Documentation of References for Terrestrial Field Dissipation (TFD) Half-life and Organic Carbon Normalized Soil Adsorption Values (Koc) for Known Ground Water Pesticide Contaminants in California: Values for Use in Probabilistic Modeling

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April 16, 2009

EH 09-03

ACKNOWLEDGMENT

My thanks to those who have helped in gathering and analyzing the various DPR data sources. And my sincerest appreciation to Murray Clayton, Frank Spurlock, and Rick Bergin for their review of the report.

SUMMARY

Scientists in the Department of Pesticide Regulation (DPR), California Environmental Protection Agency (CAL EPA) have developed a probabilistic approach to model predicted concentrations of pesticides in well water. The approach has relied on the collection of terrestrial field dissipation half-life (TFD) and soil adsorption values normalized for organic carbon content (Koc) for pesticide active ingredients known to contaminate California's ground water. This pool of values provides the basis for a Monte Carlo approach to pesticide fate modeling where a large number of random samples are taken from a distribution of known values. The data are obtained from studies that are required for registration of pesticide products by the U.S. EPA. Studies published in peer reviewed scientific literature can also be a source of data when the experimental description is adequate. The current TFD and Koc values used in the probabilistic approach were collated from two databases. One was the DPR Pesticide Chemistry database (PestChem) that contains data from studies submitted to DPR for registration. The other database was an accumulation of pesticide chemistry parameters by the U.S. Department of Agriculture-Agricultural Research Service (USDA- ARS).

An initial investigation into the original references for each reported value indicated that the values did not necessarily represent a unique study. For example, some TFD values reported in the USDA database were traced back to the same report referenced by another value reported in DPR's PestChem database. One cause of the difference between values derived from the same study was that the USDA database contained values reported by registrants of active ingredient, whereas the value in DPR's database was generated from a recalculation of the data. This resulted in multiple values reported for the same study. For Koc, the values reported in the USDA database were in many cases averaged so they were not representative of unique study conditions. The purpose of this investigation was to review the values previously collected for the Monte Carlo approach and, when warranted, provide a reference for new unique data. Tables 3 and 4 in this report contain the updated list of values for TFD and Koc, respectively, where each datum represents a unique study condition.

The conclusions from this investigation are:

1. Only 17 of the 52 TFD half-life values originally collected from the two databases could be referenced to a unique study. Table 3 in this report contains the updated list of values.
2. For atrazine, two TFD values were identified but they were from a study conducted at the same location and at exactly the same time of year. One value represents a cropped condition and the other a bare soil condition.
3. Only two TFD values that were obtained from two unique study conditions were identified for bromacil, diuron, and Hexazinone. The two studies were conducted in the same two locations for all three chemicals: Newark, Delaware and Madera, California.
4. For norflurazon, four TFD values from studies conducted in different locations were identified, but all were from a cropped study condition.
5. For simazine, five TFD values were identified from studies conducted at 3 different locations. A bare ground and a cropped study was conducted at the same time in two of the locations.
6. Prometon was included in this review of TFD studies because it is a 6800(a) listed pesticide. Six values are currently reported in the PestChem database but they represent 6 treatments from a single study. In addition, data from two other similar studies were available but they had not been entered into the PestChem database.

7. For Koc soil adsorption values, the major observation was that the references derived from the USDA database were mostly averaged values. Thus, upon review of the original studies, many more unique values were identified in Table 4. A more comprehensive database has been developed that contains accompanying soil information on soil texture, organic carbon content, cation exchange capacity, and pH for each Koc value, where available. Specific increases in the number of unique Koc values were:
    - Atrazine: from 25 to 96 values
    - Bromacil: from 4 to 10 values
    - Diuron: from 4 to 128 values
    - Hexazinone: from 8 to 33 values
    - Norflurazon: from 4 to 5 values
    - Prometon: from 0 to 71 values
    - Simazine: from 4 to 141 values

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INTRODUCTION

Scientists in the Ground Water Protection Program, Department of Pesticide Regulation (DPR) have developed a modeling approach to estimate the potential of a pesticide to move to ground water (Troiano and Clayton, 2004). The modeling is based on a probabilistic approach developed by Spurlock (2000). The premise of the approach is to produce a distribution of predicted results based on observed variation in terrestrial field dissipation (TFD) half-life and soil adsorption (Koc) data for known ground water contaminants. The LEACHM model (Hutson and Wagenet, 1992) was used to estimate the amount of pesticide that leaches below the crop root zone. Specific chemical properties that require inputs for each pesticide are water solubility, vapor pressure, soil half-life, and soil adsorption. A single value is usually reported for water solubility and vapor pressure of a chemical so there is little to no variation in the model input of these variables. In contrast, TFD and Koc values are affected by edaphic, climatic, and geographic factors and, subsequently, have the largest affect on changing the potential outcome of the model.

Estimation of the field dissipation rate of a pesticide is obtained from TFD studies that are required for registration of a pesticide with the U.S. Environmental Protection Agency (USEPA). In California, the Pesticide Contamination Prevention Act (PCPA) (Connelly, 1986), specified that two TFD studies were required for registration and that one study was to be conducted in California or under California-like conditions.

Spurlock reported the range in TFD and Koc values used in Appendix 2 of DPR report EH 00-01. That appendix is reproduced as Table 1 in this report. Logically, the values were obtained from the two databases that were collating chemical data at the time and as stated in the Appendix they were the U.S. Department of Agriculture-Agricultural Research Service (USDA- ARS) (1999) Pesticide Properties Database (Wauchope, 1992) and DPR's Pesticide Chemistry Database (Kollman and Segawa, 1985). During the revision of Troiano and Clayton's 2004 memo, an initial investigation into the original reference for each reported value in Appendix 2 indicated that the value did not necessarily represent a unique study condition. For example, some TFD values reported in the USDA database were traced back to the same report reference by another value reported in DPR's PestChem database. One cause of the difference between values derived from the same study was that the USDA database contained values reported by registrants of active ingredients, whereas the value in DPR's database was generated from a recalculation of the data. This resulted in multiple values reported for the same study. The objective of this investigation was to assign a specific reference to each TFD and Koc value listed in Appendix 2 of EH 00-01 (Table 1 in this report). Upon locating the original reference, the data were re-evaluated and if needed, the updated value recommended as the value to enter into the PestChem database. Tables 3 and 4 in this report contain the final analysis for unique TFD and Koc values, respectively.

MATERIALS AND METHODS

The data from the USDA-ARS database were extracted on 03 Nov 2008 (available at: http://www.ars.usda.gov/SP2UserFiles/ad_hoc/12755100DatabaseFiles/PesticideProperti

esDatabase/Allchemicals/listallchemicals.doc). The chemistry data includes values for TFD, denoted as Field Dissipation Half-lives, and Koc for atrazine, bromacil, diuron, hexazinone, norflurazon, prometon, and simazine. The full data for each active ingredient are reproduced in Attachment I of this report. Except for atrazine, the last update to the extracted data was May 1999, which corresponded to the date of the citation in Spurlock's Appendix 2 (2000). Comparison of the order of listing of the TFD data between the USDA-ARS download (reproduced as Attachment 1 in this report) and Appendix 2 in Spurlock (reproduced as Table 1 in this report) clearly indicated that the USDA database values were listed first in Appendix 2, following the order in which they were listed in the USDA database. Data extracted from DPR's Pesticide Chemistry database (PestChem) are listed after the USDA data in Spurlock's Appendix 2 (Kollman and Segawa, 1995).

The USDA values had associated references and the key to references is available at: http://www.ars.usda.gov/SP2UserFiles/ad_hoc/12755100DatabaseFiles/PesticideProperti esDatabase/Codenlist/CodenList.doc. In some cases the reference was to a specific journal article or book allowing retrieval and review of the data source. In many cases, though, the reference was generic such as referring to Ciba Geigy, 1989. Ancillary data were included for many of the generic references such as soil type, crop, or location of the study (Attachment I). The additional information was sufficient to identify and verify the exact TFD or Koc data package submitted to DPR for registration of the pesticide. This discovery indicated that some of the data were not from independent studies and that the values reflected differences between registrant submitted values that were expressed in the USDA database and reevaluated values assigned by DPR scientists.

Original data volumes that were the source for TFD or Koc values in the PestChem database were obtained from the Registration Resource Center. The studies were reevaluated to confirm or refine, if necessary, the value reported in the PestChem database. Refinements will be noted as an update to existing values.

There were two other circumstances that required further evaluation. One was that TFD or Koc studies were submitted to DPR but they were not reviewed by Registration staff and thus were not designated as DPR approved or disapproved. Second, further analysis of the earliest approved studies indicated that they might not have met guidelines that were developed later for study approval. Since the guidelines for approval were developed near or after these initial submissions, these earlier studies were reevaluated. For these studies, an EM-Accepted or EM-Unaccepted status was developed with guidance generated from a meeting held on Dec 2, 2008, and attended by Frank Spurlock, Murray Clayton, Mike Papathakis, Rick Bergin, and Wisam Fattah. The following EM-derived guidelines were used to determine whether or not a TFD study was EM-acceptable or EM-Unacceptable:

- Duration of the study was greater than 180 days, or if less than or equal to 180 days, the duration covered at least 2 ½ half-lives as determined from a log transformed linearization of the exponential decay curve.
- Data displaying a hump in the response curve potentially indicate more applications were made than stated. When data are humped, the data should be

truncated to where the decay curve starts at the peak of the hump. The rule for duration of the study must be observed where the time span must either be greater than 180 days or if less than or equal to 180 days, the duration should cover at least 2 ½ half-lives.

- At later sampling dates where low-level residues cannot be quantified or residues are not present, usually referred to as non-detects, a value of ½ the reporting limit will be assigned to the first observed non-detect. The remaining non-detects would be censored from the analysis.
- When the dissipation curve appears to reach an asymptote where breakdown is no longer observing the half-life rule, the data will be truncated after the first of two similar consecutive values.

Designation as EM-Accepted or EM-Unaccepted were derived to distinguish from the approval process during Registration staff evaluation, which will be noted as DPR-Approved or DPR-Unapproved.

DISCUSSION

ANALYSIS OF TFD VALUES

Each TFD value in Appendix 2 of the Spurlock report is discussed in the order of entry where atrazine data is first discussed and in order of the values as listed in Table 1. For each value, the specific reference source for the data was reviewed to determine:

- If the value was derived from a unique study
- When possible, the data were reproduced and reevaluated
- Based on the evaluation, a recommendation is made as to its use and reassignment of a revised value for entrance into the PestChem database.

Table 2 contains a summary of the discussion for each value, indicating the original, value, the source of the value with respect to database and/or DPR registration record number, and the evaluation and recalculated value. Table 3 contains the recommended TFD values that have associated references and that should be considered for subsequent probabilistic modeling studies.

Atrazine TFD Half-Life

173 days – Occupies the first position in Appendix 2 and corresponds to the first value in the USDA database (See Appendix I in this report). The USDA value is specifically noted as '173 (13-402)*'. The USDA database explains that "* denotes a selected value where multiple values of a property are listed". The mean of this range in parentheses is 207.5 so the value is not the mean. The reference to the data is Ciba Geigy 1989 but the 13 and 402 values do not match any records in the PestChem database.

Recommendation: Do not use this value because it is derived from multiple observations.

61 days – Occupies the second position in Appendix 2. The second position in the USDA database is noted as a 42-70 day range. The USDA 42-70 day range has a citation with reference to Agrochemicals Handbook, 1983 edition. The average of the cited

USDA range is 56 so it does not coincide with the 61-day value. The Agrochemicals Handbook does not contain a reference for the values.

Recommendation: Do not use this value because there is no known citation.

48 days – Third position in both Appendix 2 and the USDA database. The USDA citation is Rao and Davidson, 1980. Degradation rates are given in Table IV and a 48-day value is noted for atrazine but it is from an aerobic soil metabolism study.

Recommendation: Do not use this value because it is not derived from a TFD study.

64 days – Fourth position in both Appendix 2 and the USDA database. The USDA citation is Jury et al., 1987 and the value is reported as T ½ in Table 2 of the citation. The header for Table 2 indicates that the data were adapted from three references: Rao et al., 1985; Wilkerson et al., 1984; and Jury et al., 1984. The Rao et al., 1985 citation contains an estimate of 71 days in Table 2, but the reference in this table refers back to Jury et al., 1984, which also states 71 days. The reference given in the Jury et al., 1984 is to Rao and Davidson, 1980, which in Table IV contains a field dissipation value of 20 days. The contribution of the Wilkerson reference is unclear as there was no specific EH report that corresponded to that date. Since none of the refereed articles refer to 64 days the origin of this value may be the average of the three sources or from Wilkerson.

Recommendation: Do not use this value because the references are inconsistent.

18 days – Fifth position in both Appendix 2 and the USDA database. The USDA citation is the Gleams manual version 1.8.55 (Davis et al, 1990). Tables C-1 and C-2 in the Appendix of the manual provide estimates for pesticide properties. The estimate for atrazine's half-life is 60 days, which does not match the USDA value. In Table C-2 the half-life for alachlor is listed directly below atrazine and this value is 18 days.

Recommendation: Do not use this value, first because it is most likely a value that was given for alachlor and not atrazine, and second there is no reference as to the source of the data so it is not possible to determine if this is a TFD value.

74 days – Occupies the sixth position in both Appendix 2 and the USDA database. The USDA citation is Gustafson 1989. The data from that citation were taken from Wilkerson and Kim, 1986. As stated on page two of the Wilkerson and Kim report, the values were a collection of values from aerobic, anaerobic, and TFD studies and the value was a mean of collected values.

Recommendation: Do not use this value because it is an average value and most likely not restricted to TFD studies.

119 days – Seventh position in both Appendix 2 and the USDA database. The USDA citation is Ciba-Geigy 1989. The value corresponds to a registrant reported value in data Volume 220-107 with registration record number 67386. The study was conducted on bare ground in a Sandy Loam soil in Ripon, CA. The 119-day value was reported on page 50 of the record and it was calculated from the first 0-6 inch sample only. An obvious **outlier at 180 days was included in the calculation.**

Recommendation: Do not use this value because it is a duplicate from record 67386 in the PestChem database.

70 days – Occupies the eight position in Appendix 2 and corresponds to a DPR accepted value of 69.8 days in the PestChem database from data Volume 220-0019 with registration record 69062. This report, however, is an addition to registration records 67385 and 67386 in data Volumes 220-106 and 220-107, respectively, which were submitted TFD studies conducted on a Sandy Loam soil in Ripon, CA under corn-cropped and bare ground conditions, respectively. The additional volume, 69062, supplies analyses for hydroxyatrazine, which is a degradation product so it does not supply TFD data for atrazine. Additional data for the cropped study were submitted in Volume 220-414 with registration record number 139124 and that within that submission was indicated as Volume 24 of 26. The data updated the analysis and concentration values were changed for the 6-12-inch depth. The updated data and recalculation provided a half-life of 92 days.

Recommendation – DPR-Approved value. This is a good citation but the value should be updated to reflect the additional data submitted, the correct registration record for a cropped study, and the recalculated value is **92 days**.

102 days - Occupies the ninth position in Appendix 2 and corresponds to a DPR accepted value of 102 days in the PestChem database from data Volume 220-107 with registration record 67386. This study was conducted on a Sandy Loam soil in Ripon, CA under bare ground condition. Additional data for the bare ground study were submitted in Volume 220-414 with registration record number 139128 and that within that submission was indicated as Volume 24 of 26. The data represented additional sampling to day 1045 with residues detected until day 552. The recalculation of the regression was conducted on data until 726 days after treatment with and without a potential outlier at day 180. The updated half-life values are 140 and 141, respectively.

