" type="checkbox"/> | Other justification <input checked="" type="checkbox"/> |
| Detailed justification: <p>This information is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems, outside normal atmospheric ranges. In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system. <i>Refer to next page for details of the scientific calculation which supports this statement.</i></p> <p>Consequently there will be no increased carbon dioxide levels in the terrestrial system so it is not necessary to determine the effect of increased carbon dioxide in plants.</p> <p>Notwithstanding the above, it should be noted that carbon dioxide plays a vital role in the photosynthesis pathway of plants. It is widely accepted that commercial horticulturists, such as tomato growers, use carbon dioxide to enrich the atmospheres of their greenhouses to accelerate the growth of their crops.</p> <p style="text-align: center;">(Continued.....)</p> | | |



Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

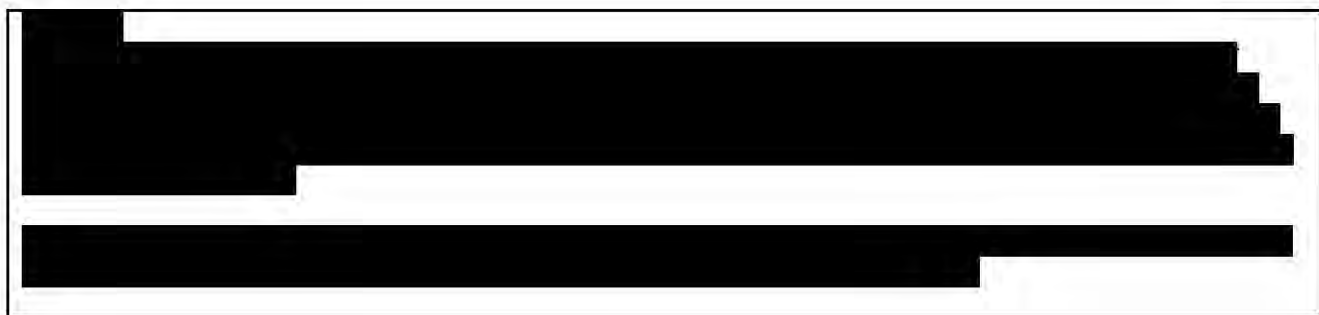
Undertaking of intended data submission

Not applicable.

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|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Section A7.5.1.3 Annex Point / TNsG Annex IIIA XIII 3.4 | Acute Toxicity to Plants Section 7: Ecotoxicological Profile, including Fate and Behaviour |
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| Evaluation by Competent Authorities | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Section A7.5.2.1 Annex Point / TNsG Annex IIIA XIII 3.2 | Reproduction Study with Earthworms or Other Soil Non-target Macro-organisms Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
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| Limited exposure | <input checked="" type="checkbox"/> | Scientifically unjustified <input type="checkbox"/> |
| Detailed justification: | <p>This information is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems, outside normal atmospheric ranges. In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system. <i>Refer to next page for details of the scientific calculation which supports this statement.</i></p> <p>Consequently there will be no increased carbon dioxide levels in the terrestrial system so it is not necessary to determine the effect of increased carbon dioxide on earthworms or other soil non-target macro-organisms.</p> <p>(Continued.....)</p> | |



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|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section A7.5.2.1 Annex Point / TNsG Annex IIIA XIII 3.2 | Reproduction Study with Earthworms or Other Soil Non-target Macro-organisms Section 7: Ecotoxicological Profile, including Fate and Behaviour |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|

Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Undertaking of intended data submission Not applicable.

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|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section A7.5.2.1 Annex Point / TNsG Annex IIIA XIII 3.2 | Reproduction Study with Earthworms or Other Soil Non-target Macro-organisms Section 7: Ecotoxicological Profile, including Fate and Behaviour |
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| Evaluation by Competent Authorities | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use separate “evaluation boxes” to provide transparency as to the comments and views submitted | |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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| Section A7.5.2.2 Annex Point / TNsG Annex IIIA XIII 3.4 | Long-term Test with Terrestrial Plants Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
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| Other existing data | <input type="checkbox"/> | Technically not feasible <input type="checkbox"/> |
| Limited exposure | <input checked="" type="checkbox"/> | Scientifically unjustified <input type="checkbox"/> |
| Detailed justification: | <p>This information is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems, outside normal atmospheric ranges. In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system. <i>Refer to next page for details of the scientific calculation which supports this statement.</i></p> <p>Consequently there will be no increased carbon dioxide levels in the terrestrial system so it is not necessary to determine the effect of increased carbon dioxide in plants.</p> <p>(Continued.....)</p> | |



Detailed justification:

[Redacted text block]

Undertaking of intended data submission Not applicable.

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| Section A7.5.2.2 Annex Point / TNsG Annex IIIA XIII 3.4 | Long-term Test with Terrestrial Plants Section 7: Ecotoxicological Profile, including Fate and Behaviour |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|

| Evaluation by Competent Authorities | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
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| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
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| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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| Section A7.5.3.1.1. Annex Point / TNsG Annex IIIA XIII 1.1 | Acute Oral Toxicity – Birds Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
| JUSTIFICATION FOR NON-SUBMISSION OF DATA <i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i> <i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i> | | Official use only |
| Other existing data | <input checked="" type="checkbox"/> Technically not feasible | <input checked="" type="checkbox"/> Scientifically unjustified [] |
| Limited exposure | <input checked="" type="checkbox"/> Other justification | <input type="checkbox"/> [] |
| Detailed justification: <p>An acute oral toxicity study for carbon dioxide cannot be submitted because it is not technically possible to determine the acute toxicity of carbon dioxide by the oral route. This is because there is no approved guideline for testing the acute toxicity of a gas by the oral route.</p> <p>Notwithstanding the above, it should be noted that carbon dioxide is constantly produced by all birds as a result of the numerous metabolic reactions involving carbon-containing compounds. Broiler chickens in a healthy barn environment can produce up to 60 litres CO₂ /bird/day without causing any toxic effects. (See attached study summary for details).</p> <p>Carbon dioxide is recognised as a humane method for the dispatch of birds and small mammals. As shown in the attached study summary, the UK Home Office recommends that a rising concentration of carbon dioxide be used to dispatch birds up to 1.5% in weight. In atmospheres containing 30% carbon dioxide, the bird will lose consciousness and at 70% death will occur.</p> <p>The risk assessment for the use of carbon dioxide as a biocidal active substance in rodenticide products (PT 14) shows that carbon dioxide is released into the atmosphere at such a level that there is no increase in atmospheric carbon dioxide levels outside normal atmospheric ranges (see details for this below), consequently there will be no risk to birds.</p> <p style="text-align: center;">(Continued.....)</p> | | |

Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Undertaking of intended data submission Not applicable.

| | |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Section A7.5.3.1.1. Annex Point / TNsG Annex IIIA XIII 1.1 | Acute Oral Toxicity – Birds Section 7: Ecotoxicological Profile, including Fate and Behaviour |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|

| Evaluation by Competent Authorities | |
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| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
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| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

Section A7.5.3.1.1 Acute Oral Toxicity on Birds (1 of 2)

Annex Point IIIA, XIII, 1.1

Official
use only

1. REFERENCE

1.1 Reference

[Redacted]

1.2 Data protection

[Redacted]

1.2.1 Data owner

[Redacted]

1.2.2

1.2.3 Criteria for data protection

[Redacted]

2. GUIDELINES AND QUALITY ASSURANCE

2.1 Guideline study

No.

Not carried out to SETAC procedures (as advised in The Technical Guidance Document in Support of Directive 98/8/EC Concerning the Placing of Biocidal Products on the Market: Guidance on Data Requirements for Active Substances and Biocidal Products).

2.2 GLP

No.

GLP was not compulsory at the time study was performed.

2.3 Deviations

Yes.

No set guideline followed.

3. METHOD

3.1 Test material

As given in section 2.

3.1.1. Lot/Batch number

[Redacted]

3.1.2 Specification

[Redacted]

[Redacted]

Section A7.5.3.1.1**Acute Oral Toxicity on Birds (1 of 2)****Annex Point IIIA, XIII, 1.1**

| | | |
|------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.2 | Administration of the test substance | Refer to table A7.5.3.1.1-1, at the end of this study summary. However, note that study simply reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. |
| 3.3 | Reference substance | No |
| 3.3.1 | Method of analysis for reference substance | Not applicable. Reference substance was not used. |
| 3.4 | Testing procedure | |
| 3.4.1 | Test organisms | Refer to table A7.5.3.1.1-2, at the end of this study summary. |
| 3.4.2 | Test system | Refer to table A7.5.3.1.1-3, at the end of this study summary. |
| 3.4.3 | Diet | Not reported, however note that the test substance not administered in the diet. (Refer to table A7.5.3.1.1-1, at the end of this study summary for details). |
| 3.4.4 | Test conditions | No data available on test conditions (such as temperature, shielding of animals, ventilation, humidity and photoperiod /lighting). |
| 3.4.5 | Duration of test | Carbon dioxide production by birds, via respiration, was measured for 35 days. |
| 3.4.6 | Test parameter | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. Parameters such as mortality, abnormal behaviour or signs of intoxication were not studied. |
| 3.4.7 | Examination / Observation | Carbon dioxide production per day, was reported for birds weekly, for 5 weeks on days 1, 7, 14, 21, 28 and 35. |
| 3.4.8 | Statistics | No calculations or statistics applied. Carbon dioxide production by birds was reported as litres carbon dioxide per 10,000 birds, per day. |
| 4.1 | Limit test / Range finding test | 4. RESULTS Not performed. |
| 4.2 | Results test substance | |
| 4.2.1 | Applied concentrations | Carbon dioxide is naturally produced by birds, by the process of respiration. Each bird respire carbon dioxide into the air, where it is inhaled by other birds in the environment. Carbon dioxide production by birds is reported in table A7.5.3.1.1-4, at the end of this study summary. |
| 4.2.2 | Effect data (Mortality) | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. Parameters such as mortality, abnormal behaviour or signs of intoxication were not studied. |
| 4.2.3 | Body weight | Body weights not reported. Results were expressed for birds of different ages (see table A7.5.3.1.1-4, at the end of this study summary). |
| 4.2.4 | Feed consumption | Not reported. |