Recommendation – DPR-Approved value. This is a good citation but the value should be updated to reflect the additional data submitted and the recalculated value with day 180 excluded is **141 days**.

Bromacil TFD Half-Life

207 days – Occupies the first position in both Appendix 2 and the USDA database. The USDA database value is '207 (61-349)*'. The USDA database explains that "* denotes a selected value where multiple values of a property are listed". The mean of the range is 205, which does not exactly match, but 207 could be the median or mode of all values.

Recommendation: Do not use this value because it is derived from other observations.

227 days – Occupies the second position in Appendix 2. The second position in the USDA database is a range of values from 106-349. The mean is 227.5 so the second entry in Appendix 2 is most likely reflecting the mean of these values. The USDA cited reference for the range is Rao, P.S.C., and J.M. Davidson, 1980, in which the

data are cited in Table IV. The 106-day value is noted as a laboratory aerobic dissipation study so it is not a TFD value. The higher value of 349 is noted as a field-derived value. Data in Table IV are referenced as Ou et al, 1980 that was noted as an EPA report to be published and that was eventually published as Rao and Davidson, 1982.The summary tables in the Ou et al. subsection of the 1982 EPA report are the same as in the earlier Rao and Davidson, 1980 reference. Raw data were reported in Table B18 in Appendix B of the 1982 EPA report. Two values were obtained from Gardiner et al., 1969 and 4 others from Leistra et al, 1975. (Leistra was misspelled as Leistru in Ou et al., 1982). Thus, the reported value of 349 days was an average of the 6 values. In addition, the mean of the rate coefficient is .0038, which corresponds to a half-life value of 182 days. The value of 349 was obtained as the mean of the transformed half-life values for each of the studies, e.g. the mean of the transformed values is not the same as the mean of the lognormal values.

Recommendation: Do not use this value because it is the derived from other observations, some of which are not TFD studies.

165 days – Occupies the third position in Appendix 2. The third position in the USDA database is a range of values at 150-180. Since the 165 value is the mean of these two numbers, it most likely is derived from the range given in the USDA database. The USDA reference is the Herbicide Handbook, 1983. On page 49, under Section E (Behavior in Soils), number 4 (Resultant average persistence at recommended rates), the half-life of radiolabeled bromacil is indicated at 5 to 6 months, which corresponds to the 150-180 day range on a Bultertown silt loam. The reference to this information is Gardiner et al., 1969. This article was submitted to DPR as an Aerobic soil metabolism study in data Volume 210-18 with registration record 48332. Though a study was conducted in the field, stainless steel tubes were inserted into the ground and soil sampled down to only 12 inches. The pattern of residue in soil at 1 year indicated that mass was moved below 12 inches so the estimate is low.

Recommendation: Do not use this value because that study was not formally a TFD study and it was submitted as an Aerobic study but not formally added to the database

350 days – Occupies the fourth position in both Appendix 2 and the USDA database. The USDA citation is Jury et al., 1987. The value for T ½ is reported in Table 2 as 350 days where the table header indicates that the data were adapted from three references: Rao et al., 1985, Wilkerson et al., 1984, and Jury et al., 1984. The Rao et al., 1985 citation contains the 350 day estimate in Table 2, but the reference in this table refers back to Jury et al. 1984. The contribution of the Wilkerson reference is not clear, as there was not a specific EH report that corresponded to the reference. There was a report in 1986 (Wilkerson and Kim, 1986) that was the first derivation of specific numerical values for AB2021. Bromacil, however, was not included in the analysis so it is not clear if data for bromacil existed in the PestChem database at that time. The reference given in the Jury et al. 1984 table is to Rao and Davidson 1980. See the previous discussion for 227-day value for the source of those estimates.

Recommendation: Do not use this value because it is most likely derived from the 349-day estimate.

61 days – Occupies the fifth position in both Appendix 2 and the USDA database. The USDA citation is Nofziger et al., 1988, which is an article on the model CHEMRANK. The article has not yet been retrieved.

Recommendation: Do not use until the reference can be retrieved and reviewed.

120 days – Occupies the sixth position in both Appendix 2 and the USDA database. The USDA citation is Dupont 1989. Additional information in the USDA database indicated that the test area was in Delaware and the soil pH was 6.4 and %OM was 2.8. These values correspond to data in data Volume 210-0018 with registration record 48339. Two soils were used: one a Keyport silt loam from Delaware and the other a Myakka Sand from Florida The soil values match the Keyport Silt Loam soil. This study was not accepted by DPR because it was conducted with stainless steel sleeves and did not follow TFD protocol.

Recommendation: Do not use this value because it is a duplicate of a study in the DPR database and that study was unaccepted.

350 days - Occupies the seventh position in both Appendix 2 and the USDA database. The USDA citation is Soil and Crop Society of Florida Volume 44:1-8, 1985. This is a repeat of Rao et al., 1985 so it is a duplicate of the previous 350-day entry.

Recommendation: Do not use this value because it is duplicative of the previous 350 day estimate but with a different citation.

175 days - Occupies the eighth position in both Appendix 2 and the USDA database. The USDA citation is Dupont 1989. The registrant submitted two studies conducted in Delaware. One was reported in data Volume 210-0018 with record number 48339. This data was not accepted by DPR because it was conducted with stainless steel sleeves and did not follow TFD protocol. The other was reported in data Volume 210-0044 with registration record 88916, which was accepted. The 175-day value is most likely related to the second study but there is no specific verification of that exact numerical reference.

Recommendation: Do not use this value because it is most likely a duplicate from registration record 88916 in the DPR database.

155 days – Occupies the ninth position in Appendix 2 and corresponds to a DPR accepted value of 155 days in the PestChem database from data Volume 210-0044 with registration record 88916. The study was conducted on bare ground on Silty Clay Loam soil from Newark, Delaware with OM at 1.1% and application rate at 12 lbs a.i./acre. Data for this and the next entry at 168 days are from same study, but calculated for different lengths of soil depth. This analysis was conducted on the shallower 0-10 cm soil depth.

Recommendation: Do not use this citation because it is a censored value.

168 days – Occupies the tenth position in Appendix 2 and corresponds to a DPR accepted value of 168 days in the PestChem database from data Volume 210-0044 with registration record 88916. The study was conducted on bare ground on Silty Clay Loam soil from Newark, Delaware with OM at 1.1% and application rate at 12

lbs a.i./acre. Data for this and the preview entry of 155 days are from same study, but calculated for different lengths of soil depth. This analysis was conducted on the complete 0-40 cm sampled depth.

Recommendation: **DPR-Approved value** and recalculated value is **167 days.**

124 days – Occupies the eleventh position in Appendix 2 and corresponds to a DPR accepted value of 124 days in the PestChem database from data Volume 210-0044 with registration record 88916. The study was conducted on bare ground on Loam soil from Madera, CA with OM at 1.0% and application rate at 12 lbs a.i./acre. Data for this and the next entry at 137 days are from same study, but calculated for different lengths of soil depth. This analysis was conducted on the shallower 0-10 cm soil depth.

Recommendation: Do not use this citation because it is a censored value

137 days – Occupies the twelfth position in Appendix 2 and corresponds to a DPR accepted value of 137 days in the PestChem database from data Volume 210-0044 with registration record 88916. The study was conducted on bare ground on Loam soil from Madera, CA with OM at 1.0% and application rate at12 lbs a.i./acre. Data for this and the previous entry at 124 days are from same study, but calculated for different lengths of soil depth. This analysis was conducted on the complete 0-40 cm sampled depth.

Recommendation: **DPR-Approved value** and recalculated value is **147 days.**

Diuron TFD Half-Life

90 days – Occupies the first position in both Appendix 2 and the USDA database. The USDA citation is a 1989 submission by Dupont. The site was Madera, CA, which coincides with a submitted TFD study for data Volume 106-0045 with registration record 89036.

Recommendation: Do not use this value because it is a duplicate of a study in the DPR database.

102 days – Occupies the second position in Appendix 2. The value is from a DPR accepted study from data Volume 106-0045 with registration record 89035. The study was conducted on bare ground on Sandy Loam soil from Madera, California with OM at 1.1% and an application rate at 12 lbs a.i./acre. This entry and the one at 100 days are from same study. The 100-day value reported below is a recalculation but the reason for the difference is unclear.

Recommendation: **DPR-Approved value** and the recalculated value are **103 days**.

134 days – Occupies the third position in Appendix 2. The value is from a DPR accepted study from data Volume 106-0045 with registration record 89036. The study was conducted on bare ground on Silty Clay Loam soil from Newark, Delaware with OM at 0.8% and application rate at 12 lbs a.i./acre. Data for this and the entry at 127 days are from the same study.

Recommendation: **DPR-Approved value** and the recalculated value are **133 days**.

100 days – Occupies the fourth position in Appendix 2. The value is from a DPR accepted study from data Volume 106-0045 with registration record 89035. The study was conducted on bare ground study on Sandy Loam soil from Madera, California with OM at 1.1% and application rate at 12 lbs a.i./acre. Data for this and the entry at 102 days are from the same study. The 100-day value is a recalculation but the reason for the difference is unclear.

Recommendation: Do not use this value because it is a duplicate of the 102-day estimate.

127 days – Occupies the fifth position in Appendix 2. The value is from a DPR accepted study from data Volume 106-0045 with registration record 89036. The study was conducted on bare ground on Silty Clay Loam soil from Newark, Delaware with OM at 0.8% and application rate at 12 lbs a.i./acre. Data for this and the entry at 134 days are from same study. The 134-day value is a recalculation but the reason for the difference is unclear.

Recommendation: Do not use this value because it is a duplicate of the 134-day estimate.

Hexazinone TFD Half-Life

105 days – Occupies the first position in Appendix 2. There is neither a reference in the PestChem database nor an accompanying data sheet.

Recommendation: Do not use this value because there is no documentation.

60 days – Occupies the second position in Appendix 2. There is neither a reference in the PestChem database nor an accompanying data sheet.

Recommendation: Do not use this value because there is no known documentation.

90 days – Occupies the third position in Appendix 2 and the second position in the USDA database. The USDA citation is a reference to Dupont 1989. This value potentially corresponds to data submitted in Volume 396-042 with registration record 63764. That study was not accepted because it was conducted with steel tubes punched in the ground so it did not follow TFD protocol. The author of the report was Robert C. Rhodes and the report was for field studies conducted in 1973 and 1974 in Keyport Silt Loam, Newark, DE; Flanagan Silt Loam, Rochelle, IL; and Dundee Silt Loam, Scoot, MS. The values reported for the half-lives were 1 month, 2 months, and 6 months, respectively. These values most likely correspond to additional entries in the PestChem database that indicate a lower bound of 30 days and an upper bound of 180 days. This study was also reported in a journal article (Rhodes, 1980). Moreover the mean of the 3 values is 90 days and could be the source for this entry.

Recommendation: Do not use this value because there is no known documentation.

79 days – Occupies the fourth position in Appendix 2 and reflects the value in the third position in the USDA database where it indicates ‘79 (30-180)*’. The USDA database explains that “* denotes a selected value where multiple values of a property are listed”. The mean of this range, oddly, is 105, which matches the first value in Appendix 2. There are two listings in the PestChem database one that indicates a

lower bound of 30 days and upper bound of 180 days and this appears to match the ranged reported in USDA data, as well as the discussion of Volume 396-042 above for the 90-day entry. The relationship of the 79-day value to the reported range is unclear.

Recommendation: Do not use this value because it is derived from other observations.

75 days – Occupies the fifth position in Appendix 2 and the fourth position in the USDA database. The USDA citation is Dupont 1989 and that the study was conducted on a Silt Loam soil in Delaware with pH at 6.4 and %OM at 2.7. Rhodes (1980) indicates field and greenhouse studies using this soil, which was a Keyport silt loam from Newark, DE. As indicated in the discussion for the 90-day entry, the field estimate was 30 days for this soil with reference to Table III of the article. The Table that references the greenhouse study contains a different Delaware soil as a Fallsington sandy loam. Although this study is the most likely source for this estimate, no specific reference to 75 days is available.

Recommendation: Do no use this value because the exact source is unknown but it is most likely derived from a greenhouse study.

75 days – Occupies the sixth position in Appendix 2 and the fifth position in the USDA database. The USDA citation is 1989 and that the study was conducted on a Silt Loam soil in Illinois with pH at 5.0 and %OM at 4.0. Rhodes (1980) indicates field and greenhouse studies using this soil, which was a Flanagan silt loam soil from Rochelle, IL. As indicated in the discussion for the 90-day entry, the field estimate was 60 days for this soil with reference to Table III of the article. The Table references appear incorrect in the article as the field data are in Table II. The estimate for the greenhouse-treated soils was stated as less than 4 months for the Flanagan silt loam soil with reference to Table IV. Although this study is the most likely source for this estimate, no specific reference to 75 days is available.

Recommendation: Do not use this value because the exact source is unknown but it is most likely derived from a greenhouse study.

120 days – Occupies the seventh position in Appendix 2. No known source for this entry.

Recommendation: Do not use this citation because there is no know reference.

154 days – Occupies the eighth position in Appendix 2 and the sixth position in the USDA database. The USDA citation is Dupont, 1999 with reference to a study conducted in Mississippi on a Slit Loam soil with pH 7.0 and OM of 0.7%. The 154-day value corresponds to the reported value on page 45 in data Volume 396-0061 with registration record 116843 where the study was conducted in Greenville, MS. The soil data are close but for some reason the pH value in the report is 6.8 and not 7. 0 as reported in the USDA database. The study is indicated as accepted in the PestChem database but the value is noted as “Approx. 154 days”. The registrant applied a value of 0.029 ppm to all values that were non-detected. Substituting a zero instead of 0.029 gives a half-life value of 136 days. The study duration was 540 days.

Recommendation: **DPR-Approved value** and the recalculated value are **136 days**.

123 days – Occupies the ninth position in Appendix 2 and the seventh position in the USDA database. The USDA citation is Dupont, 1999 with reference to a study conducted in Delaware on a Loam soil with pH 6.3 and OM of 1.5%. The 123-day value corresponds to the reported value on page 44 in data Volume 396-0061 with registration record 116846 where the study was conducted in Newark, DE. The soil data are similar but textures reported in the USDA and PestChem databases are for the first 0-30 cm whereas the soil types are reported as Silt loam and Silty Clay Loam for the DE and MS sites, respectively. The study is indicated as accepted in the PestChem database but the value is noted as "Approx. 123 days". The study duration was 539 days.

Recommendation: **DPR-Approved value** and the recalculated value are **100 days**.

Additional References

140 days – Occupies the eighth position in the USDA database but it is not currently referenced in the PESTCHEM database and not cited in Appendix 2. The USDA indicates that the study was conducted on a Sandy Loam soil in California and this corresponds to accepted data Volume 396-0060 with record number 116836. The 140-day value corresponds to the reported value on page 35 in Volume 396-0060. The registrant applied a value of 0.029 ppm to all values that were non-detected. Substituting a zero instead of 0.029 gives a half-life value of 124 days. According to the EM guidance this study duration of 180 days was not long enough because the half-life estimate at 124 days was shorter than 2 ½ half-lives.

Recommendation: EM-Unaccepted.

Volume 396-105 and registration record 175757 – This is a report of a prospective ground water study conducted in Merced, California with application of 0.75 lb/acre on 11 Jan 1996. The site was a cropped alfalfa field and the soil was loamy sand with 0.7 % OM measured in first 1.5 feet of soil. Soil was sampled down to the 24-inch depth. Bromide tracer indicated movement of water below 24 inches. Hexazinone was noted to move as fast as the tracer through the soil profile, preventing determination of an accurate half-life. Residues of the parent and metabolites were measured in monitoring wells.

Recommendation: EM-Unaccepted because it is not appropriate for half-life determination because of significant movement of pesticide mass below the deepest sampled depth.

Norflurazon TFD Half-Life

163 days – Occupies the first position in both Appendix 2 and the USDA database and it is the only entry in the USDA database. The USDA citation is Sando Agro with indication that the study was conducted in Mississippi on a cotton crop. This description corresponds to a submitted study in data Volume 356-115 with registration record number 163189. This study was conducted in Greensville, MS on a Silt Loam soil with application at 4 lbs a.i./acre applied to a cotton crop. The 163-day value was reported by the registrant in Volume 356-115 on page 16 of report #9.

Soil sampling was conducted until 601 days after application but the study report is lacking with respect to complete reporting, e.g. soil data is only given for the 0 to 12-inch depth with the texture given as a Silt Loam. Calculation of the amount of norflurazon recovered is given for each sampled depth and the calculation appears correct. The pattern of dissipation does not exhibit an unusual increase noted in the other studies. Regression of the amount recovered per 30-cm depth core, as reported in Table VI on page 28, against time produces a slope of –0.00157 and a half-life of 443 days.

Recommendation: EM-Accepted and the half-life value at **443 days** entered into the PestChem database.

33 days – Occupies the second position in Appendix 2. This value corresponds to a DPR accepted value of 33.4 days from data Volume 356-0060 with registration record 73729. This study was conducted on a Sandy Loam soil with OM at 1% and application rate at 2.0 lbs a.i./acre in Kerman, CA under vineyard crop condition. The registrant noted an unusual increase in concentration during the study where the concentration at day 186 was 0.052 ppm and then 0.916 at day 277. The registrant provided analysis from day 0 to 186 (8 sampling dates) and then from day 277 to 547 (3 sampling dates). The analysis was conducted on parent plus the breakdown product so it was for total residue and they indicated a half-life of 27 days for 0 to 186 days and 121 days for 277 to 547. A second application was suspected for the rise in concentration. A recalculation of norflurazon data indicated half-lives of; 151 days for all data; 33 days for the first 8 sampling intervals; and 87 days for the last 3 sampling intervals. R-square for all data is 0.39 compared to an r-Square of 0.99 for the analysis from 0 to 180 days. According to the criteria of meeting 2 ½ half-lives within a 180-day study, the study is considered accepted.

Recommendation: **DPR-Approved value** and the half-life value for all data is **33 days**.

180 days – Occupies the third position in Appendix 2. The value corresponds to a DPR accepted value of 180 days from data Volume 356-0062 with registration record 85464. This study was conducted on a Sandy Loam soil with OM at 1.2% and application rate at 1.50 lbs a.i./acre in Donalsonville, GA under peanut crop condition. Data for this and the next entry at 304 days are from same study, but calculated for different portions of the sampling data. This value was calculated for the 0-10 cm soil depth.

Recommendation: Do not use this value because it was derived from censored data.

304 days – Occupies the fourth position in Appendix 2. The value corresponds to a DPR accepted study from Volume 356-0062 with registration record 85464. This is the same data as for the 180-day entry and reflects a recalculation of the recovery from the 0-40 cm depth of soil. The Registrant pointed out that the first month's data appeared low, especially in light of a large increase noted at day 60. They provided another analysis excluding days 1, 15, and 30 and reported a half-life of 169 days. The data point at 120 days was approximately twice the magnitude for the values measured at 0 and 1 day sampling intervals: 14.4 kg/ha vs 3.0 and 8.4 kg/ha respectively. The humped pattern does not reflect an exponential decay and could be

indicative of additional applications. Recalculation starting at day 120 gives a half-life of 149 days. The total sampling interval from day 120 was 427 days, which is greater than the 180-day guideline.

Recommendation: **DPR-Approved value** and the recalculated value is **149 days,** which was derived from the censored data starting at the 120-day sampling interval.

Additional References

Volume 356-0112. This study was not reviewed. The study was conducted in Alfred, FL on Fine Sandy soils with application rate at 8.0 lbs a.i./acre in a citrus crop. Sampling was conducted until 574 days and the residues indicate stability. The registrant conducted analysis on total residue for parent plus degradation product and reported essentially no degradation and ascribing this result to variability. The data indicate stability and recalculation of all data for only the parent provides an estimate of 920 days. The value at day 120 appears lower than the rest. Exclusion of this value increases the R-square from 0.42 to 0.67 and gives a half-life value of 835 days.

Recommendation: EM-Accepted with a half-life of **835 days** where the value at 120 days is excluded from the analysis.

Volume 356-0059 recorded as record number 72281. This study was not accepted with the following reasons: it lacked a storage stability study and rainfall data; only 2 lbs a.i./acre was applied; and the shape of response curve did reflect an exponential decay. A rebuttal letter pointed out that daily rainfall data was submitted. The application rate is a normal use rate, so it should be acceptable, and norflurazon is known to be stable under the storage conditions. The shape of the response curve is problematic in that concentration increases at 30 and 60 days after application with a peak at 120 days after application. Use of all data gives basically a flat line and a censored value for 60 day on out sampling intervals produces an estimate of 149 days.

Recommendation. Do not use this study is **EM-Unaccepted.** The study is not acceptable because the data are too variable to determine a degradation curve.

Prometon TFD ½ Life

Prometon is a 6800(A) listed pesticide, which means that residues have been detected in California's ground water due to legal agricultural use. Prometon also is a pre-emergence herbicide but it historically has been registered for noncrop/roadside use. This type of use indicates that movement of prometon to ground water was most likely as dissolved residue in runoff water generated from rain events and where the runoff water has been collected into areas that provide direct movement to ground water. The Monte Carlo modeling approach (Troiano and Clayton, 2004) has been used to study the effects of irrigation water on downward movement of pesticides directly from the site of application so it may not be appropriate to add prometon to the modeling procedure: the magnitude of the concentrations in wells could differ depending on the pathway to ground water. The submitted TFD studies are reviewed in order to assure the accuracy of values in the PestChem database. Values in the USDA database are also reviewed to determine the independence of those reported values.

Volumes 50170-028 and 029 could not be located but the titles indicate that studies conducted in Fresno, CA and Columbia, NY, respectively. These could be initial reports of the studies in 030 and 031, which are evaluated below.

Volume 50170-0030 recorded as registration record number 51029 – This is a DPR approved TFD study. The PestChem database has 6 values entered from this single study. The study was initiated in 1976 and conducted on a Sandy Loam soil in Fresno, California. The condition was bare ground. The six values reflect 6 different soil application treatments. They were:

1. 1x – Paramitol 25E applied at 10 lbs a.i./acre.
2. 2x – Paramitol 25E applied at 20 lbs a.i./acre.
3. 1x with two annual applications - The 10 lb rate was applied in two consecutive years
4. 2x with two annual applications - The 20 lb rate was applied in two consecutive years
5. 1x with three annual applications - The 10 lb rate was applied in three consecutive years
6. 2x with three annual applications - The 20 lb rate was applied in three consecutive years

The six TFD values in the PestChem database were derived from these six treatments and, thus, they are not from independent studies conducted at different temporal or spatial locations. Furthermore, only the 1x treatment did not appear to have significant residues at the deepest sampled soil depth: all other treatments lack from potential loss of residues past the lowest sampled depth. The 1x treatment sampling lasted for 1092 days. The concentrations reached an asymptote where concentrations were similar between sampled days 370 and 518. Values were reported below the MDL at day 958. The value was recalculated for the sampling interval until day 370 where the asymptote was initiated and the recalculated half-life is 307 days. There appeared to be problems with the targeted rates of application. Based on a soil bulk density value of 1.4 g/cc, soil concentration at the 1x and 2x rates of application should have been approximately 5.3 and 10.5 ppm, respectively. The values after application were 2.1 and 3.9 ppm for 1x and 2x, respectively. Thus, the first year application rate appeared lower than the targeted rate, however, the later years appeared closer to the targeted values.

Recommendation: The only valid value is from the 1x treatment and the recalculated value is **307 days** that was calculated for data until day 370 where the asymptote was initiated.

Volume 50170-0031 recorded as registration record numbers 51030 and 51031 – This report contains two additional studies that were conducted exactly as reported in the previous discussion of registration record number 51029 and that were indicated as DPR approved. The study in 51030 was conducted in Columbia, New York on a Silt Loam soil and the one in record number 51031 was conducted in York, Nebraska on a Silt Loam soil. The targeted application rates were 10 and 20 lbs a.i./acre and again the application rates over the years appeared inconsistent. For both studies, the first

year application rates were close to the targeted rates but the soil concentrations in the 2 and 3rd years were 2 to 3 times greater than the targeted rate. Movement of residues below the lowest sampled depth at both sites was another potential problem, especially for the second and third years of the multiple application treatments. For the study conducted in Columbia, NY (51030), the response appeared asymptotic for the single applications with the asymptotes appearing within 1 year of the application when the concentration was around 50% of the initial values. Analysis of the data from day 0 to 365 provides a half-life value of 333 days. For the study conducted in York, NE (51031), a hump was observed in the decay curve in the first year for both the 1x and 2x treatments at sampling day 365. Censoring the curve by starting at day 365 resulted in half-life estimates of 1319 and 2728 days for the 1x and 2x treatments.

Recommendation: The two studies in data Volume 50170-0030 were approved and the values for the 1x treatment should be entered into the PestChem database and they are **333 days** for registration record 51030 and **1319 days** for registration record 51031.

The USDA database contains 12 TFD values. As indicated previously many of the values reflect data from studies submitted to DPR for registration.

309 days - Occupies the first position in the USDA database. The associated reference indicates that Ciba Geigy, 1989, submitted the data and that the study was conducted in California on a Sandy Loam soil. This corresponds to the study in registration record 51029. On page 192 of the submitted data volume, the 309-day value is reported as the average of all of the six treatments, where the treatments are described above.

Recommendation. Do not use it is a duplicate of record 51029. Since this value is an average of six different treatments it should not be considered reflective of a single study and single set of study conditions.

938 days - Occupies the second position in the USDA database. The associated reference indicates that Ciba Geigy, 1989, submitted the data and that the study was conducted in Nebraska on a Silt Loam soil. This corresponds to the study in registration record 51031. On page 526 of the submitted data volume, the 938-day value is reported as the average of all of the six treatments, where the treatments are described above. This average appears to be in error. The exact same values are reported for record 51030 on page 353 for the New York study. A recalculation of the average for the six values reported in record 51031, the Nebraska study, gives 1026 days. So the number appears to have come from the registration package but there was a transcription error in the reported the value.

Recommendation. Do not use it is a duplicate of record 51031. Since this value is an average of six different treatments it should not be considered reflective of a single study and single set of study conditions.

789 days - Occupies the third position in the USDA database. The associated reference indicates that Ciba Geigy, 1989, submitted the data and that the study was conducted in New York on a Silt Loam soil. Theoretically, this corresponds to registration record 51030 and the value should agree with the registrant's summary sheet on page 353 of the data volume. The reported value is 938 days and corresponds with the

average of all six treatments, where the treatments are described above. It is unclear where the 789-day value originates.

Recommendation. Do not use it is a duplicate of record 51030. Since this value is an average of six different treatments it should not be considered reflective of a single study and single set of study conditions.

459-1123 days – Occupies the fourth position in the USDA database. The reference is the U.S. Environmental Protection Agency (1984) ground water data call in files, Office of Pesticide Programs, Environmental Fate and Effects Div., Wash., DC. The value apparently is just a summary of the range in values reported in positions seven and eight in the USDA database, which are duplicate values from data volumes submitted to DPR.

Recommendation. Do not use Duplicate of data submitted to DPR.

>365 days - Occupies the fifth position in the USDA database. The reference is the U.S. Environmental Protection Agency (1984) ground water data call in files, Office of pesticide programs, Environmental Fate and Effects Div., Wash., DC. There is no discernable reference.

Recommendation. Do not use because the reference is unknown.

531-2058 days – Occupies the sixth position in the USDA database. The reference is the U.S. Environmental Protection Agency (1984) ground water data call in files, Office of Pesticide Programs, Environmental Fate and Effects Div., Wash., DC. This range reflects the range in values noted for the six treatments in the Columbia, New York study submitted in registration record 51030. The range in values is on page 353 and reported as the unchanged values.

Recommendation. Do not use because it is a duplicate of data submitted to DPR.

1123 days – Occupies the seventh position in the USDA database with reference to the EPA database but also with reference to Nebraska. This most likely corresponds to registration record 51031. On page 526 the registration report, the average of the unchanged values is given at 1041. This is in error and should be 1123 days. So the value in the USDA database is the average of the six unchanged values reported by the registrant.

Recommendation. Do not use because it is a duplicate of record 51031. Since this value is an average of six different treatments it should not be considered reflective of a single study and single set of study conditions

459 days – Occupies the eighth position in the USDA database with reference to the EPA database but also with reference to California. This most likely corresponds to registration record 51029. On page 526 the registration report, the average of the unchanged values is given at 549 days. So the value in the USDA database is the average of the unchanged value reported by the registrant in the submitted data volume.

Recommendation. Do not use because it is a duplicate of record 51029. Since this value is an average of six different treatments it should not be considered reflective of a single study and single set of study conditions

300-1000 days – Occupies the ninth position in the USDA database. The associated reference indicates that the data were submitted by Ciba Geigy, 1989. The reference is unknown.
Recommendation. Do not use because the reference is unknown.

264 days – Occupies the tenth position in the USDA database. The associated reference indicates that the data were submitted by Ciba Geigy, 1989. The reference is unknown. The value matches a value reported on the summary page of record 51029 but this could be serendipity.
Recommendation. Do not use because the reference is unknown.

3084 days - Occupies the eleventh position in the USDA database. The associated reference indicates that the data were submitted by Ciba Geigy, 1989. The reference is unknown and there is no match in the DPR volumes.
Recommendation. Do not use because the reference is unknown.

1300* days - Occupies the eleventh position in the USDA database. The associated reference indicates that the data were submitted by Ciba Geigy, 1989. The reference is unknown and there is no match in the DPR volumes.
Recommendation. Do not use because the reference is unknown

Simazine TFD Half-Life

Most of the USDA reported half-lives corresponded to studies submitted to DPR. Studies submitted to DPR are in registration record numbers 50876, 50877, and 71428. The study in 50876 in data Volume 213-0055 was conducted on a (clay) loam soil in Oregon both in a raspberry crop and bare soil condition. The study in 50877 in data Volume 213-0055 was conducted on a sandy soil in Florida both in a citrus crop and bare soil condition. The study in 71428 in data Volume 213-0074 was originally unaccepted in a memo from Tom Leffingwell but then a memo superceding this decision was in data Volume 213-0090. Two additional TFD studies were submitted in data Volume 213-054 but the volume has been located. This volume contains registration record numbers 50976, a dissipation study on corn, and 50977, another citrus study or explanation of the previous study. The registrant has provided electronic scanned copies of these reports and they have been given registration record numbers 243279 and 243280, respectively, and in data Volume 213-0173.

26 days – Occupies the first position in both Appendix 2 and the USDA database. The USDA citation is Ciba-Geigy, 1989. Test area information states that the study was conducted in Florida on a Sandy soil and that study was conducted on cropped soil. This most likely is a duplicate of the study submitted in 50877, which was not accepted and not entered into the PestChem database. The study appears to have been

conducted at the same time as 50977. The relationship between these studies is unclear.

Recommendation: Do not use this value because it is a duplicate of a DPR submission that was rejected.

87 days – Occupies the second position in both Appendix 2 and the USDA database. The USDA citation is Ciba-Geigy, 1989. Test area information states that the study was conducted in Florida on a Sandy soil and that study was conducted on bare soil. This most likely is a duplicate of the study submitted in 50877, which was not accepted and not entered into the PestChem database. The study appears to have been conducted at the same time as 50977. The relationship between these studies is unclear.