Section A7.5.3.1.1 Acute Oral Toxicity on Birds (1 of 2)**Annex Point IIIA, XIII, 1.1**

| | | |
|------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.2.5 | Concentration / response curve | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. Parameters such as mortality, abnormal behaviour or signs of intoxication were not studied. |
| 4.2.6 | Other effects | None reported. |
| 4.3 | Results of controls | |
| 4.3.1 | Number / percentage of animals showing adverse effects | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. Parameters such as mortality, abnormal behaviour or signs of intoxication were not studied. |
| 4.3.2 | Nature of adverse effects | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. Parameters such as mortality, abnormal behaviour or signs of intoxication were not studied. |
| 4.3 | Test with reference substance | Not performed. |
| 5.1 | Materials and Methods | <p>5. APPLICANTS SUMMARY AND CONCLUSION</p> <p>This study was not carried out to SETAC procedures (as advised in The Technical Guidance Document in Support of Directive 98/8/EC Concerning the Placing of Biocidal Products on the Market: Guidance on Data Requirements for Active Substances and Biocidal Products).</p> <p>Study reports typical volume of carbon dioxide added to air, by broiler chickens in a barn environment (when housed for farming e.g. for egg production). This report is simply advice about the minimum, good quality ventilation required to control carbon dioxide levels for a healthy barn environment.</p> |
| 5.2 | Results and discussion | As shown in table A7.5.3.1.1-4, at the end of this study summary, broiler chickens in a healthy barn environment can produce up to 60 litres carbon dioxide / bird / day without causing toxic effects. |
| 5.3 | Conclusion | This data has been supplied to demonstrate the levels of carbon dioxide that chickens, when intensively farmed, are exposed to daily. Therefore validity criteria according to EPA OPPTS 850.2100 is not relevant for this study. |
| 5.3.1 | Reliability | 4 |
| 5.3.2 | Deficiencies | Yes |
| | | <p>Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space.</p> <p>It is duly acknowledged that there is insufficient reporting of methods used in this study, and the results. In addition, this data has not been generated in accordance with scientifically acceptable protocols.</p> <p>Despite the major reporting deficiencies in this study, it gives an indication about the level of carbon dioxide that can be tolerated by birds in a barn environment (when housed for farming e.g. egg production).</p> <p>This study, notwithstanding it's deficiencies, can be used to support the inhalation toxicity of carbon dioxide because under normal conditions of use, the use of carbon dioxide in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the level</p> |

of carbon dioxide in air, outside normal atmospheric ranges.

Rentokil Initial plc

Carbon Dioxide

March 2004

Section A7.5.3.1.1

Acute Oral Toxicity on Birds (1 of 2)

Annex Point IIIA, XIII, 1.1

Table A7_5_3_1_1-1 Method of administration of the test substance

| Carrier/vehicle | Details |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water | No |
| Organic carrier | No |
| Concentration of the carrier (% v/v) | Carrier not used. See "Administration of test substance" (below). |
| Other vehicle | Vehicle not used. See "Administration of test substance" (below). |
| Function of carrier/ vehicle | Carrier/ vehicle not used. See "Administration of test substance" (below). |
| Administration of test substance | Carbon dioxide is naturally produced by birds, by the process of respiration. Each bird respire carbon dioxide into the air, where it is inhaled by other birds in the environment. |

Table A7_5_3_1_1-2 Test animals

| Criteria | Details |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Species / strain | Broiler chicken. |
| Source | Not reported. |
| Age (in weeks), sex and initial body weight (bw) | Sex and body weight not reported. Age of birds were: 1 day old 1 week old 2 weeks old 3 weeks old 4 weeks old 5 weeks old. |
| Breeding population | Not reported. |
| Amount of food | Not reported. |
| Age at time of first dosing | Study simply reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. Measurements were taken from birds aged 1 day old. |
| Health condition / medication | Not reported. |

Section A7.5.3.1.1 Acute Oral Toxicity on Birds (1 of 2)

Annex Point IIIA, XIII, 1.1

Table A7_5_3_1_1-3 Test system

| Criteria | Details |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Test location | Indoors, in a barn environment (when housed for farming e.g. for egg production). |
| Holding pens | Not used. |
| Number of animals | Number of animals tested has not been reported but results expressed per 10,000 birds. |
| Number of animals per pen (cm ² /bird) | Not reported, but minimum permitted space allowed is 23.77 cm ² /bird (0.78 ft ² /bird). |
| Number of animals per dose | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. |
| Pre-treatment / acclimation | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. |
| Diet during test | Not reported. |
| Dosage levels (of test substance) | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. |
| Replicate/dosage level | Number of replicate measurements of carbon dioxide production by birds (if any) has not been reported. |
| Feed dosing method | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. |
| Dosing volume per application | Not applicable. Study reports levels of carbon dioxide produced by birds, through respiration, in an enclosed space. |
| Frequency, duration and method of animal monitoring after dosing | Observations / animal monitoring not reported. |
| Time and intervals of body weight determination | Body weights not reported. |

Section A7.5.3.1.1 Acute Oral Toxicity on Birds (1 of 2)
Annex Point IIIA, XIII, 1.1**Table A7_5_3_1_1-4 Test results: Carbon dioxide Production by Broiler Chickens in a barn environment**

| Bird age | Carbon dioxide production / day per 10,000 birds |
|------------------|-----------------------------------------------------------------|
| Day 1 | 57,000 L/ day (equivalent to 5.7 L CO ₂ /bird/day) |
| Day 7 (1 week) | 107,000 L/ day (equivalent to 10.7 L CO ₂ /bird/day) |
| Day 14 (2 weeks) | 200,000 L/ day (equivalent to 20 L CO ₂ /bird/day) |
| Day 21 (3 weeks) | 320,000 L/ day (equivalent to 32 L CO ₂ /bird/day) |
| Day 28 (4 weeks) | 455,000 L/ day (equivalent to 45.5 L CO ₂ /bird/day) |
| Day 35 (5 weeks) | 600,000 L/ day (equivalent to 60 L CO ₂ /bird/day) |

| Evaluation by Competent Authorities | |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Use separate "evaluation boxes" to provide transparency as to the comments and views submitted. |
| | EVALUATION BY RAPPORTEUR MEMBER STATE |
| Date | <i>Give date of action</i> |
| Materials and Methods | <i>State if applicants version is acceptable, or indicate relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.</i> |
| Results and discussion | <i>Adopt applicant's version or include revised version. If necessary, discuss relevant deviations from applicant's view referring to the (sub)heading numbers.</i> |
| Conclusion | Other conclusions: <i>(adopt applicant's version or include revised version)</i> |
| Reliability | <i>Based on assessment of materials and methods include appropriate reliability indicator.</i> |
| Acceptability | acceptable / not acceptable <i>(give reasons if necessary e.g. if a study is considered acceptable despite a poor reliability indicator. Discuss the relevance of deficiencies and indicate if repeat if necessary).</i> |
| Remarks | |
| | COMMENTS FROM |
| Date | <i>Give date of comments submitted.</i> |
| Materials and Methods | <i>Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion</i> <i>Discuss if deviating from view of rapporteur member state. .</i> |
| Results and discussion | <i>Discuss if deviating from view of rapporteur member state.</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state.</i> |
| Reliability | <i>Discuss if deviating from view of rapporteur member state.</i> |
| Acceptability | <i>Discuss if deviating from view of rapporteur member state.</i> |
| Remarks | |

Section A7.5.3.1.1 Acute Oral Toxicity on Birds (2 of 2)

Annex Point IIIA, XIII, 1.1

Official use only

1. REFERENCE

1.1 Reference [Redacted]

1.2 Data protection [Redacted]

1.2.1 Data owner [Redacted]

1.2.2 [Redacted]
1.2.3 Criteria for data protection [Redacted]

2. GUIDELINES AND QUALITY ASSURANCE

2.1 Guideline study Not applicable.
[Redacted]

2.2 GLP Not applicable. Refer to "2.1 Guideline Study" (above).

2.3 Deviations Not applicable. Refer to "2.1 Guideline Study" (above).

3. METHOD

3.1 Test material As given in section 2.

3.1.1 Lot/Batch number [Redacted]

3.1.2 Specification [Redacted]

[Redacted]

3.2 Administration of the test substance Refer to table A7.5.3.1.1-1, at the end of this study summary.

3.3 Reference substance No

3.3.1 Method of analysis for reference substance Not applicable. Reference substance was not used.


Section A7.5.3.1.1**Acute Oral Toxicity on Birds (2 of 2)****Annex Point IIIA, XIII, 1.1****3.4 Testing procedure**

- 3.4.1 Test organisms Refer to table A7.5.3.1.1-2, at the end of this study summary.
- 3.4.2 Test system Refer to table A7.5.3.1.1-3, at the end of this study summary.
- 3.4.3 Diet Not reported, however note that the test substance not administered in the diet. (Refer to table A7.5.3.1.1-1, at the end of this study summary for details).
- 3.4.4 Test conditions Refer to table A7.5.3.1.1-3, at the end of this study summary.
- 3.4.5 Duration of test Birds and small animals become unconscious when the rising carbon dioxide concentration reaches 30%, and they die when it reaches 70 % v/v. Typical timescales to reach these concentrations have not been reported, because it depends on size of the enclosed chamber.
- 3.4.6 Test parameter Mortality.
- 3.4.7 Examination / Observation Not reported.
- 3.4.8 Statistics No calculations or statistics applied.