Recommendation: Do not use this value because it is a duplicate of a DPR submission that was rejected.

125 days – Occupies the third position in both Appendix 2 and the USDA database. The USDA citation is Ciba-Geigy 1989. Test area information states that the study was conducted in Oregon on a Loam soil and that study was conducted on bare soil. This most likely is a duplicate of the study submitted in 50876.

Recommendation: Do not use this value because it is a duplicate of a study in the DPR database.

369 days – Occupies the fourth citation in Appendix 2 and most likely corresponds to the fourth citation of 69 days in the USDA database. The USDA citation is Ciba-Geigy 1989. Test area information states that the study was conducted in Missouri on a Loam soil and that study was conducted on cropped soil. This is a duplicate of the study submitted in 50976, which has not yet been entered into the DPR PestChem database. If one compares the ordering between the lists, the 369-value is logically a typo made during data entry. The registrant e-mailed a copy of the submitted report, which was given Volume number 213-0173 and registration record number 243279. The copy is more complete than the original on file in volume 213-0054 because the title of the original report of that report indicated that the study was a "Six Month Field Dissipation Study….". The submitted report contains tables where soil sampling was longer at 544 days after application. Re-calculation of all the data gives a half-life value of 121 days and an R-Square of regression at 0.71.

Recommendation: EM-Accepted and the recalculated value of **121 days** entered into the PestChem database as noted for a cropped soil condition.

55 days – Occupies the fifth position in both Appendix 2 and the USDA database. The USDA citation is Ciba-Geigy,1989. Test area information states that the study was conducted in Missouri on a Loam soil on bare ground condition. This is a duplicate of the study originally submitted in 50976 and now is in data Volume 213-0173 with registration record number 243279. This data has not yet been entered into the DPR PestChem database. Re-calculation of all the data gives a half-life value of 93 days and an R-Square of regression at 0.89.

Recommendation: EM-Accepted and the recalculated value of **93 days** entered into the PestChem database as noted for a bare ground condition.

186 days - Occupies the sixth position in both Appendix 2 and the USDA database. The USDA citation is Ciba-Geigy, 1989. Test area information states that the study was conducted in Minnesota on a Loam soil and that study was conducted on bare soil. A submitted study conducted in Minnesota has not been located.

Recommendation. Do not use because there is no known citation for this value so this value should not be used unless a report can be located and reviewed.

44 days – Occupies the seventh position in both Appendix 2 and the USDA database. The USDA citation is Ciba-Geigy, 1989. Test area information states that the study was conducted in Florida and that study was conducted on bare, sandy soil. This probably is a duplicate of the study submitted in 50977. The registrant e-mailed a copy of the submitted report, which is in Volume 213-0173 with registration record number 243280. The copy is more complete than the original on file in volume 213-0054 because the title of the report on file indicated that the study was a "Six Month Field Dissipation Study….": The e-mailed report contains tables where soil sampling was longer at 548 days after application. Data for the last two sampling intervals at 365 and 548 days after application were non-detected. In accordance with the EM-guidance, the calculation excluded day 548 and included day 365 with ½ the reporting limit assigned as the value. The re-calculation indicated a half-life of 46 days.

Recommendation: EM-Accepted and the recalculated value of **47 days** entered into the PestChem database as noted for a bare ground condition.

119 days – Occupies the eighth position in Appendix 2 but the ninth position in the USDA list. The USDA citation is Ciba-Geigy 1989. Test area information states that the study was conducted in Oregon on a Loam soil and that study was conducted on cropped soil. This most likely is a duplicate of the study submitted in data Volume 213-0055 with registration record 50876.

Recommendation: Do not use this value because it is a duplicate of a study in the DPR database.

33 days – Occupies the ninth position in Appendix 2 and the tenth position in the USDA database. The USDA citation is Ciba-Geigy 1989. Test area information states that the study was conducted in Florida and that study was conducted on a cropped, sandy soil. This most likely is a duplicate of the study submitted in Volume 213-0054 with registration record 50977. The registrant e-mailed a copy of the submitted report, which is in Volume 213-0173 with registration record number 243280. The copy is more complete than the original on file in volume 213-0054 because the title of the report on file indicates that the study is a "Six Month Field Dissipation Study….": The e-mailed report contains tables where soil sampling was longer at 548 days after application. Data for the last two sampling intervals at 366 and 549 days after application were non-detected. In accordance with the EM-guidance, the calculation

excluded day 549 and included day 366 with ½ the reporting limit assigned as the value. The re-calculation indicated a half-life of 36 days.

Recommendation: EM-Accepted and the recalculated value of **36 days** entered into the PestChem database as noted for a cropped soil condition.

89 days – Occupies the tenth position in Appendix 2 and the eleventh position in USDA list with the range noted as '89 (26-186)*'. The USDA denotes that "* denotes a selected value where multiple values of a property are listed". The mean of the range is 106, which does not exactly match, but 89 could be the median or mode of all values.

Recommendation: Do not use this value because it is derived from other observations.

84 days – Occupies the eleventh position in Appendix 2 and corresponds to a DPR accepted value of 84 days in the PestChem database from data Volume 213-0055 with registration record 50876. The study was conducted on a cropped, loamy soil in Oregon. The study duration was 180 days. The recalculated value was 85 days. According to the EM guidance this study duration of 180 days was not long enough because the half-life estimate of 84 days was shorter than 2 ½ half-lives.

Recommendation. Do not use this study is **EM-Unaccepted.**

9 days – Occupies the twelfth position in Appendix 2 and corresponds to a DPR accepted study from data Volume 213-0055 with registration record 50876. The study was conducted in Oregon on a bare soil. The entry is a typo from the PestChem data sheets and the entry should be 91 days. The recalculated value was 97 days. According to the EM guidance this study duration of 180 days was not long enough because the half-life estimate of 97 days was shorter than 2 ½ half-lives.

Recommendation. Do not use this study is **EM-Unaccepted**.

144 days – Occupies the thirteenth position in Appendix 2. Not sure as to the source but there was an entry for the California TFD study in Volume 213-0074 with registration record 71428. That entry was at 149 days and this matches the eighth entry in the USDA database. The test area information in the USDA database stated that the study was conducted in California on a Sandy Loam, bare soil condition, which matches the test area in 71428. The USDA value is most likely is a duplicate of the study submitted in 71428. The 144-day value may be a typo since this position in the Appendix 2 list usually occupied data from the PestChem database. The 149-day value in the PestChem database was for the 0-6 inch soil depth so it is not inclusive of all residues. Another entry at 244 days in the PestChem database was for the entire sampled soil column but for some reason it was labeled as not accepted.

Recommendation: DPR-Approved value and the recalculated value is **153 days**.

ANALYSIS OF Koc VALUES

As observed for the TFD analysis, values reported in the USDA database that were derived from DPR's PestChem database could be identified based on the reference and on the supplemental soil data. The only data entered into the USDA database for bromacil and diuron were from DPR's PestChem database. As for the TFD analysis, many of the USDA values were averaged or summarized from numerous referenced sources. In some cases, review of the referenced studies provided numerous Koc values with accompanying soil data. Thus, in contrast to the TFD analysis where the number of values for each pesticide was generally decreased, the number of Koc values for each 6800(a) listed pesticide was increased. The list of EM-approved values with the accompanying general soil type is in Table 4. A more complete database for the soil properties is available upon request. When sand and clay percentages were reported, soil texture was recalculated from reported texture values using a calculator developed by the New Mexico Climate Center and available at: (http://weather.nmsu.edu/Teaching_Material/soil456/soilwater.html).

Atrazine Koc Values

148 – First position in both USDA and Appendix 2. The reference is to Kenaga, 1980 where the value is actually 149. This reference further cites Kenaga and Goring, 1980 as the source. In that reference, the Koc value was compiled from 8 other sources. Reference numbers 28, 63, 64, and 203 are reviewed below in discussion of the CREAMS manual and Rao and Davidson, 1982 citations. The following reviews the remaining atrazine references in Kenaga and Goring, 1980:

Ref (4) in Kenaga and Goring, 1980 is Hamaker and Thompson, 1972. This reference contains two tables of values with accompanying citations in each Table. The citations with reference numbers 54, 56, 57, 59, 60, 84, 85, and 86 are reviewed below in discussion of the CREAMS manual and the Rao and Davidson, 1982 citations. The following reviews the remaining reference numbers in Hamaker and Thompson, 1972, which is indicated as Ref (4).

Ref (4)-#21 Hayes et al, 1968. As the title indicates adsorption to organic matter was the objective and the OC content of two soils wasa extremely high at nearly 50%..
Recommendation: Do not use because of extremely high organic matter contents of tested soil.

Ref (4)-#58 Fusi and Corsi, 1968. Soil matrix was not tested.
Recommendation: Do not use because soil matrix was not tested

Ref (4)-#78 Nearpass, 1967. The study measured adsorption of atrazine and simazine on a Bayboro clay soil. Effects of soil to water ratio and various cation exchange surfaces were measured. Although the soil data is good the specific water to solution concentrations or amounts of soil and water used

were not specified. Upon recalculation of the Kd values using a hypothetical amount of soil, water, and pesticide added, the Kd values for simazine appeared wrong in Table 2 for the no treatment condition. For example, the reported value for simazine at the 2:1 ratio was 78 but a recalculation indicated the value should have been 98. A check at the 5:1 ratio also indicated that the reported Kd value of 88 should have been 95. The data for atrazine was correct in that at the 2:1 ratio the reported Kd was 19 and a recalculation was 18 and at the 5:1 ratio both values were 14. The resulting Koc values are rather large and do not agree with previous values.

Recommendation – Do not use because lack of experimental study conditions does not allow for a critical review. Also, errors in the reported Kd values place the calculations in question.

Ref (4)-#81 Hilton and Yuen, 1963 –The study was conducted on Hawaiian soils. In general, a water to soil ratio of 2:1 was used at one concentration. The usefulness of the study is limited because soil data were not included and where as noted in Table 4 organic carbon data were not available.

Recommendation: Do not use due to lack of soil data and because the Hawaiian conditions have little relation to California.

Ref (4)-#83 Walker and Cawford, 1968 – Radiolabelled study for adsorption of atrazine, propazine, prometon(e), and prometryne to 36 British soils. The objective was study adsorption over a broad range of OC content in soil. Only clay content, OC, CEC, and pH reported for each soil. Initial concentration for atrazine was 150 umoles/liter. Water to soil ratio varied because 25 ml of solution used but soil weight varied from 2 to 5 g for a range of 12.5:1 to 5:1. Results reported as Kd

Recommendation – EM-Accepted and 36 values added to Table 4.

Ref (24) in Kenaga and Goring, 1980 is Brown, D, USEPA is a personal communication.

Recommendation - Do not use reference because there is no data associated with the personal communication.

Ref (130) (in Kenaga and Goring, 1980) Farmer, 1976. A compilation of references.

Recommendation - Do not use because it is a compilation of data and not original research.

Ref (183) in Kenaga and Goring, 1980 is Scott and Phillips, 1972: Identified in the CREAMS manual as reference 60. The study used radiolabeled active ingredients and tested 9 different herbicides. Oddly, atrazine and prometon were included but the USDA reference was only cited for simazine. The authors indicated that they used the procedure in Talbert and Fletchall, 1965 to calculate Kd values. The calculated Koc value for atrazine is 62.

Recommendation: EM-Accepted and 1 value added to the database**.**

Overall Recommendation for Kenaga, 1980 – **Do not use** the value in Kenaga, 1980 because it refers to a further reference of Kenaga and Goring, 1980 and these are compiled values.

288 and 174 – Occupy the second and twelfth position, respectively, on both lists. The values are from the same USDA reference, which is Gerstl and Helling, 1987. Data were collected from the literature for numerous pesticide active ingredients but no citations were given as to their source. The 174-value was the raw input data used to derive regression equations and the 288-value was a predicted value based on the derived regression.

Recommendation – Do not use these values because the value is from multiple sources and there are no associated citations for the values. The two values are redundant.

214 – Third position on both lists. The USDA reference is Brown and Flagg, 1981 where sediment was obtained from a pond in Georgia. Soil data were not given so the derivation of the Koc value cannot be confirmed. The value in Table 1 was 216.

Recommendation – Do not use this citation because of incomplete reporting of soil data and experimental conditions.

149 – Fourth position on both lists. The USDA reference is Green and Karickoff, 1990. This value is one of four single values that are given with further references in an Appendix on page 15 of the first chapter written by the authors. The reference for the 149 value is Kenaga and Goring, 1980. The recommendation for this reference was previously given for the first value on this list (148).

Recommendation: Do not use because it is a multiple reference from Kenaga and Goring, 1980 and duplicates the first value of 148.

163 – Fifth position on both lists. The USDA reference is Green and Karickoff, 1990. This value is one of four single values that are given with further references in an Appendix on page 15. The reference for this value is Rao and Davidson, 1980 and the value is from Table 1. This value is derived from 56 individual observations with a further reference to a Rao and Davidson EPA report that was eventually published as Rao and Davidson, 1982. Table A3 in Appendix A of the 1982 report contains 56 values with a citation for each value. The 56 values were derived from 10 citations. The following reviews each citation in Rao and Davidson, 1982:

Ref (7) Grover and Hance, 1969: Atrazine adsorption measured on one soil using radiolabeled C^{14} at one concentration. The authors reported %OC for the Begbroke soil as 1.93. In Table A3 in Rao and Davidson, 1982, however, this value was further multiplied by the 0.58 %OM conversion factor. Since the value was reported as %OC in another article, Grover and Hance, 1970, one must assume that the value is %OC. The correction in Table A3 is most likely in error and the Koc value should be 51.81.

Recommendation: EM-Accepted and 1 value with soil data added to Table 4, but the %OC error should be corrected and the Koc value reported **as 52 and not 90.0.**

Ref (11) Talbert and Fletchall, 1965 – Atrazine adsorption was measured on 25 Missouri soils using radiolabeled C^{14} where one initial concentration at 2.2 ppm was used. The soil properties and Kd values are given in Table 1 on page 48. The soil textures were not indexed exactly as noted in the current NRCS soils triangle available at:
http://soils.usda.gov/technical/aids/investigations/texture/
For example, the first soil is noted as a Putnam s.l., which would indicate a sandy loam but when the percent sand and clay are entered into the soil texture calculator the soil is classified as a silty loam, which should be noted as SiL. These inaccuracies were transposed from the article to the compiled Appendix Table A3 in Rao and Davidson, 1982. Koc values and corrected textures are given in Table 4. In addition, one of the soils in Table A3, Baxter csl, was incorrectly referenced as from #22 but this reference contains data on 1,2-D. The Baxter soil is from the Talbert and Fletchall reference, which was Ref (11).
Recommendation: EM-Accepted and 25 values with soils data added to Table 4.

Ref (13) Harris, 1966: Atrazine adsorption measured on 4 Maryland soils using radiolabeled C^{14} where 4 unspecified initial concentrations were used. Kd values are reported in Table 3 on page 7.
Recommendation: EM-Accepted and 4 values with soils data added to Table 4.

Ref (16) Colbert et al., 1975: Atrazine adsorption was measured on 10 soils at one initial concentration of 20 ppm where 200 ug radiolabeled C^{14} atrazine added in 10 ml of water to 5 g air-dried soil. Amount sorbed per ug/g reported in Table 1. An example of the derivation of Kd for the Chehalis soil is:

1. 11.7 ug/g sorbed equals (200-(11.7*5))/10= 14.15 ug/ml
2. Kd = 11.7/14.15 = 0.83.

Entries were correct in Table A3 in Rao and Davidson. Eight of the ten soils were reported – the two with highest pH at 8.5 9.6 were not included, perhaps deemed not representative.
Recommendation: EM-Accepted and 10 values added to Table 4.