4. RESULTS**4.1 Limit test / Range finding test**

Not performed.

4.2 Results test substance

- 4.2.1 Applied concentrations 70% v/v carbon dioxide (which causes death of test animals).
- 4.2.2 Effect data (Mortality) Mortality data expressed as a percent of exposed animals has not been reported. 
- 4.2.3 Body weight Recommendations are for birds and small mammals up to 1.5 kg in weight.
- 4.2.4 Feed consumption Feed consumption of test animals has not been reported. Refer to "4.2.2 Effects Data (Mortality)" for explanation.
- 4.2.5 Concentration / response curve Not reported. Refer to "4.2.2 Effects Data (Mortality)" for explanation.
- 4.2.6 Other effects Inhalation of higher concentrations of carbon dioxide produces a slightly irritant or fizzy sensation in the nasal mucous membrane as the gas goes into solution. A rising blood concentration has a direct effect on the brain producing unconsciousness, first stimulating then depressing the rate of breathing. The initial stimulation of breathing first enhances the uptake of the gas. Unconsciousness is due to the direct narcotic effect of carbon dioxide rather than hypoxia resulting from the lowered oxygen content in the inspired air. Induction of narcosis is faster in smaller laboratory animals and therefore causes less distress. For this reason, exposure of carbon dioxide in a rising concentration is recommended as a humane method of killing rodents, rabbits and birds up to 1.5 kg body weight.

Note that although death of animals occurred when the carbon dioxide concentration reached 70% v/v, unconsciousness was

Section A7.5.3.1.1

Acute Oral Toxicity on Birds (2 of 2)

Annex Point IIIA, XIII, 1.1

4.3 Results of controls

4.3.1 Number / percentage of animals showing adverse effects

Results of control animals has not been reported.

4.3.2 Nature of adverse effects

Not applicable. Refer to "4.3.1 Number / percentage of animals showing adverse effects" for explanation.

4.3 Test with reference substance

Not performed.

5.1 Materials and Methods

5. APPLICANTS SUMMARY AND CONCLUSION

following method as a means to humanely kill birds and small mammals (up to 1.5 kg in weight) after scientific procedures or when kept in breeding or supply establishments.

A simple chamber with a lid and a means to introduce a controlled flow of carbon dioxide can be used. The animal is placed in the empty chamber and the carbon dioxide, being heavier than air, will accumulate at the lower level. Animals may be left in the chamber until rigor mortis is observed, or removed and death ensured by exsanguination or neck dislocation. The chamber should be emptied, flushed clear of residual carbon dioxide and cleaned after each batch of animals has been killed.

5.2 Results and discussion

dispatch birds and other small mammals up to 1.5 kg in weight. In atmospheres containing 30% carbon dioxide, the bird (or other small mammal) will lose consciousness and at 70% death will occur.

5.3 Conclusion

for humane methods for killing of birds and small mammals after scientific procedures or when kept in breeding or supply establishments.

Therefore validity criteria according to EPA OPPTS 850.2100 is not relevant for this study.

Section A7.5.3.1.1

Acute Oral Toxicity on Birds (2 of 2)

Annex Point IIIA, XIII, 1.1

5.3.1 Reliability 4

5.3.2 Deficiencies Yes

[REDACTED] gives recommendations for humane methods for killing of birds and small mammals after scientific procedures or when kept in breeding or supply establishments. It recommends exposure of 70% v/v carbon dioxide as a method to humanely kill birds and small animals.

It is duly acknowledged that there is insufficient reporting of methods used in this study, and the results. In addition, this data has not been generated in accordance with scientifically acceptable protocols.

Despite the major reporting deficiencies in this study, it gives an indication about the level of carbon dioxide that kills birds (up to 1.5 kg in weight).

This study, notwithstanding its deficiencies, can be used to support the inhalation toxicity of carbon dioxide because under normal conditions of use, the use of carbon dioxide in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the level of carbon dioxide in air, outside normal atmospheric ranges.

Section A7.5.3.1.1


Acute Oral Toxicity on Birds (2 of 2)

Annex Point IIIA, XIII, 1.1

Table A7_5_3_1_1-1 Method of administration of the test substance

| Carrier/vehicle | Details |
|--------------------------------------|------------------------------------------------------------------------------------------|
| Water | No |
| Organic carrier | No |
| Concentration of the carrier (% v/v) | Carrier not used. See "Administration of test substance" (below). |
| Other vehicle | Vehicle not used. See "Administration of test substance" (below). |
| Function of carrier/ vehicle | Carrier/ vehicle not used. See "Administration of test substance" (below). |
| Administration of test substance | Carbon dioxide is pumped into an enclosed chamber, where it is inhaled by the test bird. |

Table A7_5_3_1_1-2 Test animals

| Criteria | Details |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Species / strain | Rodents, rabbits and birds. |
| Source | Not applicable.  |
| Age (in weeks), sex and initial body weight (bw) | Method is recommended for rodents, rabbits and birds up to 1.5 kg in weight. |
| Breeding population | Not reported. Refer to "source" (above) for explanation. |
| Amount of food | Not reported. Refer to "source" (above) for explanation. |
| Age at time of first dosing | Not reported. Refer to "source" (above) for explanation. |
| Health condition / medication | Not reported. Refer to "source" (above) for explanation. |

Section A7.5.3.1.1

Acute Oral Toxicity on Birds (2 of 2)

Annex Point IIIA, XIII, 1.1

Table A7_5_3_1_1-3 Test system

| Criteria | Details |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test location | A simple chamber with a lid and a means to introduce a controlled flow of carbon dioxide. |
| Number of animals | One animal per chamber. |
| Number of animals per dose | Not reported. [REDACTED] |
| Pre-treatment / acclimation | No pre-treatment or acclimation. [REDACTED] |
| Diet during test | Not reported. Refer to "Number of animals per dose" (above) for explanation. |
| Dosage levels (of test substance) | Not reported. Refer to "Number of animals per dose" (above) for explanation. |
| Replicate/dosage level | Not reported. Refer to "Number of animals per dose" (above) for explanation. |
| Feed dosing method | Not applicable. Refer to "Number of animals per dose" (above) for explanation. |
| Dosing volume per application | Not applicable. Refer to "Number of animals per dose" (above) for explanation. |
| Frequency, duration and method of animal monitoring after dosing | Observations of the animals in the test chamber have been reported (see "4.2.6 Other effects" in study summary), but frequency, duration and method of animal monitoring have not been reported. |
| Time and intervals of body weight determination | Not reported. Refer to "Number of animals per dose" (above) for explanation. |

| Evaluation by Competent Authorities | |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Use separate "evaluation boxes" to provide transparency as to the comments and views submitted. |
| | EVALUATION BY RAPPORTEUR MEMBER STATE |
| Date | <i>Give date of action</i> |
| Materials and Methods | <i>State if applicants version is acceptable, or indicate relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.</i> |
| Results and discussion | <i>Adopt applicant's version or include revised version. If necessary, discuss relevant deviations from applicant's view referring to the (sub)heading numbers.</i> |
| Conclusion | Other conclusions: <i>(adopt applicant's version or include revised version)</i> |
| Reliability | <i>Based on assessment of materials and methods include appropriate reliability indicator.</i> |
| Acceptability | acceptable / not acceptable <i>(give reasons if necessary e.g. if a study is considered acceptable despite a poor reliability indicator. Discuss the relevance of deficiencies and indicate if repeat if necessary).</i> |
| Remarks | |
| | COMMENTS FROM |
| Date | <i>Give date of comments submitted.</i> |
| Materials and Methods | <i>Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion</i> <i>Discuss if deviating from view of rapporteur member state. .</i> |
| Results and discussion | <i>Discuss if deviating from view of rapporteur member state.</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state.</i> |
| Reliability | <i>Discuss if deviating from view of rapporteur member state.</i> |
| Acceptability | <i>Discuss if deviating from view of rapporteur member state.</i> |
| Remarks | |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Section A7.5.3.1.2. Annex Point / TNsG Annex IIIA XIII 1.2 | Short Term Toxicity –Birds Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
| JUSTIFICATION FOR NON-SUBMISSION OF DATA <i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i> <i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i> | | Official use only |
| Other existing data | <input checked="" type="checkbox"/> Technically not feasible [] | Scientifically unjustified [] |
| Limited exposure | <input checked="" type="checkbox"/> Other justification [] | |
| Detailed justification: | <p>The risk assessment for the use of carbon dioxide as a biocidal active substance in rodenticide products (PT 14) shows that carbon dioxide is released into the atmosphere at such a level that there is no increase in atmospheric carbon dioxide level, outside normal atmospheric ranges - consequently there will be no risk to birds. <i>Refer to attached page for details of scientific calculation which supports this statement.</i></p> <p>Notwithstanding the above, it should be noted that carbon dioxide is constantly produced by all birds as a result of the numerous metabolic reactions involving carbon-containing compounds. Broiler chickens in a healthy barn environment can produce up to 60 litres CO₂ /bird/day without causing any toxic effects¹.</p> <p>1. Refer to study summary submitted under section A7.5.3.1.1 Acute Oral Toxicity – Birds, for details.</p> <p style="text-align: center;">(Continued.....)</p> | |

Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Undertaking of intended data submission Not applicable.

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| Section A7.5.3.1.2. Annex Point / TNsG Annex IIIA XIII 1.2 | Short Term Toxicity –Birds Section 7: Ecotoxicological Profile, including Fate and Behaviour |
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| Evaluation by Competent Authorities | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use separate “evaluation boxes” to provide transparency as to the comments and views submitted | |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Section A7.5.3.1.3. Annex Point / TNsG Annex IIIA XIII 1.3 | Effects on Reproduction – Birds Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
| JUSTIFICATION FOR NON-SUBMISSION OF DATA <i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i> <i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i> | | Official use only |
| Other existing data | <input checked="" type="checkbox"/> Technically not feasible [] | <input type="checkbox"/> Scientifically unjustified [] |
| Limited exposure | <input checked="" type="checkbox"/> Other justification [] | |
| Detailed justification: <p>The risk assessment for the use of carbon dioxide as a biocidal active substance in rodenticide products (PT 14) shows that carbon dioxide is released into the atmosphere at such a level that there is no increase in atmospheric carbon dioxide level, outside normal atmospheric ranges - consequently there will be no risk to birds. <i>Refer to attached page for details of scientific calculation which supports this statement.</i></p> <p>Notwithstanding the above, it should be noted that carbon dioxide is constantly produced by all birds as a result of the numerous metabolic reactions involving carbon-containing compounds. Broiler chickens in a healthy barn environment can produce up to 60 litres CO₂ /bird/day without causing any toxic effects¹.</p> <p>1. Refer to study summary submitted under section A7.5.3.1.1 Acute Oral Toxicity – Birds, for details.</p> <p style="text-align: center;">(Continued.....)</p> | | |

Detailed justification:

The use of RADAR: Effects on atmospheric concentrations of CO₂

RADAR is a mousetrap that is designed to be placed along wall floor junctions where mice are likely to run. The unit has entrances at each end through which mice can enter. Once inside, the mouse activates a pressure pad which causes the doors to shut, trapping the mouse inside, creating a sealed chamber. In the same action that closes the doors, a second mechanism causes CO₂ to be totally released from an aerosol canister which humanely kills the mouse inside the trap. The aerosol canister used in RADAR contains 3.0g of pressurised CO₂.

The aerosol canister used in RADAR contains 3.0g of pressurised CO₂. When the RADAR unit is activated, the gas is released from the aerosol canister and expands to fill the chamber. The volume that the CO₂ gas will occupy in the chamber can be calculated. One mole of any gas will occupy a volume of 24.45 litres at standard temperature and pressure (25°C and 1 atmosphere). As one mole of CO₂ weighs 44.0g, the volume that will be occupied by 3.0g of gas (at standard temperature and pressure) will be:

$$\text{Volume CO}_2 = (3.0/44.0)*24.45 = 1.667$$

If this volume of CO₂ was released into an average room (dimensions of 2.5 x 4.0 x 2.5m, giving a volume of 25 m³ = 25,000 litres), the concentrations of CO₂ released from the unit would be:

$$(1.667/25,000)*100\% = 0.007\% \text{ v/v}$$

The normal atmospheric concentration of CO₂ is 0.03 % v/v so the release of CO₂ from a RADAR unit would increase the concentration to 0.037% v/v, which is in the normal ranges for CO₂.

This calculation assumes that the CO₂ is immediately released into a completely airtight room. In practice, the RADAR unit will contain the CO₂ and release it over a period of over 15 minutes. The room is also likely to have some airflow, which will help to dissipate the CO₂. Thus, the levels of CO₂ in the room are unlikely to ever reach the levels calculated.

The amount of CO₂ released by a RADAR unit can also be compared to the CO₂ produced by a person sitting in the room. At rest, a person will breathe about six litres of air per minute, with the exhaled air containing around 5% CO₂. In one minute, the amount of CO₂ exhaled will be (6 x 5/100) = 0.3 litres, so in six minutes the person will have exhaled 1.8 litres of CO₂, more than is released by a RADAR unit over fifteen minutes.

Undertaking of intended data submission

Not applicable.

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| Section A7.5.3.1.3. Annex Point / TNsG Annex IIIA XIII 1.3 | Effects on Reproduction – Birds Section 7: Ecotoxicological Profile, including Fate and Behaviour |
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| Evaluation by Competent Authorities | |
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| Use separate “evaluation boxes” to provide transparency as to the comments and views submitted | |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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| Section A7.5.4.1 Annex Point / TNsG Annex IIIA XIII 3.1 | Acute Toxicity to Honeybees and other Beneficial Arthropods Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
| JUSTIFICATION FOR NON-SUBMISSION OF DATA <i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i> <i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i> | | Official use only |
| Other existing data | <input type="checkbox"/> | Technically not feasible <input type="checkbox"/> |
| Limited exposure | <input checked="" type="checkbox"/> | Scientifically unjustified <input type="checkbox"/> |
| Detailed justification: | <p>Other justification <input checked="" type="checkbox"/></p> <p>The risk assessment for the use of carbon dioxide as a biocidal active substance in rodenticide products (PT 14) shows that carbon dioxide is released into the atmosphere at such a level that there is no increase in atmospheric carbon dioxide levels, outside normal atmospheric concentrations - consequently there will be no risk to honeybees or other beneficial arthropods. <i>Refer to attached page for details of scientific calculation which supports this statement.</i></p> <p>Notwithstanding the above, it should be noted that carbon dioxide is constantly produced by arthropods as a result of the numerous metabolic reactions involving carbon-containing compounds, without causing any toxic effects.</p> <p style="text-align: center;">(Continued....)</p> | |

Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Undertaking of intended data submission Not applicable.

| | |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Section A7.5.4.1 Annex Point / TNsG Annex IIIA XIII 3.1 | Acute Toxicity to Honeybees and other Beneficial Arthropods Section 7: Ecotoxicological Profile, including Fate and Behaviour |
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| Evaluation by Competent Authorities | |
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| Use separate “evaluation boxes” to provide transparency as to the comments and views submitted | |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES <i>(specify)</i> | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Section A7.5.5 Annex Point / TNsG Annex IIA, VII 7.5 | Bioconcentration, Terrestrial Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
| JUSTIFICATION FOR NON-SUBMISSION OF DATA <i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i> <i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i> | | Official use only |
| Other existing data | <input type="checkbox"/> | Technically not feasible <input type="checkbox"/> Scientifically unjustified <input type="checkbox"/> |
| Limited exposure | <input checked="" type="checkbox"/> | Other justification <input checked="" type="checkbox"/> |
| Detailed justification: <p>Carbon dioxide is naturally present in the soil. It is constantly produced by soil-dwelling organisms as a result of the numerous metabolic reactions involving carbon-containing compounds¹. Carbon dioxide is also naturally produced in the soil during the process of decomposition¹. Soil dwelling organisms are exposed to carbon dioxide in the soil without any toxic effects.</p> <p>The risk assessment for the use of carbon dioxide as a biocidal active substance in rodenticide products (PT 14) shows that carbon dioxide is released into the atmosphere at such a level that there is no increase in atmospheric carbon dioxide levels, outside normal atmospheric ranges - consequently there is no risk of bioconcentration in the terrestrial environment.</p> <p><i>Refer to attached page for details of scientific calculation which supports this statement.</i></p> <div style="background-color: black; width: 100px; height: 15px; margin: 10px 0;"></div> <div style="background-color: black; width: 480px; height: 45px; margin: 10px 0;"></div> <p style="text-align: center;">(Continued...)</p> | | |

Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]


[REDACTED]

[REDACTED]

Undertaking of intended data submission Not applicable.

| | |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Section A7.5.5 Annex Point / TNsG Annex IIA, VII 7.5 | Bioconcentration, Terrestrial Section 7: Ecotoxicological Profile, including Fate and Behaviour |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|

| Evaluation by Competent Authorities | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use separate “evaluation boxes” to provide transparency as to the comments and views submitted | |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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| Section A7.5.5.1 Annex Point / TNsG Annex IIA, VII 7.5 | Bioconcentration, Further Studies Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
| JUSTIFICATION FOR NON-SUBMISSION OF DATA <i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i> <i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i> | | Official use only |
| Other existing data | <input type="checkbox"/> | Technically not feasible <input type="checkbox"/> |
| Limited exposure | <input checked="" type="checkbox"/> | Scientifically unjustified <input type="checkbox"/> |
| Detailed justification: | <p>Carbon dioxide is naturally present in the soil. It is constantly produced by soil-dwelling organisms as a result of the numerous metabolic reactions involving carbon-containing compounds¹. Carbon dioxide is also naturally produced in the soil during the process of decomposition¹. Soil dwelling organisms are exposed to carbon dioxide in the soil without any toxic effects.</p> <p>The risk assessment for the use of carbon dioxide as a biocidal active substance in rodenticide products (PT 14) shows that carbon dioxide is released into the atmosphere at such a level that there is no increase in carbon dioxide levels, outside normal atmospheric ranges - consequently there is no risk of bioconcentration in the terrestrial environment. <i>Refer to attached page for details of scientific calculation which supports this statement.</i></p> <p style="text-align: center;">  (Continued....) </p> | |



Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Undertaking of intended data submission Not applicable.

| | |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Section A7.5.5.1 Annex Point / TNsG Annex IIA, VII 7.5 | Bioconcentration, Further Studies Section 7: Ecotoxicological Profile, including Fate and Behaviour |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|

| Evaluation by Competent Authorities | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use separate “evaluation boxes” to provide transparency as to the comments and views submitted | |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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| Section A7.5.6 Annex Point / TNsG Annex IIIA XIII 3.4 | Effects on Other Terrestrial Non-Target Organisms Section 7: Ecotoxicological Profile, including Fate and Behaviour | |
| JUSTIFICATION FOR NON-SUBMISSION OF DATA <i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i> <i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i> | | Official use only |
| Other existing data | <input type="checkbox"/> | Technically not feasible <input type="checkbox"/> |
| Limited exposure | <input checked="" type="checkbox"/> | Scientifically unjustified <input type="checkbox"/> |
| Detailed justification: | <p>This information is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems, outside normal atmospheric ranges. In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system. <i>Refer to next page for details of the scientific calculation which supports this statement.</i></p> <p>Consequently there will be no increased carbon dioxide levels in the terrestrial system so it is not necessary to determine the effect of increased carbon dioxide on terrestrial non-target organisms.</p> <p style="text-align: center;">(Continued.....)</p> | |



Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Undertaking of intended data submission Not applicable.

| | |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Section A7.5.6 Annex Point / TNsG Annex IIIA XIII 3.4 | Effects on Other Terrestrial Non-Target Organisms Section 7: Ecotoxicological Profile, including Fate and Behaviour |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|

| Evaluation by Competent Authorities | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use separate “evaluation boxes” to provide transparency as to the comments and views submitted | |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

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| Section A7.5.7.1 Annex Point / TNsG Annex IIIA XIII 3.4 | Effects on Mammals Section 7: Ecotoxicological Profile, including Fate and Behaviour | | | | | | | |
| <p align="center">JUSTIFICATION FOR NON-SUBMISSION OF DATA</p> <p><i>As outlined in the TNsG on data requirements, the applicant must always be able to justify the suggested exemptions from the data requirements. The justifications are to be included in the respective location (section) of the dossier.</i></p> <p><i>If one of the following reasons is marked, detailed justification has to be given below. General arguments are not acceptable</i></p> | | | | | | | | |
| Other existing data | <input type="checkbox"/> | Technically not feasible <input type="checkbox"/> Scientifically unjustified <input type="checkbox"/> | | | | | | |
| Limited exposure | <input checked="" type="checkbox"/> | Other justification <input checked="" type="checkbox"/> | | | | | | |
| <p>Detailed justification:</p> <p>This information is only required if a concern for the direct/indirect exposure for mammals is possible, and there is a severe risk for the terrestrial environment.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems, outside normal atmospheric ranges. In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system. <i>Refer to next page for details of the scientific calculation which supports this statement.</i></p> <p>Consequently there will be no increased carbon dioxide levels in the terrestrial system so it is not necessary to determine the effect of increased carbon dioxide to mammals.</p> <p>Given the above justification, it is not necessary to submit data to meet the following data end points:</p> <table border="0"> <tr> <td>7.5.7.1.1</td> <td>Acute oral toxicity (mammals)</td> </tr> <tr> <td>7.5.7.1.2</td> <td>Short term toxicity (mammals)</td> </tr> <tr> <td>7.5.7.1.3</td> <td>Effects on reproduction (mammals)</td> </tr> </table> <p>Note that these points have been addressed for carbon dioxide in Section 6 Toxicological and Metabolic Studies. Further studies are not required.</p> <p align="center">(Continued.....)</p> | | | 7.5.7.1.1 | Acute oral toxicity (mammals) | 7.5.7.1.2 | Short term toxicity (mammals) | 7.5.7.1.3 | Effects on reproduction (mammals) |
| 7.5.7.1.1 | Acute oral toxicity (mammals) | | | | | | | |
| 7.5.7.1.2 | Short term toxicity (mammals) | | | | | | | |
| 7.5.7.1.3 | Effects on reproduction (mammals) | | | | | | | |

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| Section A7.5.7.1 Annex Point / TNsG Annex IIIA XIII 3.4 | Effects on Mammals Section 7: Ecotoxicological Profile, including Fate and Behaviour |
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Detailed justification:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Undertaking of intended data submission Not applicable.

| | |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Section A7.5.7.1 Annex Point / TNsG Annex IIIA XIII 3.4 | Effects on Mammals Section 7: Ecotoxicological Profile, including Fate and Behaviour |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

| Evaluation by Competent Authorities | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use separate “evaluation boxes” to provide transparency as to the comments and views submitted | |
| EVALUATION BY RAPPORTEUR MEMBER STATE | |
| Date | <i>Give date of action</i> |
| Evaluation of applicant’s justification | <i>Discuss applicant’s justification and, if applicable, deviating view</i> |
| Conclusion | <i>Indicate whether applicant’s justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data</i> |
| Remarks | |
| COMMENTS FROM OTHER MEMBER STATES (specify) | |
| Date | <i>Give date of comments submitted</i> |
| Evaluation of applicant’s justification | <i>Discuss if deviating from view of rapporteur member state</i> |
| Conclusion | <i>Discuss if deviating from view of rapporteur member state</i> |
| Remarks | |

Section A7.6

Summary of ecotoxicological effects and fate and behaviour in the environment.

Note that the following information is identical to that found in Document IIA.

4 ENVIRONMENTAL EFFECTS ASSESSMENT

4.1 FATE AND DISTRIBUTION IN THE ENVIRONMENT

4.1.1 Degradation

4.1.1.1 Biodegradation (1 of 2)

| Guideline / Test method | Test type | Test parameter | Type | Inoculum | | Additional substrate | Test substance conc. | Degradation | | Remarks | Reference |
|-------------------------|-----------|----------------|------|----------|------------|----------------------|----------------------|-------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| | | | | Conc | Adaptation | | | Incubation period | Degree [%] | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <p><u>Ready Biodegradability</u>¹</p> <p>Carbon dioxide does break down in water to give carbonic acid:</p> $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3$ <p>This, however, is not brought about by biological means, as it will happen as the result of the simple dissolution of the carbon dioxide in water.</p> <p>Testing for the ready biodegradability of carbon dioxide is scientifically unjustified. Carbon dioxide evolution is one of the major end-points used in such biodegradability tests. Ready biodegradability describes the conversion of test substances to carbon dioxide, thus recognising that there will not normally be any further degradation.</p> | Document III-A Section 7.1.1.2.1 |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <p><u>Inherent Biodegradability</u>¹</p> <p>Inherent biodegradability is technically not possible to perform on carbon dioxide as the test methods are designed to work with water-soluble, non volatile organic substances. Carbon dioxide, although water soluble, is volatile and inorganic.</p> | Document III-A Section 7.1.1.2.2 |

Footnotes

1. Due to the ready biodegradability and inherent biodegradability of carbon dioxide, it is not scientifically necessary to determine the rate and route of carbon dioxide degradation in aquatic systems (the data end points detailed in Document III-A, 7.1.2, 7.1.2.2.1 and 7.1.2.2.1).

4.1.1.1 Biodegradation (2 of 2)

| Guideline / Test method | Test type | Test parameter | Type | Inoculum | | Additional substrate | Test substance conc. | Degradation | | Remarks | Reference |
|-------------------------|-----------|----------------|------|----------|------------|----------------------|----------------------|-------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| | | | | Conc | Adaptation | | | Incubation period | Degree [%] | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <u>Biodegradation in sea water</u> Data on biodegradation in seawater is not required as carbon dioxide is not intended to be either used or released into marine environments. For these purposes, it is intended that carbon dioxide be used as a biocide in a closed system. | Document III-A Section 7.1.1.2.3 |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <u>Biological sewage treatment – aerobic and anaerobic biodegradation</u> Aerobic biodegradation in biological sewage treatment is not applicable, as carbon dioxide is not intended to enter sewage treatment plants before release to the environment. Anaerobic biodegradation is not applicable, as carbon dioxide is not intended to be exposed to anaerobic conditions. For these purposes, it is intended that carbon dioxide be used as a biocide in a closed system. | Document III-A Section 7.1.2.1.1 Document III-A Section 7.1.2.1.2 |