Ref (19) **Dao and Lavy, 1978**: Atrazine adsorption was measured on 4 Sandhills Nebraska soils. Adsorption measured using radiolabeled C^{14} atrazine added in 10 ml of water at 0.5, 1.5, 3.0, 4.5, 6.0, and 15 ppmw to 2 g soil (5:1 ratio). Ratio 0.4:1 also studied. Amount sorbed vs solution equilibrium concentrations reported in Table 2.
Recommendation: EM-Accepted and 4 values with soils data added to Table 4.

Ref (25) McGlamery and Slife, 1966: Effect of pH adjustment on one soil investigated. Adsorption was measured using radiolabeled C^{14} atrazine added in

20 ml of water at 0.375, 0.75, 1.5, 5.0, 10.0, 20, and 40 ppm to12 g soil (20:1 ratio). Adsorption was compared at 5 different temperatures. Table A3 contains the data at 20 C but for all of the pH treatments. Only the value reported for natural soil at pH 6.0 and at 20 C will be retained.

Recommendation: EM-Accepted and 1 value with soils data added to Table 4.

Ref (29) Hance, 1967: Rather esoteric adsorbents used. Two English soils with very little data and very little relation to California conditions.

Recommendation: Do not use this citation because the test conditions have little relationship to California use conditions.

Ref (38) Obien and Green, 1969 and Green and Obien, 1969: Radio-labelled study on 4 Hawaiian soils. Again the soil properties are rather esoteric with little relation to California conditions.

Recommendation: Do not use this citation because the test conditions have little relationship to California use conditions.

Ref (42) Rao and Davidson, 1979: Radio-labelled study on 3 Florida soils using 5 or 10 g of soil added to 10 ml of pesticide solution. Concentrations not specified.

Recommendation: EM-Accepted and 3 values with soils data added to Table 4.

111 – Occupies the sixth position on both lists. The USDA reference is Green and Karickoff, 1990. Four single values with references are given in an Appendix on page 15 of the first chapter written by the authors. The reference for this value is Rao et al., 1984. The report is no longer available through the EPA document download. It is unclear as to the extent to which the previous value of 163 associated with Rao and Davidson, 1982 was modified or to the overlap in citations between these publications.

Recommendation: Do not use because it is a further modification of the original Rao and Davidson estimate, which was derived from numerous sources.

170 – Occupies the seventh position on both lists. The USDA reference is 8ABACA but there is no corresponding citation. The closest is 8AOAA, which is McCall et al. (1980) and this citation has not yet been retrieved.

Recommendation: Do not use because the citation has not yet been reviewed**.**

163 – Eighth position on both lists. The USDA reference is Rao and Davidson, 1980 and it is redundant to the discussion of the 163 value in the fifth position.

Recommendation: Do not use because it is a duplicate value.

160 – Ninth position on both lists. The USDA reference is to Jury et al., 1987 where, as noted before, three citations are further referenced. One of the citations is to Jury et al., 1984 where Table 1 contains a further reference to Rao and Davidson, 1980. This value is then the same value as the previous value in the eighth position, just rounded.

Recommendation: Do not use this citation because it is a duplicate value.

127 – Tenth position on both lists. The USDA reference is to the CREAMS manual (Knisel, 1980) where Table 1 on page 611 contains average Koc values for some active ingredients but with individual citations. References numbered 14, 20, 28, and 31 were previously reviewed for Rao and Davidson, 1982, The remaining recommendations for each citation are:

Ref (3) Armstrong and Chesters, 1968: The study was a radiolabel study but the study was long-term with adsorption measured between a 56 and 67-day period.
Recommendation: Do not use because the study does not conform to a short-term batch study.

Ref (17) Grover, 1973: The article tests 2,4-D and not atrazine so the listing is in error.
Recommendation: Do not use this citation because it was listed in error.

Ref (21) Grover and Hance, 1970: Atrazine adsorption on one soil compared between two soil:water ratios of 1:10 and 4:1. Five concentrations ranging from 0.5 to 5 ppm used for 1:10 and from 5 to 20 pm for the 4:1 ratio. The same soil was used as in Grover and Hance, 1969.
Recommendation: EM-Accepted and 1 value with soils data added to Table 4.

Ref (33) Harris, C.I, and G.G. Warren, 1964. Agricultural soils were not tested, instead bentonite, muck soil, and anion and cation exchange resins were used as adsorbants.
Recommendation: Do not use this citation because the test conditions have little relationship to California use conditions.

Ref (58) Rhodes et al., 1970: Also noted as Rao (10) but the reference does not include atrazine as a test chemical.
Recommendation: Do not use this citation because it was listed in error.

Ref (63) Swanson and Dutt, 1973: Radio-labelled study on 2 soils. Oddity is that the concentrations were 0, 5, 10, 15, 20, and 25 ppm on soil weight basis. Recalculation of soil texture indicated that the Mohave was indicated as a sandy loam but should be noted as loamy sand.
Recommendation: EM-Accepted and 2 values with soils data added to Table 4.

Ref (72) Wildung, 1968: The article tests chloramben and not atrazine so the listing is in error.
Recommendation: Do not use this citation because it was listed in error.

Ref (74) Yamane and Green, 1972: Adorption tested on Hawaiian soils. No soils properties given.
Recommendation: Do not use this citation because the test conditions have little relationship to California use conditions and data are missing for soils.

107 – Occupies the eleventh position on both lists. The USDA reference is Gustafson, 1989. As previously reviewed, the data from that citation were taken from Wilkerson and Kim, 1986 where values were derived from the initial PestChem database.

Recommendation: Do not use this citation because the data are averaged from an early version of the PestChem database.

174 – Twelfth position on both lists – see the discussion of the value in the second position at 288.

Recommendation: **Do not use** this value because it is redundant.

88, 38, 72, 157 – Occupying the thirteenth through sixteenth positions on both lists. The USDA reference is Ciba-Geigy Corporation, 1989. These values appear to be redundant to the last four values on the list but they do not match the order of insertion. The last 8 values are from accepted studies from the PestChem database. Oddly the last four values in the list lack a reference to Ciba-Geigy whereas the 88 through 157 values contain the Ciba-Geigy reference.

Recommendation: Do not use these values because they are to be redundant of values taken from the PestChem database.

102 – Occupies the seventeenth position on both lists. The USDA reference is Green and Karickoff, 1990. Single values with references are given in an Appendix on page 15 of the first chapter written by the authors. The reference for this value is Hamaker and Thompson, 1972 that is described in Table 4 on page 81. The Hamaker and Thompson, 1972 reference was reviewed for the first value (148) where it was a subreference from Kenaga and Goring, 1980.

Recommendation: Do not use because it is a redundant value.

90 through 70 – Occupying the final eight positions on both lists. The reference for the first four is noted as Ciba-Geigy Corporation, 1989 but as indicated above the last four do not have a reference. These data have accompanying soil information, which identifies the first four values from registration record 50818 in Volume 220-0083 and the last four values from registration record 87580 in Volume 220-0124. Radio-labelled study where 20 ml of atrazine at 0, 0.2,0 .5, 1.0, and 5.0 ug/ml (ppm) was added to 4 gram soil for a 5:1 water to soil ratio.

Recommendation: DPR-Approved values. Some slight difference in the recalculated Koc values to the reported ones are due to use of 1.7 by the registrant for division into the % OM value whereas for this evaluation the % OM value was multiplied by 0.58.

Bromacil Koc Values

12, 33, 2.3, 14 – First through fourth values on both lists are from the PestChem database and they are derived from registration record 69456 in Volume 210-0027. The Kd values were derived from soil leaching column study using radio-labelling of bromacil.

Recommendation: DPR-Approved values.

Additional references

Gerstl, Z., and B. Yaron. 1983; Adsorption studies conducted on 6 Israeli soils where radio-labelled active ingredient in 10 ml of 5 unspecified concentrations added to 3 to 6 g soil for bromacil.

Recommendation: Currently, EM-Unaccepted because the soil data were incomplete. Upon greater description of soil, the data could be upgraded.

Madhun et al., 1986; Adsorption studies conducted on 2 Oregon soils, one a mucky peat and the other a loamy sand. Five ml of radio-labelled Bromacil at 2, 5, 20, 50, 100, 500, 750, 1000, 2000, 3000 uM added to 1 g of soil and compared at 4 and 25 C.

Recommendation: EM-Accepted but only data for 25 C added to Table 4.

Rhodes et al., 1970; This reference provides the source for two values that when averaged are reported as either 71 or 72 in Hamaker and Thompson, 1972; Rao and Davidson, 1980 and 1982; Kenaga, 1980; Kenaga and Goring, 1980; Jury et al., 1984; Green and Karichoff, 1990 and perhaps others. The soil data is sparse but the two soils have been studied elsewhere so it may be possible to provide better information from another source.

Recommendation: EM-Accepted and two values added to the list.

Toiber-Yasur et al., 1999; Adsorption study conducted on one Israeli soil but at different depths. Kd determined by adding 8 ml of concentrations ranging from 9 to 320 ppm Bromacil to 4 g soil.

Recommendation: EM-Accepted but for consistency with the other studies only data from the first 0-10 cm added to Table 4.

Turin and Bowman, 1997; Radio-labelled study of adsorption of 3 herbicides on a Casa Grande sandy loam. One concentration used, which was 107 mg/L for bromacil and 10 of solution was added to 10 g of soil for a 1:1 water:soil ratio.

Recommendation: EM-Accepted and 1 value with soil data added to Table 4.

Kenaga and Goring, 1982; Reports a value of 72 from three sources.

Hamaker and Thompson, 1972: Circular reference for two values 19 and 123 that is back to Rhodes et al., 1970.

Haque, R. and W.R. Coshow. 1971. Study did not use soils.

Leistra and Frissel, 1975: Does not contain a report on a batch equilibrium study.

Overall recommendation: Do not use because the value is duplicative of previous Rhodes et al. 1970 value.

Diuron Koc Values

453, 418, 560, 476 - First through fourth values on both lists are from DPR's PestChem database and they are derived from registration record 48361 in Volume 106-0024. Radio-labelled study where 20 ml of diuron at 0, 0.2,0 .5, 1.0, 2.5, and 6.0 ug/ml (ppm) was added to 20 gram soil for a 1:1 water:soil ratio.

Recommendation: DPR-Approved values.

Additional References

Volume 396-0039 and 0049 registration records 48249 and 85277, respectively: These are the same study submitted for hexazinone registration. The submitted volumes were not approved because of reference to TLC methodology. Upon review, a radiolabeled batch adsorption study was included in the submission but not reviewed. The methodology was referenced as Rhodes, 1980, which was an approved method. The disapproval appears to be in error. Data are available for 25 soils and for diuron and terbacil.

Recommendation: EM-Accepted and 25 values added to Table 4.

Rao and Davidson, 1982 – Although this reference was cited for the other active ingredients, the compiled value of 382.6 was not cited in the USDA database. Seven sources of data were cited. The following reviews each citation in Rao and Davidson, 1982:

Ref (6) Liu et al, 170: Radiolabeled studies were conducted on 34 soils from Puerto Rico, which may have been the reason for not including this data. Individual values are given in Table A13. Some transcription errors were noted for the organic carbon values and one soil was classified incorrectly.

Recommendation: EM-Accepted and 34 values with soil data added to Table 4.

Ref (7) Grover and Hance, 1969: Previously reviewed for atrazine. Diuron adsorption measured on one soil using radiolabeled C^{14} at one concentration. The authors reported %OC for the Begbroke soil as 1.93. In Table A3 in Rao and Davidson, 1982, however, the OC values were mistaken for OM values and they were multiplied by the 0.58 conversion factor . The value for the soil was reported as %OC in another article, Grover and Hance, 1970, so one must assume that the value is %OC. The correction in Table A3 is most likely in error and the Koc value should be 51.81.

Recommendation: EM-Accepted and 1 value with soil data added to Table 4 but the %OC error should be corrected and the Koc value reported **as 140 and not 243.0.**

Ref (8) Hance, 1965: Adsorption of diuron and other ureas were measured on British soils. Adsorption was measured using 25 ml of five initial concentrations ranging mostly from 10 to 80 ppm added to 0.1 to 2 g soil. These are rather high water:soil ratios and a averaged ratio will be reported at 25:1 water:soil.

Recommendation: **EM-Accepted and 11 values** added to Table 4**.**

Ref (10) Rhodes et al., 1970: Previously reviewed for bromacil.
Recommendation: EM-Accepted and two values added to the list.

Ref (12) Harris and Sheets, 1965: Adsorption measured on 32 US soils where 5 ml of concentration at either 20 or 30 ppm added to 1 gram of soil. Little difference in amount sorbed so results averaged. Amount sorbed reported so Kd determined as follows:

1. Average of 25 ppm so 25 ug/ml * 5 = 125 ug total added
2. Kd=(125*%sorbed*0.01)/(((125-(125*%sorbed*0.01))/5)

There were apparently some errors in the transcription of organic carbon values. Of the 32 soils studied, 30 were added to Table A3. One of the soils was noted as Ontario Clay but it was not in Table 1 in the original article.
Recommendation: EM-Accepted and 32 values added to Table 4.

Ref (18) Grover, 1975: Adsorption measured on 5 prairie soils where 10 ml of 4 concentrations added to 1 gram of soil. Freundlich parameters determined for the data. Soil textures recalculated according to US soils triangle.
Recommendation: EM-Accepted and 5 values added to Table 4.

Ref (40) Majka and Lavy, 1977: Radiolabeled study on two soils where soils were 0.2 ml of 2, 4, 6, or 8 ppmw of diuron added to 1 gram of soil. Soils mixed and allowed to dry overnight and then 10 ml of water added. The vials were agitated for 18 hours and then the soil particles allowed to settle for 1 week.
Recommendation: Do not use this citation because it does not conform to the normally shorter durations of batch equilibrium studies.

Knisel, 1980. The CREAMS model citation contains two additional references.

Ref (27) Hance, 1965: The absorbents were not from soils so the data do not relate to agricultural use.
Recommendation: Do not use because soils are not tested.

Ref (53) Mustafa and Gamar, 1965. Adsorption studied on 12 arid soils from the Sudan. 25 ml of 24 ppm diuron was added to 5 g of soil. The amount adsorbed was reported in mg/kg (ug/g). Kd values were determined as:

1. 24 ppm = 24 ug/L times 25 ml = 600 ug total added
2. Amount sorbed = 5g x ug/g sorbed
3. ug/mL = 600-amt sorbed/25
4. Kd = (ug/g) /(ug/ml)

Recommendation: EM-Accepted and 12 values added to Table 4.

Madhun et al., 1986: Adsorption studies conducted on 2 Oregon soils, one a mucky peat and the other a loamy sand. Five ml of radiolabeled diuron at 2, 5, 20, 50, 75, 100, 125 150 uM added to 1 g of soil and compared at 4 and 25 C.
Recommendation: EM-Accepted but only the data for 25 C added to Table 4.

Kenaga and Goring, 1980: Four references given for the reported value: Hamaker and Thompson, 1972 will be reviewed separately; Hance, 1976 is a study on glyphosate so it is not related; Mustafa and Gamar, 1965 was previously reviewed; and. *Farmer, 1976 – need to retrieve article*

Hamaker and Thompson, 1972: All references previously reviewed.

Hexazinone Koc Values

41, 37, 41, 300, 34, 74, 54, 38 – First through eight values on both lists are from DPR's PestChem database. The first four values are derived from registration record 91033 in Volume 396-0051. The last four values are derived from registration record 11141 in Volume 396-0055, which appears to be a resubmission of 91033 and just a recalculation of the first four. Oddly, a query for record 91033 or Volume 396-0051 drew a blank record.