4.1.1.2 Abiotic Degradation

Hydrolysis

| Guideline /Test Method | pH | Temperature [°C] | Initial TS concentration C ₀ [mol/l] | Reaction rate Constant, K _h [1/s x 10 ⁵] | Half-life, DT ₅₀ [h] | Coefficient of correlation, r ₂ | Remarks | Reference |
|------------------------|-----|------------------|-------------------------------------------------|-----------------------------------------------------------------|---------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | <p>Further work or studies are not considered scientifically justified as the chemistry of carbon dioxide is well known and this result can be predicted from the intrinsic properties of carbon dioxide.</p> <p>Carbon dioxide is moderately soluble in water and at 20°C, 88 ml of carbon dioxide will dissolve in 100 ml of water. Some of this dissolved carbon dioxide will react with water to form carbonic acid.</p> $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3$ <p>Carbonic acid will undergo further reactions to produce bicarbonate and carbonate ions</p> $\text{H}_2\text{CO}_3 + \text{OH}^- \rightleftharpoons \text{HCO}_3^- + \text{H}_2\text{O}$ $\text{HCO}_3^- + \text{OH}^- \rightleftharpoons \text{CO}_3^{2-} + \text{H}_2\text{O}$ <p>Thus, an aqueous solution of carbon dioxide will contain mainly carbon dioxide, with a small amount of carbonic acid, bicarbonate ions and carbonate ions. No further reactions will take place in the absence of other chemicals. The equilibrium constant for the disassociation reaction is 600, which means that there is 600 times more carbon dioxide in solution than is converted to carbonic acid. This will not change with time, so carbon dioxide can be considered to be hydrolytically stable.</p> <p>It should be noted that each of the reactions described above is reversible and an equilibrium will exist for each. The introduction or removal of even a tiny amount of any of the chemical species in the reactions described will cause the equilibria to be disturbed and change the concentrations of all the chemical species in the reaction. For this reason, it would be necessary to conduct the experiment in a sealed system with some sort of in-built analysis capability for whichever of the ions are to be monitored. The concentration of these ions is likely to be so low that they cannot be accurately measured without removing them from the system and thus disturbing the</p> | Document III-A Section 7.1.1.1.1 |

| | | | | | | | | |
|--|--|--|--|--|--|--|-------------|--|
| | | | | | | | equilibria. | |
|--|--|--|--|--|--|--|-------------|--|

Photolysis in water

| Guideline/ Test Method | Initial Molar TS concentration | Total Recovery of Test Substance [% of appl. a.s.] | Photolysis rate constant (k_p^c) | Direct photolysis sunlight rate constant (K_{pE}) | Reaction quantum yield (θ_E^c) | Half-life ($t_{1/2E}$) | Remarks | Reference |
|---------------------------|--------------------------------------|----------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------|-----------------------------------------------|-----------------------------|------------|-------------------------------------------|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | [REDACTED] | Document III-A Section 7.1.1.1.2 |

Phototransformation in air

| Guideline/ Test Method | Initial Molar TS concentration | Total Recovery of Test Substance [% of appl. a.s.] | Photolysis rate constant (k_p^c) | Direct photolysis sunlight rate constant (K_{pE}) | Reaction quantum yield (θ_E^c) | Half-life ($t_{1/2E}$) | Remarks | Reference |
|---------------------------|--------------------------------------|----------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------|-----------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | As a gas under all environmental conditions that are likely to occur on earth, carbon dioxide will occur predominately in air. Carbon dioxide is a by-product of aerobic respiration. There is a natural "carbon cycle" whereby carbon dioxide is continuously added and removed from the environment through natural processes. Under normal conditions of use, the carbon dioxide used in Rentokil Initial's rodenticide (PT14) products that contain carbon dioxide will not cause any elevation in the level of carbon dioxide in air, outside normal atmospheric ranges. This makes it unnecessary to determine the fate of carbon dioxide in air. | Document III-A Section 7.3.1 Document III-A Section 7.3.2 |

4.1.1.3 Distribution

Absorption onto/desorption from soils (1 of 2)

| Guideline/ test method | Absorbed a.s. [%] | K_a ¹ | K_{aOC} ² | K_d ³ | K_{dOC} ⁴ | K_a / K_d ⁵ | Degradation products | | Remarks | Reference |
|---------------------------|----------------------|--------------------|------------------------|--------------------|------------------------|--------------------------|----------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| | | | | | | | Name | [%] of a.s. | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <p>In water, carbon dioxide breaks down to give carbonic acid, which is brought about by the result of simple dissolution of the carbon dioxide in water.</p> $CO_2 + H_2O \rightleftharpoons H_2CO_3$ <p>It will attain equilibrium with air spaces in soil through passive diffusion.</p> <p>Under normal conditions of use, Rentokil Initial's rodenticide (PT14) products that contain carbon dioxide will not be applied directly to the sediment. In addition, calculations show that the use of carbon dioxide in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the level of carbon dioxide in water, outside normal atmospheric ranges.</p> <p>For the reasons detailed above, it is not necessary to conduct a adsorption/desorption screening test for carbon dioxide.</p> | <p>Document III-A Section 7.1.3</p> <p>Document III-A Section 7.1.4</p> <p>Document III-A Section 7.1.4.1</p> |

Key

1. K_a = Adsorption coefficient.
2. K_{aOC} = Adsorption coefficient based on organic carbon content.
3. K_d = Desorption coefficient.
4. K_{dOC} = Desorption coefficient based on organic carbon content.
5. K_a/K_d = Adsorption/desorption distribution coefficient.

Absorption onto/desorption from soils (2 of 2)

| Guideline/ test method | Absorbed a.s. [%] | K_a ¹ | K_{aOC} ² | K_d ³ | K_{dOC} ⁴ | K_a / K_d ⁵ | Degradation products | | Remarks | Reference |
|---------------------------|----------------------|--------------------|------------------------|--------------------|------------------------|--------------------------|----------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | | Name | [%] of a.s. | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <p><u>Additional soil studies (as detailed in data requirements 7.2.1, 7.2.2, 7.2.2.1, 7.2.2.2, 7.2.2.3, 7.2.2.4, 7.2.3, 7.2.3.1, 7.2.3.2)</u></p> <p>Data fate and behaviour in soil is not required as carbon dioxide is not intended to be either used or released directly to the soil and therefore these studies are not required.</p> <p>The data end points for ready biodegradability (7.1.1.2.1) and inherent biodegradability (7.1.1.2.2) do not indicate the need to conduct studies on the fate and behaviour of carbon dioxide in soil. In addition, this is substantiated by the fact that that carbon dioxide does undergo a degree of abiotic degradation by means of simple dissolution in water. Also, it is well known that although carbon dioxide occurs predominately in air, it will attain equilibrium with air spaces in soil through passive diffusion.</p> | Document III-A Section 7.2.1 7.2.2 7.2.2.1, 7.2.2.2, 7.2.2.3, 7.2.2.4, 7.2.3, 7.2.3.1, 7.2.3.2 |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <p><u>Bioconcentration in soil</u></p> <p>The risk assessment for the use of carbon dioxide as a biocidal active substance in rodenticide products (PT 14) shows that carbon dioxide is released into the atmosphere at such a level that there is no measurable increase in the atmospheric carbon dioxide level, consequently there is no risk of bioconcentration in the terrestrial environment.</p> | Document III-A Section A7.5.5 Document III-A Section A7.5.5.1 |

Key

1. K_a = Adsorption coefficient.
2. K_{aOC} = Adsorption coefficient based on organic carbon content.
3. K_d = Desorption coefficient.
4. K_{dOC} = Desorption coefficient based on organic carbon content.
5. K_a/K_d = Adsorption/desorption distribution coefficient.

4.1.2 Accumulation

Measurements of aquatic bioconcentration

| Guideline /Test method | Exposure | Log Pow of a.s. | Initial concentration of a.s. | Steady-state BCF | Uptake rate constant | Depuration rate constant | Depuration time (DT ₅₀) | Metabolites | Remarks | Reference |
|------------------------|----------|-----------------|-------------------------------|------------------|----------------------|--------------------------|-------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <p>“Bioconcentration” is the process leading to a higher concentration of, for example, a pesticide in an organism than in environmental media to which it is exposed.</p> <p>Since CO₂ is a naturally occurring substance that all living organisms are exposed to, and which plays a vital role in the normal maintenance of life, studies into the bioconcentration of carbon dioxide are not justified. The partition coefficient of CO₂ is 0.83.</p> | Document III-A Section 7.4.2 |

Estimations on aquatic bioconcentration

| Basis for estimation | Log Pow (measured) | Estimated BCF for fish (freshwater) | Estimated BCF for fish eating bird/predator | Remarks | Reference |
|----------------------|--------------------|-------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| N/A | N/A | N/A | N/A | <p>“Bioconcentration” is the process leading to a higher concentration of, for example, a pesticide in an organism than in environmental media to which it is exposed.</p> <p>Since CO₂ is a naturally occurring substance that all living organisms are exposed to, and which plays a vital role in the normal maintenance of life, studies into the bioconcentration of carbon dioxide are not justified. The partition coefficient of CO₂ is 0.83.</p> | Document III-A Section 7.4.2 |

Estimation on terrestrial bioconcentration

| Basis for estimation | Log Pow (measured) | Estimated BCF for | | | | Remarks | Reference |
|----------------------|--------------------|---------------------------------------------------|----------------------------|-------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| | | Terrestrial food chain I Soil dwelling species | Predatory bird /vertebrate | Terrestrial plant | t necessary to get organism | | |
| N/A | N/A | N/A | N/A | N/A | N/A | <p>“Bioconcentration” is the process leading to a higher concentration of, for example, a pesticide in an organism than in environmental media to which it is exposed.</p> <p>Since CO₂ is a naturally occurring substance that all living organisms are exposed to, and which plays a vital role in the normal maintenance of life, studies into the bioconcentration of carbon dioxide are not justified. The partition coefficient of CO₂ is 0.83.</p> | Document III-A Section 7.4.2 |