Recommendation: **DPR-Approved** but only four recalculated values added to Table 4.

Additional References

Volume 396-0039 and 0049 registration records 48249 and 85277, respectively: These are the same study and the submitted volumes were not approved because of reference to TLC methodology. Upon review, a radiolabeled batch adsorption study was included in the submission but not reviewed. The methodology was referenced as Rhodes, 1980, which was an approved method. The disapproval appears to be in error. Data are available for 25 soils and for diuron and terbacil.

Recommendation: EM-Accepted and values added to Table 4.

Volume 396-0090 registration record 138302: This volume was submitted but did not received a review. The study is mainly radiolabeled but non-radiolabeled studies are also reported. The design was a batch 24 study with 20 ml at 0.5, 1.0, 2.5, and 5.0 ug/ml (ppm) added to 20 g of soil for 1:1 water to soil ratio. Four soils were studied and 6 metabolites were included.

Recommendation: EM-Accepted and values added to Table 4.

Norflurazon Koc Values

490, 430, 370, 120 – The only four values on both lists. The USDA reference is to Sando Agro Inc. There are no matching records on the PestChem database.

Recommendation: Do not use because the source cannot be referenced.

Additional References

Volume 356-0046 registration record 5214 - Radiolabeled study 10 ml of norflurazon at 0.1, 0 33, 1.0, 3.3, and 10.0 ug/ml (ppm) added to 10 gram soil for 1:1 water:soil ratio. Monterey soil was sandy-textured with no measured organic carbon content so Koc could not be determined.

Recommendation: DPR-Approved values.

Kenaga and Goring, 1980. A rather high value of 1,914 is cited from reference #59, which is Carringer et al., 1975. The study was adsorption of norflurazon on pure organic matter and on mineral surfaces and it is not relevant.
Recommendation: Do not use because soil matrices were not studied.

Prometon Koc Values

218, 91, 32, 51, 103 – First though fifth positions on the USDA list with reference to Ciba-Gigey, 1989. Although there is accompanying soil data, they do not match accepted DPR submissions.
Recommendation: Do not use because there is no supporting documentation.

300 – Sixth position on USDA list. The citation is Hamaker, 1975 and the value is reported in Table 1, which contains further reference to Hamaker and Thompson, 1972. This value is an average as reported in Table 4 of Hamaker and Thompson, 1972. Two studies are cited. One is Talbert and Fletchall, 1965, which has already been reviewed and EM-Accepted and contains 25 separate values to be included in Table 4. The second citation is Walker and Crawford, 1968, which was reviewed the in atrazine section and found to be acceptable. Initial concentration for prometon was 600 umoles/liter. Water to soil ratio varied because 25 ml of solution used but soil weight varied from 2 to 5 g for a range of 12.5:1 to 5:1. Results reported as Kd
One other citation given in Table 2 of Hamaker and Thompson, 1972 is to Harris, 1966, which was previously accepted and contains 4 separate values to be included in Table 4.
Recommendation: Do not use the averaged value of 300. Instead include the separate **EM-Accepted studies,** which adds 25 values from Talbert and Fletchall, 4 values from Harris, and 36 values from Walker and Crawford to Table 4.

60 – Seventh position on USDA list with the reference to the CREAMS manual that is Knisel, 1980. The value in CREAMS is an average compiled from 2 citations that were included in the preceding review of Hamaker and Thompson, 1972, specifically they were Harris, 1966 and Talbert and Fletchall, 1965.
Recommendation: Do not use because it is redundant.

99 – Eighth position on USDA list with reference to Ciba-Geigy, 1989. There is no supporting documentation.
Recommendation: Do not use because there is no supporting documentation.

150, 172, 83, 98 – Ninth through twelfth positions on USDA list with reference to Ciba-Geigy, 1989. The accompanying soil data match these values to DPR Approved studies on the PestChem database.
Recommendation: DPR-Approved values.

Additional References

Scott, H.D. and R.E. Phillips. 1972. Identified in the CREAMS manual as reference 60. The study used radiolabeled active ingredients and tested 9 different herbicides. Oddly, atrazine and prometon were included but the reference was only cited for simazine. The authors indicated that they used the procedure in Talbert and Fletchall, 1965 to calculate Kd values. . The calculated Koc value for prometon is 54.

Recommendation: EM-Accepted and 1 value added to Table 4**.**

Simazine Koc Values

138 – First position on both lists. The USDA notes three citations:

First subentry is Gustafson, 1989 that reports a 138 value: As indicated previously this data was obtained from the original PestChem citation of Wilkerson and Kim, 1986, which predates the AB2021 data call-in.

Recommendation: Do not use because the references are not available.

Second subentry is Rao and Davidson, 1980 that reports a 138.4 value: As indicated previously, the citations for this averaged value are from Rao and Davidson, 1982 where Table A30 contains 147 separate entries that are derived from 5 citations. The recommendations for the citations are:

Ref (4) Day et al, 1968: Adsorption was studied on 65 California soils where K, expressed as percent in solution, was reported, resulting from a mixture of 400 ug simazine in 100 g soil and 100 g water. Kd was determined as follows:

1. Adsorbed ug/g = (400-(400*proportion in solution))/100
2. Solution ug/ml = (400*proportion in solution)/100)
3. Kd = (ug/g)/(ug/ml)

Recommendation: EM-Accepted and 65 values added to Table 4.

Ref (11) Talbert and Fletchall, 1965 – Previously reviewed in the atrazine section and approved. Adsorption was measured on 25 Missouri soils using radiolabeled C^{14} where one initial concentration at 2.2 ppm was used.

Recommendation: EM-Accepted and 25 values added to Table 4.

Ref (12) Harris and Sheets, 1965: Previously reviewed in the diuron section and approved. Adsorption was measured on 32 US soils where 5 ml of concentration at either 20 or 30 ppm added to 1 gram of soil. Little difference in amount sorbed so results averaged

Recommendation: EM-Accepted and 32 values added to Table 4.

Ref (13) Harris, 1966: Previously reviewed in the atrazine section and approved. Adsorption was measured on 4 Maryland soils using radiolabeled C^{14} where 4 unspecified initial concentrations were used. Kd values are reported in Table 3 on page 7.

Recommendation: EM-Accepted and 4 values added to Table 4.

Ref (44) Williams, 1968: Adsorption studied on British soils with values reported for subplots and for various depths within each site. This citation provided 21 observations in the Rao and Davidson soil when there were actually only 3 different soil conditions. The soil data was incomplete.
Recommendation: Do not use because the soil is limited.

Third subentry is Hamaker, 1975 that reports a 135 value: The value is reported in Table 1 with a further reference to Hamaker and Thompson, 1972, which is an average as reported in Table 4. There are 7 supporting citations and all are reviewed elsewhere in this report or in this section.
Recommendation: Do not use because it is a compilation of data.

230 - Second position on both lists. The USDA citation is the GLEAMS manual, Davies et al., 1990. An update to the manual, Knisel, 1993, indicates a value of 130 for simazine in Table P-2 on pages 2092-208.. The source of the value is indicated as Wauchope et al., 1992, which is a self-reference to the UDSA database
Recommendation: Do not use this value because it is compiled from numerous resources. It also has been updated in a more recent edition of the manual.

112 - Third position on both lists. The USDA citation is the CREAMS model, Knisel, 1980. Eight separate citations are listed for this value. The review for citations is:

Ref (8) Day et al, 1968. Previously reviewed as Ref (4) in Rao and Davidson, 1982 and approved.
Recommendation: EM-Accepted and added to Table 4.

Ref (31) Harris, 1966: Previously reviewed as Ref (13) in Rao and Davidson, 1982 and approved.
Recommendation: EM-Accepted and added to Table 4.

Ref (32) Harris and Sheets, 1965: Previously reviewed as Ref (12) in Rao and Davidson, 1982 and approved.
Recommendation: EM-Accepted and the values added to Table 4.

Ref (33) Harris and Warren, 1964: Adsorption studies not conducted on agricultural soils.
Recommendation: Do not use because studies are not conducted on agricultural soils.

Ref (54) Nearpass, 1965: Method to determine adsorption is unclear. Not a normal equilibrium study because test samples were left to stand overnight.
Recommendation: Do not use because standard test protocol not followed.

Ref (60) Scott, H.D. and R.E. Phillips. 1972. Identified in the CREAMS manual as reference 60. The study used radiolabeled active ingredients and tested 9 different herbicides. Oddly, atrazine and prometon were included but the reference was only cited for simazine. The authors indicated that they used the procedure in Talbert and Fletchall, 1965 to calculate Kd values. The calculated Koc value for simazine is 61.

Recommendation: EM-Accepted and 1 value added to the database**.**

Ref (64) Talbert and Fletchall, 1965: Previously reviewed as Ref (11) in Rao and Davidson, 1982 and approved.

Recommendation: EM-Accepted and the values added to Table 4.

Ref (73) Williams, 1968: Previously reviewed as (11) in Rao and Davidson, 1982 and disapproved.

Recommendation: Do not use because the soil data is limited.

160 - Fourth position on both lists. The USDA citation is Gerstl and Helling, 1987. Previously reviewed in the atrazine section and disapproved.

Recommendation – EM-Unaccepted, d**o not use** these values because the value is from multiple sources and there are no associated citations for the values.

155, 124 - Fifth and sixth position on both lists, respectively. The associated soil data link these values to DPR PestChem approved values from registration record 85610 in Volume 213-0084. Radiolabeled study for simazine where 20 ml of at 0, 0.3, 0.6, 1.2, 2.5, and 5.0 ug/ml (ppm) was added to 4 gram soil for a 5:1 water to soil ratio.

Recommendation - DPR-Approved values. Some slight difference in the recalculated Koc values to the reported ones are due to use of 1.7 by the registrant for division into the % OM value whereas for this evaluation the % OM value was multiplied by 0.58.

115, 114 - Seventh and eighth position on both lists, respectively. The citation is Ciba Geigy but with no further reference.

Recommendation - Do not use these values because there is no reference.

140* - Ninth position on both lists. The asterisk indicates that it was averaged from two USDA references. Both references were previously reviewed a Jury et al., 1987 and Rao and Davidson, 1980.

Recommendation - Do not use because the value is a compilation from numerous sources that have been previously reviewed.

144 *- Tenth position on both lists. The USDA citation is Nofziger et al., 1988. Need to retrieve article.*

114, 103 - Eleventh and twelfth position on both lists. The associated soil data link these values to DPR PestChem approved values from registration record 85610 in Volume 213-0084. Radiolabeled study for simazine where 20 ml of at 0, 0.3, 0.6, 1.2, 2.5, and 5.0 ug/ml (ppm) was added to 4 gram soil for a 5:1 water to soil ratio.

Recommendation: DPR-Approved values. Some slight difference in the recalculated Koc values to the reported ones are due to use of 1.7 by the registrant for division into the % OM value whereas for this evaluation the % OM value was multiplied by 0.58.

Additional References

Volume 213-0055 – Eight additional DPR approved values are contained in registration records 50871 and 50872. Records numbered 50873, 50874, and 50875 contain data for hdroxysimazine, DACT, and ACET, respectively. The studies were radiolabeled where in record number 50871 simazine was added at 0, 0.084, 0.42, 0.84, and 1.84 ug/ml (ppm) at a water to soil ratio of 5:1 for Iowa-1and New York, 4:1 ratio for Missouri, and 10:1 ratio for Iowa-3 soils. In record number 50872 radiolabeled atrazine was also studied where 20 ml at 0, 0.2,0 .5, 1.0, and 5.0 ug/ml (ppm) added to 4 gram soil for a 5:1 water to soil ratio.

Recommendation – DPR-Approved s**tudies** and values added to Table 4.

Sukop and Cogger, 1992. This was a radiolabeled study where 16 ml of concentrations ranging from 0.5-500 nmol/ml were added to 4 g of soil for a 4:1 water to soil ratio. Two soils were studied at 6 depths ranging down to around 160 cm.

Recommendation: ***EM-Accepted***. For consistency the data for the first soil segment from 0 to 30 cm is added to Table 4.

Scribner et al., 1992. The study used 20 ml of radiolabeled simazine at x added to 10 grams of soil for a 2:1 water to soil ratio. Batch study was conducted for 24 and 48 hours.

Recommendation: EM-Accepted and 1 value added to Table 4.

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Table 1. Reprint of Appendix 2 in report EH00-01 that contains environmental data used for Monte Carlo simulation.

Appendix 2 - Input data for 6800(a) pesticides

Field dissipation half-life (days)- USDA-ARS, 1999; Kollman and Segawa, 1995

atrazine	bromacil	diuron	hexazinone	norflurazon	simazine
173	207	90	105	163	26
61	227	102	60	33	87
48	165	134	90	180	125
64	350	100	79	304	369
18	61	127	75		55
74	120		75		186
119	350		120		44
70	175		154		119
102	155		123		33
	168				89
	124				84
	137				9
					144

K_{OC} - USDA-ARS, 1999

148	12	453	41	490	138
288	33	418	37	430	230
214	2.3	560	41	370	112
149	14	476	300	120	160
163			34		155
111			74		124
170			54		115
163			38		114
160					144
127					114
107					103
174					
88					
38					
72					
157					
102					
90					
57					
120					
139					
155					
87					
39					
70					

Table 2. Summary of source analysis for TFD values listed in Appendix 2 where source designations are: USDA for USDA database; PC for DPR's PestChem database; /xxxxxx designates the registration number with a summary of the location and soil and whether it was bare ground or cropped study. Under comments DNU means Do Not Use.

Atrazine			Bromacil			Diuron		
Appendix value (days)	Source or Registration Record Number	Recalculated Value or Comment	Appendix value (days)	Source or Registration Record Number	Recalculated Value or Comment	Appendix value (days)	Source or Registration Record Number	Recalculated Value or Comment
173	USDA	DNU Derived from Multiple Observations	207	USDA	DNU Derived from Multiple Observations	90	USDA/89036; Madera, CA; Bare Ground; S L	DNU USDA Duplicate of PC Record
61	Not Known	DNU	227	USDA	DNU Derived from Multiple Observations	102	PC/89036 ; Madera, CA; Bare Ground; S L	103
48	USDA	DNU Derived from an Aerobic Study	165	USDA/48332	DNU Derived from an Unapproved Study	134	PC/89035; Newark, DE; Bare Ground; Si C	133
64	USDA	DNU Derived from Multiple Observations	350	Source not Retrieved	DNU	100	PC/89036; Madera, CA; Bare Ground; S L	DNU Duplicate PC Record
18	USDA	DNU Alachlor not Atrazine Value	61	ChemiRank Model Citation	Need to Retrieve Reference	127	PC/89035 ; Newark, DE; Bare Ground; Si C	DNU Duplicate PC Record
74	USDA	DNU Derived from Multiple Observations	120	USDA/48339; Delaware; Si L	DNU USDA Duplicate of Unapproved PC record			
119	PC/67386; Ripon, CA; Bare Ground; S L	DNU Censored Value	350	USDA	DNU Duplicate Value			
70	PC/69062 Actually 67835/139124; Ripon, CA; Cropped; S L	92	175	USDA/ 88916; Newark, DE; Bare Ground; Si L	DNU USDA Duplicate of PC record			
102	PC/67836/139128; Ripon, CA; Bare Ground; S L	141	155	PC/88916; Newark, DE; Bare Ground; Si L	DNU-Censored value			
			168	PC/88916; Newark, DE; Bare Ground; Si L	167			
			124	PC/88916; Madera, CA; Bare Ground; L	DNU-Censored value			
			127	PC/88916; Madera, CA; Bare Ground; L	146			

Table 2 Continued:

Hexazinone			Norflurazon			Simazine		
Appendix value (days)	Source or Registration Record Number	Recalculated Value or Comment	Appendix value (days)	Source or Registration Record Number	Recalculated Value or Comment	Appendix value (days)	Source or Registration Record Number	Recalculated Value or Comment
105	Not Known	DNU	163	USDA /163189 No review; Greensville, MS; Cropped; Si L	443 EM Accepted	26	USDA/50877; Lake Placid, FL; Cropped; L	DNU USDA Duplicate Uapproved PC record
60	Not Known	DNU	33	PC/73729; Kerman, CA; Cropped Study; S L	33	87	USDA/50877; Lake Placid, FL; Bare Ground; S	DNU USDA Duplicate Uapproved PC record
90	USDA/6374	DNU Derived from Multiple Observations	180	PC/85464; Donalsonville, GA ; Cropped Study; S L	DNU Censored Value	125	USDA/50876; Hillboro, OR; Bare Ground; L	DNU USDA Duplicate of PC record
79	USDA	DNU Derived from Multiple Observations	304	PC/85464; Donalsonville, GA Cropped Study S L	149	369	PC/50976/243279; Clarence, MO; Cropped; L	121 EM Accepted
75	USDA/Not Known	DNU		Volume 356-0059 72281	EM Unacccepted	55	USDA/50976/243279; Clarence, MO; Bare Ground; L	93 EM Accepted
75	USDA/Not Known			Volume 356-0112 No Review; Alfred, FL; Cropped Study; F S	835 EM Accepted	186	USDA; No Submitted Study; MN; Bare Ground; L	DNU USDA Value with No Reference
120	Not Known	DNU				44	USDA/50977/243280; Lake Placid, Fl; Bare Ground; S	47 EM Accepted
154	USDA/116843; Greenville, MS; Bare Ground; Si L	136				119	USDA/50876; Hillboro, OR; Cropped; L	DNU USDA Duplicate of PC record
123	USDDA/116846; Newark, DE ; Bare Ground; L	100				33	USDA/50977/243280; Lake Placid, FL; Cropped; S	36 EM Accepted
140	USDA/116836; Madera, CA; Bare Ground; S L	(124) EM Unaccepted Not in PC				89	USDA	DNU Derived from Multiple Observations
						84	PC?50876; Hillboro, OR; Cropped; L	(85) EM Unaccepted
						9	PC/50876; Hillboro, OR; Bare Ground; L	(97) Em Unaccepted
						144	PC/71428; Ripon, CA; Bare Ground; S L	153

Table 3. Unique, DPR approved or EM accepted TFD values. Numbers not in italics are from bare ground studies, numbers in italics are from cropped studies and numbers that are both italics and bold-faced are a cropped study conducted in the same location as the preceding bare ground study. Analysis of prometon, a 6800(a) listed pesticide, was added to the table.

TFD half-life (Days)						
Atrazine	Bromacil	Diuron	Hexazinone	Norflurazon	Simazine	Prometon
92	167	103	136	*443*	93	307
141	146	133	100	*33*	***121***	333
				149	47	1319
				835	***36***	
					153	

Table 4. Compiled Koc values for 6800(a) listed pesticides. For soil texture, bold and italic values are as reported and not recalculated using pedosphere.com and where: S=Sand(y); Si=Silt(y); L=Loam(y); C=Clay(y).

Atrazine				Bromacil				Diuron				Hexazinone				Norflurazon				Prometon				Simazine			
SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc
S	0.5	6.5	38	CL	1.3	4.2	2	***SL***	0.1	5.1	0	S	5.7	5.4	13	SL	0.8	7.0	292	***SL***	1.9	6.2	52	SL	2.8	7.3	19
SL	1.9	7.1	52	S	0.8	7.0	12	***C***	0.9	5.9	24	S	0.7	6.5	19	C	6.6	6.2	393	SiCL	4.1	6.4	54	SL	1.9	6.2	21
SL	1.9	6.2	52	SiL	1.7	6.2	14	***SL***	1.9	6.2	58	SL	0.9	7.0	21	L	0.5	6.0	441	SiL	0.7	6.4	72	SL	1.3	6.7	25
SL	1.8	6.1	55	***LS***	0.4	5.8	20	SCL	0.3	9.2	61	S	0.8	7.5	25	L	0.2	7.1	1092	SiL	0.8	6.5	74	SL	2.6	6.9	25
L	*1.3*	8.0	61	LS	0.4	7.3	20	S	5.7	5.4	83	SL	0.4	7.4	27	L	0.2	7.7	1092	SiL	1.7	5.9	75	SL	1.4	6.7	26
SiCL	4.1	6.4	62	Muck	27.8	5.4	20	***LS***	0.6	4.9	109	CL	1.8	5.6	28					SCL	2.9	4.3	83	LS	1.3	7.2	27
SiL	*1.7*	7.7	71	SL	0.8	7.5	33	LS	0.4	7.3	113	SiL	1.8	5.1	29					SiL	1.4	5.3	86	SL	2.3	7.0	27
SL	1.1	7.5	72	SL	1.2	7.7	57	***C***	1.3	7.6	114	SL	36.9	5.2	29					SiL	1.2	7.0	99	SL	1.0	7.4	28
SL	*0.8*	7.1	76	LS	0.20	7.7	58	***SiL***	1.4	4.3	119	SL	0.8	5.6	31					SiL	1.2	6.0	140	SL	1.4	6.5	29
LS	0.3	6.5	82	***SiL***	1.2	5.4	123	***C***	1.0	7.3	125	LS	2.0	5.9	34					SL	1.7	6.1	150	SL	2.8	6.4	29
SL	*1.0*	5.2	84					***SiL***	1.1	5.6	126	L	3.1	6.5	35					S	0.5	5.6	159	SL	1.0	7.1	30
C	2.8	5.9	88					***SiC***	4.7	7.1	126	SL	1.22	6.5	37					SiL	1.7	6.9	172	SL	2.8	6.3	30
SL	*0.3*	8.0	90					***SiC***	2.7	7.7	133	SiL	1.4	6.8	38					***SiCL***	2.5	5.5	172	L	1.3	7.2	31
LfS	*0.8*	5.9	90					***L***	0.9	5.5	136	SL	2.2	5.1	39					L	0.8	7.1	199	SL	1.8	5.9	31
S	0.5	5.6	91					SL	1.9	7.1	140	SL	0.5	6.4	40					LS	0.3	5.3	201	SL	1.4	6.0	33
fSL	*1.7*	6.3	95					***SL***	1.1	5.1	141	SiL	1.4	5.5	41					SiC	1.7	6.4	202	SL	2.1	6.4	33
SiL	0.8	6.5	99					***SCL***	1.1	5.3	144	SiL	2.49	5.4	41					***SiL***	2.6	4.6	212	CL	2.1	7.2	33
SL	0.9	5.6	99					***CL***	1.0	7.7	148	SL	0.58	6.4	41					SiL	1.1	5.3	254	SL	0.5	6.6	33
SiC	*0.6*	8.0	102					***C***	0.6	5.6	153	S	0.5	6.4	42					SiL	0.9	5.2	259	SL	1.6	6.4	34
SiL	*1.3*	5.2	109					***L***	0.6	4.4	154	SiL	1.6	6.4	42					SiL	0.8	5.7	271	LS	1.2	5.8	34
SL	1.9	7.1	109					***SCL***	0.9	7.3	155	L	1.1	6.9	43					SiCL	2.1	5.6	302	SL	0.7	7.2	35
S	0.6	5.6	111					***SiL***	1.3	7.5	163	S	0.2	6.1	46					SiL	1.2	6.4	328	***SL***	1.9	6.2	36
SiCL	*1.7*	5.8	117					SL	2.9	5.7	163	SiCL	2.4	5.8	48					***SiL***	1.1	5.6	354	***LS***	0.6	4.9	37
SiL	1.2	7.0	121					***SiCL***	1.3	7.6	163	SiCL	2.3	5.0	64					SiCL	2.4	5.4	361	***C***	0.9	5.9	37
SiL	1.4	5.3	122					***L***	1.7	4.9	167	CL	0.9	7.4	70					SiL	1.2	6.3	378	L	1.5	5.1	37
SL	*0.5*	5.9	129					***C***	0.7	7.7	167	L	1.1	7.7	76					SiL	1.7	5.4	380	LS	1.7	6.7	38
CL	1.5	6.6	135					C	1.1	4.7	169	SL	0.8	8.3	78					SiL	1.6	4.7	383	C	1.9	7.3	39
SiL	1.7	5.9	144					***CL***	1.3	7.7	169	SiL	1.8	6.8	94					SiC	2.8	4.8	408	L	1.2	7.2	39
SiCL	2.5	5.5	148					***SiCL***	2.5	5.5	170	SL	2.0	4.4	98					L	0.9	4.7	540	SL	1.3	7.0	39
CL	2.1	4.3	153					SiC	2.0	4.9	179	SL	0.6	5.3	119					SiL	1.0	5.4	584	L	1.6	5.8	40
SiCL	3.9	7.3	156					***SiL***	2.6	4.6	181	SiC	1.1	6.4	126					SiL	1.0	4.9	747	LS	1.3	7.0	40
SiL	2.6	4.6	157					***SiC***	2.8	4.7	200	SiC	1.1	6.4	191					CL	2.1	4.3	1068	LS	0.9	7.2	40
L	0.5	6.7	157					muCk	27.8	5.4	205	L	0.46	8.0	2328					C	1.3	5.7	1332	L	1.5	5.8	41
SiC	1.7	6.4	161					***CL***	4.0	7.4	213									SiL	0.8	4.6	1835	SL	1.3	6.9	42
SiL	1.1	5.6	163					SiCL	1.0	4.5	216									C	1.5	5.0	3807	LS	0.9	6.5	44
LS	0.3	5.3	172					***SL***	0.3	7.0	218									.	0.1	7	1400	L	1.8	7.2	46
SiL	1.1	5.3	172					***SiL***	0.6	5.8	218									.	0.4	6.6	100	SL	0.8	6.2	47
SiCL	*2.2*	5.2	174					***SiL***	1.9	4.8	223									.	0.5	6.2	100	***SL***	1.9	6.2	47
SiL	1.5	6.8	174					SL	0.3	9.2	223									.	0.9	4.9	122	L	1.2	6.6	47
CL	3.7	6.0	178					***SiL***	3.1	5.4	226									.	0.9	5.7	100	L	1.2	5.6	48

Table 4. Continued.

Atrazine				Bromacil				Diuron				Hexazinone				Norflurazon				Prometon				Simazine			
SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc
SiCL	2.4	5.4	185					***SiCL***	1.0	5.0	232									.	1.2	5.9	108	L	3.0	5.2	51
SiL	1.2	6.3	189					SCL	1.0	4.7	232									.	1.3	6.1	115	CL	1.3	7.2	52
SiL	1.2	6.0	189					C	1.9	5.1	249									.	1.5	5.8	93	CL	1.2	7.4	53
SiL	0.9	5.2	194					L	2.1	8.0	250									.	1.5	6.7	47	SL	0.5	6.2	53
SiC	2.8	4.8	197					SL	1.2	5.2	255									.	1.5	6.2	107	SCL	0.8	6.4	58
SiL	0.7	6.4	201					***C***	2.3	6.2	281									.	1.6	2.8	88	SL	0.7	6.5	58
SiL	1.6	4.7	204					SL	0.8	5.1	291									.	1.6	6.9	94	***SiC***	2.7	7.7	58
SiL	0.8	5.7	209					CL	2.0	7.5	297									.	1.7	6.4	106	***SL***	1.1	5.1	59
SiL	1.0	4.9	211					L	1.2	5.3	307									.	1.8	6.7	72	L	0.6	7.5	59
C	1.5	5.0	214					SL	2.0	5.0	310									.	2.7	6.6	78	L	2.3	6.6	60
SiL	1.7	5.4	214					S	0.8	7.5	312									.	3.1	6.5	74	SL	1.1	6.9	61
SiCL	2.1	5.6	230					S	1.2	7.9	320									.	3.4	6.9	47	SiCL	4.1	6.4	61
SiL	1.2	6.4	259					SL	1.5	7.4	326									.	3.8	6.3	71	LS	0.3	6.4	61
SiL	0.8	4.6	271					***SiL***	1.2	5.4	328									.	4.6	5.7	59	***SiC***	4.7	7.1	63
C	1.3	5.7	290					C	0.3	9.2	337									.	6.5	7.6	42	SL	1.1	7.3	64
L	0.8	7.1	292					C	2.8	8.1	337									.	7.8	7.2	31	CL	2.1	6.8	66
L	0.9	4.7	299					SL	0.9	7.0	340									.	9.4	6.8	57	***SiCL***	2.5	5.5	67
SiL	1.0	5.4	393					L	1.9	5.8	341									.	9.9	5.3	80	***C***	1.3	7.6	67
SiL	*0.4*	9.6	1251					SL	0.3	6.0	362									.	13	7.4	53	CL	1.2	5.9	68
SiL	*0.5*	8.5	4358					CL	2.8	5.7	363									.	14	7.1	54	***SCL***	1.1	5.3	68
.	0.1	7	1200					S	0.7	6.5	372									.	14	6.9	70	L	1.7	6.6	69
.	0.4	6.6	100					L	3.1	6.5	378									.	14	6.5	67	SCL	0.8	6.1	72
.	0.5	6.2	140					SCL	0.3	6.5	379									.	15	6.5	73	SL	0.9	6.4	73
.	0.9	4.9	89					L	1.3	5.1	385									.	16	6.5	75	L	1.3	6.2	75
.	0.9	5.7	178					CL	3.1	8.0	388									.	17	5.9	79	SCL	0.7	6.1	76
.	1.2	5.9	100					SiC	1.4	8.1	392									.	19	6.8	76	***SiL***	1.3	4.7	78
.	1.3	6.1	146					SL	0.4	7.4	398									.	20	6.9	93	LS	0.2	7.2	79
.	1.5	5.8	100					SiL	1.8	5.1	409									.	23	6.8	75	SL	1.9	.	79
.	1.5	6.7	167					C	0.2	8.2	411									.	24	5.6	108	***C***	1.0	7.3	81
.	1.5	6.2	100					SCL	0.2	7.8	414									.	26	6.7	84	CL	1.8	6.4	81
.	1.6	2.8	94					SL	1.2	6.5	419									.	27	6.9	62	***SiCL***	1.3	7.5	84
.	1.6	6.9	69					SL	36.9	5.2	420													***C***	0.7	7.7	85
.	1.7	6.4	118					CL	0.9	7.4	428													L	1.2	6.6	85
.	1.8	6.7	78					CL	3.7	6.2	434													***CL***	1.3	7.7	87
.	2.7	6.6	107					CL	1.8	5.6	434													L	14.2	6.9	87
.	3.1	6.5	90					C	0.4	8.6	435													***CL***	4.0	7.4	90
.	3.4	6.9	53					C	2.8	5.4	436													***L***	1.7	4.9	94
.	3.8	6.3	92					CL	0.8	9.0	442													***SCL***	0.9	7.3	95
.	4.6	5.7	89					SCL	11.7	7.4	453													***CL***	1.0	7.7	100
.	6.5	7.6	57					SL	0.6	6.6	455													***SiL***	2.6	4.6	101
.	7.8	7.2	37					C	0.5	9.2	457													***L***	0.9	7.6	102
.	9.4	6.8	101					C	1.0	8.7	459													L	0.5	6.7	103

Table 4. Continued.