4.2 EFFECT ON ENVIRONMENTAL ORGANISMS

4.2.1 Aquatic compartment

Acute toxicity to fish

| Guideline/ Test method | Species | Endpoint/ Type of test | Exposure | | Results | | | Remarks | Reference | |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------|------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| | | | Design | Duration | LC ₀ | LC ₅₀ | LC ₁₀₀ | | | |
| No set guideline followed. Refer to "Exposure Design" for summary of methodology followed. | Brook Trout (<i>Salvelinus fontinalis</i>) Slimy Sculpin (<i>Cottus cognatus</i>) Blacknose dace (<i>Rhinichthys atratulus</i>) | Rather than looking at acute toxicity <i>per se</i> , this test investigated the physiological and behavioural effects of fish exposed to carbon dioxide. | 3 replicates of 4 different CO ₂ levels were tested in treatment vessels. Dose levels of CO ₂ were 1.4%, 2.8% and 5.1%. Substrate cover of flat creekbed stones (5-15 cm) was provided in each tank; floe maintained at 6 l/min and water volume 85 l. CO ₂ was measured throughout the test period, and adjustments made periodically to maintain treatments at or near prescribed points. After tests, fish were monitored for 1 week to assess short-term mortality. | 24 h | | | | Rather than looking at acute toxicity <i>per se</i> , this test investigated the physiological and behavioural effects of fish exposed to carbon dioxide. The results show that physiological responses to exposure to increased carbon dioxide in fish differed by species when they were exposed to 1.4%, 2.8% and 5.1% CO ₂ . However recovery to pre-treatment activity rates of most behaviour patterns (including feeding) was observed 24h after cessation of exposure in all 3 test species. | This study gives an indication about the possible physiological and behavioural effects increased levels of CO ₂ may have on fish. This study, notwithstanding its deficiencies, can be used to support the acute toxicity of CO ₂ to fish because under normal conditions of use, the use of CO ₂ in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the level of CO ₂ in water or air outside normal atmospheric ranges. Given this, it makes it unnecessary to conduct further studies on the toxicity of CO ₂ to fish. ^{1,2,3} | Document III-A Section 7.4.1.1 |

Footnotes

1. Due to the results available on the acute toxicity of carbon dioxide to fish, coupled with the fact that there is no exposure to the aquatic environment, it is not necessary to submit further studies on the effects of carbon dioxide to aquatic organisms (the data requirements detailed in Document III-A, 7.4.3). It is also not necessary to submit data on prolonged toxicity of carbon dioxide to fish (Document III-A, 7.4.3.1).
2. Due to the results available in the core base set of environmental toxicity data for carbon dioxide, particularly that available on the acute toxicity to fish and the fact that there is no exposure to the aquatic environment, it is not necessary to submit further studies on the effects of carbon dioxide on the reproduction and growth rate of fish (the data requirements detailed in Document III-A, 7.4.3.2).
3. Due to the fact that there is no exposure to the aquatic environment, coupled with the fact that there is no data available which suggests that carbon dioxide will bioaccumulate in the environment, nor is there a risk of secondary poisoning through the use of carbon dioxide, it is not necessary to submit data on bioaccumulation in fish (the data requirements detailed in Document III-A 7.4.3.3.1).

Acute toxicity to invertebrates

| Guideline/ Test method | Endpoint / Type of test | Exposure | | Results | | | Remarks | Reference |
|---------------------------|----------------------------|----------|----------|-----------------|------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| | | Design | Duration | LC ₀ | LC ₅₀ | LC ₁₀₀ | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | In principle, invertebrates will be expected to show similar physiological tolerances to carbon dioxide as those exhibited by fish (refer to table above for details). There is no underlying reason why aquatic invertebrates should be more sensitive, and so the generation of additional test data is unjustified. ^{1,2,3} | Document IIIA Section 7.4.1.2 |

Footnotes

1. Due to the results available on the acute toxicity of carbon dioxide to fish (which can be applied to invertebrates), coupled with the fact that there is no exposure to the aquatic environment, it is not necessary to submit further studies on the effects of carbon dioxide to aquatic organisms (the data requirements detailed in Document III-A, 7.4.3). It is also not necessary to submit data on prolonged toxicity of carbon dioxide to fish (Document III-A, 7.4.3.1).
2. Due to the fact that there is no exposure to the aquatic environment, coupled with the fact that there is no data available which suggests that carbon dioxide will bioaccumulate in the environment, nor is there a risk of secondary poisoning through the use of carbon dioxide, it is not necessary to submit data on bioaccumulation in invertebrate species (the data requirements detailed in Document III-A 7.4.3.3.2).
3. Due to the results available in the core base set of environmental toxicity data for carbon dioxide, particularly that available on the acute toxicity to fish (which can be applied to invertebrates) and the fact that there is no exposure to the aquatic environment, it is not necessary to submit further studies on the effects of carbon dioxide on the reproduction and growth rate of invertebrates (the data requirements detailed in Document III-A, 7.4.3.4).

Growth inhibition on algae

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | Results | | | Remarks | Reference |
|---------------------------|---------|----------------------------|----------|----------|--------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| | | | Design | Duration | NOE _r C | E _b C ₅₀ ¹ | E _r C ₅₀ ² | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | It is not scientifically necessary to calculate the growth inhibition of carbon dioxide to algae, because carbon dioxide is an essential substrate for photosynthesis. In addition, under normal conditions of use, the use of CO ₂ in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the level of CO ₂ in water or air outside normal atmospheric ranges. ¹ | Document IIIA Section 7.4.1.3 |

Key

1. Calculated from the area under the growth curve
2. Calculated from growth rate

Footnotes

1. Due to the results available on the toxicity of carbon dioxide to algae, coupled with the fact that there is no exposure to the aquatic environment, it is not necessary to submit further studies on the effects of carbon dioxide to aquatic organisms (the data requirements detailed in Document III-A, 7.4.3). It is also not necessary to submit data on prolonged toxicity of carbon dioxide to fish (Document III-A, 7.4.3.1).

Inhibition of microbial activity (aquatic)

| Guideline / Test method | Species / Inoculum | Endpoint/ Type of test | Exposure | | Results | | | Remarks | Reference |
|-------------------------|--------------------|------------------------|----------|----------|------------------|------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| | | | Design | Duration | EC ₂₀ | EC ₅₀ | EC ₈₀ | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <p>Whilst elevated levels of carbon dioxide may affect environmental conditions for bacteria by reducing pH, there are a number of mitigating factors that would reduce any environmental impacts of such changes and make it unnecessary to generate new test data.</p> <p>(a) Most free living prokaryotic bacteria can tolerate a pH range of about 3 units (three orders of magnitude changes in pH).</p> <p>(b) There is a high level of functional redundancy amongst mixed communities of micro-organisms such that declines in population of some species e.g. due to unfavourable pH conditions, will be compensated for by increases in others. The effect of this biological diversity and different environmental optima for different species means that most bacteria can live in a wide range of pH conditions, from 0.5-9.0.</p> <p>In addition, it is not necessary to determine the effect of increased carbon dioxide levels on microbial activity because under normal conditions of use, the use of CO₂ in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the level of CO₂ in water or air outside normal atmospheric ranges.¹</p> | Document IIIA Section 7.4.1.4 |

Footnotes

1. Due to the results available on the toxicity of carbon dioxide to aquatic microbes, coupled with the fact that there is no exposure to the aquatic environment, it is not necessary to submit further studies on the effects of carbon dioxide to aquatic organisms (the data requirements detailed in Document III-A, 7.4.3). It is also not necessary to submit data on prolonged toxicity of carbon dioxide to fish (Document III-A, 7.4.3.1).

Effects on sediment dwelling organisms

| Remarks | Reference |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| This information is only required if the active substance partitions to, and persists in, aquatic sediments, such that sediment dwelling organisms are likely to be exposed to the active substance. Under normal conditions of use, the use of CO ₂ in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the level of CO ₂ in water, outside normal atmospheric ranges thus sediment dwelling organisms will not be exposed to increased carbon dioxide. This makes it unnecessary to generate data on the effects of increased carbon dioxide to sediment dwelling organisms. | Document IIIA Section 7.4.3.5.1 |

Aquatic Plant Toxicity

| Remarks | Reference |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Under normal conditions of use, the use of CO ₂ in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the level of CO ₂ in water, outside normal atmospheric ranges thus aquatic plants will not be exposed to increased carbon dioxide. This makes it unnecessary to generate data on the effects of increased carbon dioxide to aquatic plants. . | Document IIIA Section 7.4.3.5.2 |

4.2.2 Atmosphere

4.2.3 Terrestrial compartment

Toxicity to terrestrial organisms, initial tests (1 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | Results | | | Remarks | Reference |
|---------------------------|--------------------------|----------------------------|----------|----------|---------|------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| | | | Design | Duration | NOEC | LOEC | EC/LC ₅₀ | | |
| N/A | Microbes, terrestrial | N/A | N/A | N/A | N/A | N/A | N/A | <p>This data is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long-term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems (outside normal atmospheric ranges). In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system.</p> <p>Consequently, there will be no increased carbon dioxide levels in the terrestrial system, so it is not necessary to determine the effect of increased carbon dioxide on microbial activity.</p> | Document IIIA Section 7.5.1.1 |

Toxicity to terrestrial organisms, initial tests (2 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | Results | | | Remarks | Reference | |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| | | | Design | Duration | NOEC | LOEC | EC/LC ₅₀ | | | |
| No set guideline followed. Refer to "Exposure Design" for summary of methodology followed. | Earthworm (test species was a natural population of surface casting earthworm. Exact species not given) | Rather than investigating acute toxicity <i>per se</i> , this study investigated the effects of increased CO ₂ on cast production. | Carbon dioxide was added to soil plots using a screen aided CO ₂ control facility. Control plots contained 350µm CO ₂ while test plots contained an increased level of CO ₂ (610 µm) in natural soil | 2 years. | NOEC, LOEC, EC ₅₀ or LC ₅₀ not given because test was not investigating acute toxicity <i>per se</i> . Exposure to increased levels of CO ₂ caused rates of surface cast production to increase 6 fold. Cumulative surface cast production after 1 year was 35% greater in communities with elevated CO ₂ . CO ₂ induced stimulation of earthworms which increased soil turnover and N and C cycling. | | | | This data is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long-term exposure to the active substance. Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems (outside normal atmospheric ranges). In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system. Consequently, there will be no increased carbon dioxide levels in the terrestrial system, so it is not necessary to determine the effect of increased carbon dioxide on earthworms. Notwithstanding this, the study summarised here gives an indication about the possible effects increased CO ₂ may have on cast production by earthworms. ¹ | Document IIIA Section 7.5.1.2 |

Footnotes

1. Due to the results available in the core base set of environmental toxicity data for carbon dioxide, particularly that available on the toxicity to earthworms and the fact that there is no exposure to the terrestrial environment, it is not necessary to submit further studies on the effects of carbon dioxide on the reproduction of earthworms or other soil non-target macro-organisms (the data requirements detailed in Document III-A, 7.5.2.1).

Toxicity to terrestrial organisms, initial tests (3 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | NOEC | Results | | Remarks | Reference |
|---------------------------|---------|----------------------------|----------|----------|------|---------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| | | | Design | Duration | | LOEC | EC/LC ₅₀ | | |
| N/A. | Plants | N/A | N/A | N/A | N/A | N/A | N/A | <p>This data is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long-term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems (outside normal atmospheric ranges). In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system.</p> <p>Consequently, there will be no increased carbon dioxide levels in the terrestrial system, so it is not necessary to determine the effect of increased carbon dioxide on plants.</p> <p>Notwithstanding this, it should be noted that carbon dioxide plays a vital role in the photosynthesis pathway of plants. It is widely accepted that commercial horticulturists, such as tomato growers, use carbon dioxide to enrich the atmospheres of their greenhouses to accelerate the growth of their crops.¹</p> | Document IIIA Section 7.5.1.3 |

Footnotes

1. Due to the results available in the core base set of environmental toxicity data for carbon dioxide, particularly that available on the toxicity to plants and the fact that there is no exposure to the terrestrial environment, it is not necessary to submit further studies on the long term effects of carbon dioxide on plants (the data requirements detailed in Document III-A, 7.5.2.2).

Toxicity to terrestrial organisms, initial tests (4 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | NOEC | Results | | Remarks | Reference |
|---------------------------|---------|----------------------------|----------|----------|------|---------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| | | | Design | Duration | | LOEC | EC/LC ₅₀ | | |
| N/A. | Birds | N/A | N/A | N/A | N/A | N/A | N/A | <p>An acute oral toxicity study for carbon dioxide cannot be submitted because it is not technically possible to determine the acute toxicity of carbon dioxide by the oral route. This is because there is no approved guideline for testing the acute toxicity of a gas by the oral route.</p> <p>In addition to the above, it should be noted that carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in the atmosphere, outside normal atmospheric ranges. Consequently, there will be no increased carbon dioxide levels in the atmosphere, so it is not necessary to determine the effect of increased carbon dioxide on birds.</p> <p>Given the fact that there will be no elevation in the levels of carbon dioxide naturally found in the atmosphere (outside normal atmospheric ranges) when carbon dioxide is used as a biocide in Rentokil Initial's rodenticide (PT14) products, it is also not necessary to determine the effect of increased carbon dioxide on the reproduction of birds, and it's short-term toxicity to birds.</p> | <p>Document IIIA Section 7.5.1.1</p> <p>Document IIIA Section 7.5.1.2</p> <p>Document IIIA Section 7.5.1.3</p> |

Toxicity to terrestrial organisms, initial tests (5 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | Results | | | Remarks | Reference |
|---------------------------|---------------------------------------|----------------------------|----------|----------|---------|------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| | | | Design | Duration | NOEC | LOEC | EC/LC ₅₀ | | |
| N/A. | Honeybees | N/A | N/A | N/A | N/A | N/A | N/A | Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in the atmosphere (outside normal atmospheric ranges). Consequently, there will be no increased carbon dioxide levels in the atmosphere, so it is not necessary to determine the effect of increased carbon dioxide on honeybees or other beneficial arthropods. | Document IIIA Section 7.5.4.1 |
| N/A | Other terrestrial non-target organism | N/A | N/A | N/A | N/A | N/A | N/A | <p>This data is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long-term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems, outside normal atmospheric ranges. In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system.</p> <p>Consequently, there will be no increased carbon dioxide levels in the terrestrial system, so it is not necessary to determine the effect of increased carbon dioxide on terrestrial non-target organisms.</p> | Document IIIA Section 7.5.6 |

Toxicity to terrestrial organisms, initial tests (6 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | NOEC | Results | | Remarks | Reference |
|---------------------------|---------|----------------------------|----------|----------|------|---------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| | | | Design | Duration | | LOEC | EC/LC ₅₀ | | |
| N/A. | Mammals | N/A | N/A | N/A | N/A | N/A | N/A | <p>An acute oral toxicity study for carbon dioxide cannot be submitted because it is not technically possible to determine the acute toxicity of carbon dioxide by the oral route. This is because there is no approved guideline for testing the acute toxicity of a gas by the oral route.</p> <p>In addition to the above, it should be noted that carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in the atmosphere, outside normal atmospheric ranges. Consequently, there will be no increased carbon dioxide levels in the atmosphere, so it is not necessary to determine the effect of increased carbon dioxide on mammals.</p> <p>Given the fact that there will be no elevation in the levels of carbon dioxide naturally found in the atmosphere (outside normal atmospheric ranges) when carbon dioxide is used as a biocide in Rentokil Initial's rodenticide (PT14) products, it is also not necessary to determine the effect of increased carbon dioxide on the reproduction of mammals, and its short-term toxicity to mammals.</p> | <p>Document IIIA Section 7.5.7.1.1</p> <p>Document IIIA Section 7.5.7.1.2</p> <p>Document IIIA Section 7.5.7.1.3</p> |

4.2.4 Non compartment specific effects relevant to the food chain (secondary poisoning)

| |
|---------------|
| Result |
|---------------|

| |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Carbon dioxide does not have any intrinsic properties which suggest it will bioaccumulate in the environment. In addition, carbon dioxide is not classified as hazardous to health according to EC Directive 67/548/EEC, nor are there any indications of toxicity such as endocrine disruption. The toxicity profile of carbon dioxide, coupled with the fact that it is unlikely to accumulate in the environment, means that there is a low risk of secondary poisoning. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Section A8.1
Annex Point IIA, VIII, 8.1

**Recommended Methods and Precautions concerning Handling,
Use, Storage, Transport or Fire.**

Official
use only

1. REFERENCE

1.1 References

[REDACTED]


1.2 Details

- Handling:** Heavy protective gloves e.g. textile or leather must be worn at all times when handling cylinders in order to minimise the risk of hand injury. The use of protective safety footwear should also be considered if handling a number of cylinders regularly.
- Use:** Ensure that before use the carbon dioxide cylinder is stood in a vertical position with the valve uppermost and firmly secured against a wall or other suitable support. Cylinders must only be used with suitable valve attachments.
- Storage:** Store in original container preferably in a purpose built compound which should be well ventilated and in the open air. Keep out of reach of children, and away from food, drink and animal feeding stuffs. Do not heat cylinders, and keep below 45°C. Cylinders should be stored in the vertical position and properly secured to prevent toppling.
- Conditions to Avoid:** Do not heat container, and always keep below 45°C.
- Materials to Avoid:** None known.
- Hazardous Breakdown Products:** None known.
- Transport:** Carbon dioxide aerosols should be carried as hazardous goods, UN 1013 Carbon dioxide.
- Fire:** Carbon dioxide is used as a fire extinguisher, however, if unable to extinguish fire keep adjacent cylinders cool with water hosed from a safe distance. Self contained breathing apparatus, and suitable personal protective equipment should be worn, particularly in confined spaces. Exposure to fire may cause cylinders to rupture and/or explode.
- Accidental Release:** If cylinders are in an enclosed area, evacuate the area. Arrange for the area to be ventilated and check the atmosphere for correct oxygen/carbon dioxide content before re-entry. Check the valve on the cylinder is closed and move to a safe area. DO NOT contaminate watercourses or ground.

Section A8.2

In case of fire, nature of reaction products, combustion gases, etc.

Annex Point IIA, VIII, 8.2

| | | Official use only |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| | 1. REFERENCE | |
| 1.1 | Reference  | |
| 1.2 | Details No hazardous breakdown products, reaction products or combustion gases are known for carbon dioxide, in case of fire. | |