Atrazine				Bromacil				Diuron				Hexazinone				Norflurazon				Prometon				Simazine			
SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc
.	9.9	5.3	104					SiL	2.7	4.3	477													C	1.7	6.1	105
.	13	7.4	84					SL	0.8	5.6	480													SiL	1.2	7.0	108
.	14	7.1	87					CL	3.1	5.7	491													***SiC***	2.8	5.5	109
.	14	6.9	99					C	1.9	7.7	504													***SiL***	1.1	5.6	112
.	14	6.5	87					CL	0.3	9.3	524													***SiL***	3.1	5.4	114
.	15	6.5	113					SiL	1.4	5.5	540													SL	1.1	7.5	115
.	16	6.5	110					C	2.2	5.8	546													LS	0.9	6.6	122
.	17	5.9	104					SiL	1.6	6.4	552													SiL	0.8	6.5	123
.	19	6.8	117					C	2.4	7.7	557													L	1.8	5.8	124
.	20	6.9	115					SiL	2.5	5.4	561													S	0.5	6.5	125
.	23	6.8	119					SL	2.4	7.8	563													L	1.1	5.4	129
.	24	5.6	134					CL	2.1	5.7	567													***SiL***	2.6	4.6	129
.	26	6.7	108					LS	2.0	5.9	568													***SiCL***	2.5	5.5	132
.	27	6.9	97					C	1.2	6.3	571													SL	0.9	7.3	133
								L	1.8	6.7	580													CL	2.1	6.1	134
								LS	0.4	5.8	591													CL	1.4	6.8	135
								SiCL	2.4	5.8	611													***SiL***	1.4	4.3	139
								LS	12.0	6.3	625													L	1.0	7.3	141
								SiL	1.9	6.0	630													***SiL***	1.9	4.8	147
								C	2.3	7.0	639													C	2.8	5.9	155
								L	1.1	6.9	642													SL	1.8	6.1	162
								SiC	1.6	6.2	645													SiL	1.7	5.9	167
								C	2.4	5.9	652													SiL	0.7	6.4	172
								SL	1.5	7.6	667													SiL	0.8	5.7	172
								LS	1.0	7.5	672													SiL	1.4	5.3	180
								SiCL	1.9	5.4	700													SiL	1.2	6.0	189
								SL	1.9	7.1	705													***SL***	0.3	7.0	194
								S	0.5	6.4	706													SiL	1.1	5.3	200
								SL	3.7	6.5	718													LS	0.2	7.8	210
								CL	2.1	7.9	721													CL	1.5	6.6	214
								L	3.5	6.2	725													***L***	0.6	4.4	218
								SL	36.5	5.2	734													SiC	1.7	6.4	232
								SiCL	2.3	5.0	858													CL	2.1	4.3	244
								S	0.2	6.1	862													***SiL***	1.1	5.6	245
								CL	1.5	8.0	909													***C***	0.6	5.6	254
								SL	2.2	5.1	965													***SL***	0.1	5.1	257
								SL	0.6	5.3	988													***C***	2.3	6.2	259
								L	1.6	6.7	1009													L	0.8	7.1	265
								SiL	1.8	6.8	1019													SiL	1.2	6.4	267
								SiC	1.1	6.4	1034													SiL	1.0	4.9	268
								L	6.1	5.9	1369													SiL	1.6	4.7	268

Table 4. Continued.

Atrazine				Bromacil				Diuron				Hexazinone				Norflurazon				Prometon				Simazine			
SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc	SoiL Texture	OC (%)	pH	Koc
								SiC	1.1	6.4	1625													L	1.7	6.1	277
								CL	20.9	5.5	1743													SiC	2.8	4.8	278
								SiL	0.0	8.7	1775													SiL	1.2	6.3	287
								SL	2.0	4.4	2161													LS	0.3	5.3	287
								C	0.1	9.3	2950													SiCL	2.4	5.4	296
																								L	0.9	4.7	299
																								SiL	1.7	5.4	303
																								SL	1.5	6.0	304
																								SiL	0.6	5.8	306
																								SiCL	2.1	5.6	311
																								SiL	0.9	5.2	323
																								SiL	1.0	5.4	364
																								SiL	0.8	4.6	431
																								C	1.3	5.7	470
																								C	1.5	5.0	483
																								SiCL	1.0	5.0	684
																								SL	2.4	6.8	879

ATTACHMENT I – UDSA Database

Extracted TFD Half-Life Data from the USDA-ARS Pesticide Chemistry Database

ATRAZINE

ARS PESTICIDE PROPERTIES DATABASE last updated Oct 1, 2001

name: ATRAZINE **CASRN: 1912-24-9**

SELECTED VALUES FOR MODELING PURPOSES (from Hornsby, et al., 1996)
WATER SOLUBILITY (mg/L): 33
FIELD HALF-LIFE (days): 60
SOIL ORGANIC CARBON SORPTION (Koc, mL/g): 100
VAPOR PRESSURE (mm Hg): 2.89 x 10-7
pKb: 12.32
PUBLISHED AND MANUFACTURER VALUES AND SOURCES
molecular formula: C8H14CLN5
molecular weight : 215.68
physical state : S
(L=liquid; G=gas; S=solid)
reference: 9MERCK(10),0.125,1983

Key to sources: (M)Manufacturer, (R)eview, (H)andbook, (E)xperiment,
(C)alculated, (U)nknown, (P)EPA data, (W)auchope
* denotes a selected value where multiple values of a property are listed.

-value-	-medium-	-temp-	-pH-	-source-	-reference-
Boiling point(deg C):					
-					
Melting point(deg C):					
175 - 177				M	9CIBAG
Decomposition point(deg C):					
-					
Heat of vaporization(deg C):					
--RATE CONSTANTS--					
Hydrolysis (per day):					
STABLE*		25	5,7,9	M	9CIBAG
Photolysis (per day):					
0.015	SOIL**	25		M	9CIBAG
0.951	WATER**	25	7	M	9CIBAG
0.002	WATER***	12-44	7	M	9CIBAG
Vapor pressure (mPa):					
0.04		20		H	9HERBH,5TH ED.,p.31,1983
0.0076		10		H	9HERBH,5TH ED.,p.31,1983
0.187		30		H	9HERBH,5TH ED.,p.31,1983
3.07		50		H	9HERBH,5TH ED.,p.31,1983
0.038*		25		M	9CIBAG
Water solubility (ppm):		-temp-		-source-	-reference-
320		85		M	9TDCGB, p.1,1977
29.9		25		R	9SVPGW, p.72,1976
52				E	ETOCDK,8:339-357,1989
34.2				R	9SVPGW, p.72,1976
30		20		E	PSSCBG, 12:222,1981
33*		22		E	9CIBAG
33		20-25		R	ADCSAJ, 111:72,1972
33		25		E	WEREAT, 12:200,1972
Organic solubility (ppm):					
1.2E+4*	ETHER	25		H	9MERCK, 10:125(1983)
5.2E+049*	CHLOROFORM	25		H	9MERCK, 10:125,1983
1.8E+4*	METHANOL	25		H	9MERCK, 10:125,1983
1.8E+5*	DIMETHYL SULFOXIDE	27		H	9HERBH, 5:31(1983)
2.8E+4*	ETHYL ACETATE	27		H	9HERBH, 5:31,(1983)
3.6E+2*	N-PENTANE	27		H	9HERBH, 5:31,1983
Henrys law (Pa m3/mol):					
2.48E-4*		25		M	9CIBAG
Octanol/water partitioning (log Kow):					
2.68*		25		M	9CIBAG
2.34				R	9EINSP, p.43,1980
2.80				U	9IUPC4, 4:34,1983

2.69					E	CMSHAF, 13:275,1984
2.71					E	JEVQAA, 10(3):384,1981
2.52					E	PSSCBG, 12:219,1981
2.61					E	JAFCAU, 34:725,1986
2.60					R	9HLMCP, 1981
Acid dissociation (pKa):						
1.70			21		R	9KHBCD,2nd ed.,p.131,1974
1.68*			22		E	SSSAA8, 32:224,1968
Soil sorption:						
soiltype	temp.	Kd	Koc	%om	pH	reference
			148			EESADV, 4:28,1980
			288			JPFCD2, VB22(1):67,1987
			214			JEVQAA,V10(3):384,1981
			149			8SWAMD
			163			8SWAMD
			111			8SWAMD
			170			8ABACA
			163			9EINSP PP.23-67
			160			JEVQAA 16:422-428,1987
			127			8CREAM
			107			ETOCDK 8:339-357,1989
			174			JPFCD2 22:55-69,1987
			88			9CIBAG
			38			9CIBAG
			72			9CIBAG
			157			9CIBAG
			102			8SWAMD
SAND		0.42	90	0.8	5.6	9CIBAG
SANDY LOAM		0.99	57	3.0	6.1	9CIBAG
SILT LOAM		1.46	120	2.1	7.0	9CIBAG
LOAM		2.03	139	2.5	6.6	9CIBAG
LOAM		0.73	155	0.8		
CLAY		2.46	87	4.8		
SAND		0.2	39	0.9		
SANDY LOAM		0.75	70	1.92.1		
			147*			
Field Dissipation halflife(days):						
value	test area		pH		source	reference
173(13-402)*					M	9CIBAG
42-70					H	9ACHB2 1983 ED.
48					R	9EINSP PP.23-67
64					E	JEVQAA 16:422-428,1987
18					C	8GLEAM
74					E	ETOCDK 8:339-357,1989
119					M	9CIBAG
Halflife in soil:						
Soiltype		aerobic	anaerobic		source	reference
SANDY LOAM		330	15		M	9CIBAG
		146*	77*		M	9CIBAG
Comments:						
PHOTOLYSIS: ** ARTIFICIAL LIGHT; ***NATURAL LIGHT						

BROMACIL

ARS PESTICIDE PROPERTIES last update May 1999

name:BROMACIL **CASRN: 314-40-9**

molecular formula: C9H13BrN2O2
molecular weight : 261.12
physical state : S
(L=liquid; G=gas; S=solid)
reference: 9MERCK,10TH ED,P.190,1983

Key to sources: (M)Manufacturer, (R)eview, (H)andbook, (E)xperiment,
(C)alculated, (U)nknown, (P)EPA data, (W)auchope
* denotes a selected value where multiple values of a property are listed.

-value-	-medium-	-temp-	-pH-	-source-	-reference-
Boiling point(deg C):					
-					
Melting point(deg C):					
157.5 - 160				E	9USPAT,3,235,357,P17
Decomposition point(deg C):					
-					
Heat of vaporization(deg C):					
--RATE CONSTANTS--					
Hydrolysis (per day):					
<0.023*		25	5,9	M	9DUPON
Photolysis (per day):					
0.004*	SOIL	25	6.7	M	9DUPON
0.002*	WATER	25	5	M	9DUPON
0.007*	WATER	25	7	M	9DUPON
0.099*	WATER	25	9	M	9DUPON
Vapor pressure (mPa):					
3.30E+2		100		H	9ACHB2
0.5E+1		20		H	9ACHB2
4.1E-2		25		M	9DUPON
3.30E-2		0		E	SCSFAD, 44:5,1985

Water solubility (ppm):	-temp-	-pH-	-source-	-reference-
1.024E+03	25		E	JPFCD2,VB19(3):302,1984
807	25	5	M	9DUPON
700	25	7	M	9DUPON
1280	25	9	M	9DUPON
Organic solubility (ppm):				
7.1E+4* ACETONITRILE	25		M	9DUPON,1999
1.34E+5* ETHANOL	25		M	9DUPON,1999
3.2E+4* XYLENE	25		M	9DUPON,1999
1.67E+5* ACETONE	25		M	9DUPON,1999
Henrys law (Pa m3/mol):				
1.5E-5* (pH7)	25		M	9DUPON

Octanol/water partitioning (log Kow): -pH-				
1.88	25	7	M	9DUPON
1.53	25	5	M	9DUPON
1.63	25	9	M	9DUPON,1999
Acid dissociation (pKa):				
9.1				9CREAM
Soil sorption:				

soiltype	temp.	Kd	Koc	%om	pH	source	reference
SAND(FL)	25	0.09	12	1.3	7.0	M	9DUPON
SNDY LM(CA)	25	0.25	33	1.3	7.5	M	9DUPON
CLY LM(MD)	25	0.03	2.3	2.2	4.2	M	9DUPON

SLT LM(DE) 25 0.24 14 3.0 6.2 M 9DUPON

Field Dissipation halflife(days):

value	test area	pH	%OM	source	reference
207(61-349)*					
106-349				R	9EINSP PP.23-67
150-180				H	9HERBH
350				E	JEVQAA 16:422-428,1987
61				R	8INSFO
120	DELAWARE	6.4	2.8	M	9DUPON
350				E	SCSFAD 44:1-8,1985
175	DELAWARE			M	9DUPON

Halflife in soil:

Soiltype	aerobic	anaerobic	source	reference
SLTY CLY LM(DE)	275*		M	9DUPON

Comments:
WATER SOLUBILITY=PH7; HENRYS LAW=PH7; OCTANOL WATER=PH7;
SOIL SORPTION KOC=32(2-72); AEROBIC=PH6.6

DIURON

ARS PESTICIDE PROPERTIES last update May 1999

name:DIURON CASRN: 330-54-1

molecular formula: C9H10CL2N2O
molecular weight : 233.1
physical state : S
(L=liquid; G=gas; S=solid)
reference: 9ACHB2

Key to sources: (M)Manufacturer, (R)eview, (H)andbook, (E)xperiment,
(C)alculated, (U)nknown, (P)EPA data, (W)auchope
* denotes a selected value where multiple values of a property are listed.

-value-	-medium-	-temp-	-pH-	-source-	-reference-
Boiling point(deg C):					
-					
Melting point(deg C):					
158 - 159				H	9ACHB2
Decomposition point(deg C):					
-					
Heat of vaporization(deg C):					
--RATE CONSTANTS--					
Hydrolysis (per day):					
<0.0014*		25	5,7,9	M	9DUPON
Photolysis (per day):					
0.004* (1.4%OM)	SOIL	25	6.4	M	9DUPON
0.016*	WATER	25	7	M	9DUPON
Vapor pressure (mPa):					
9.2E-3*		25		M	9DUPON
Water solubility (ppm):		-temp-		-source-	-reference-
42*		25		M	9DUPON
Organic solubility (ppm):					
Henrys law (Pa m3/mol):					
5.1E-5*		25		M	9DUPON
Octanol/water partitioning (log Kow):					
2.8*		25		M	9DUPON
Acid dissociation (pKa):					

Soil sorption:

soiltype	temp.	Kd	Koc	%om	pH	source	reference
			477*				
SANDY LOAM	25	2.9	453	1.1	6.6	M	9DUPON
SANDY LOAM	25	5.1	418	2.1	6.5	M	9DUPON
SILT LOAM	25	14.0	560	4.3	5.4	M	9DUPON
SILT LOAM	25	13.0	476	4.7	4.3	M	9DUPON

Field Dissipation halflife(days):

value	test area	pH	source	reference
90	MADERA(CA)		M	9DUPON

Halflife in soil:

Soiltype	aerobic	anaerobic	source	reference
SILT LOAM(DE)	372*		M	9DUPON

Comments:

HEXAZINONE

ARS PESTICIDE PROPERTIES last update May 1999
name:HEXAZINONE **CASRN: 51235-04-2**
molecular formula: C12H20N4O2
molecular weight : 252.3
physical state : S
(L=liquid; G=gas; S=solid)
reference: 9ACHB2

Key to sources: (M)Manufacturer, (R)eview, (H)andbook, (E)xperiment,
(C)alculated, (U)nknown, (P)EPA data, (W)auchope
* denotes a selected value where multiple values of a property are listed.

-value-	-medium-	-temp-	-pH-	-source-	-reference-
Boiling point(deg C):					
-					
Melting point(deg C):					
115 - 117				M	9DUPON,1999
Decomposition point(deg C):					
-					
Heat of vaporization(deg C):					
--RATE CONSTANTS--					
Hydrolysis (per day):					
STABLE*		25	5,7,9	M	9DUPON
Photolysis (per day):					
0.0085*	SOIL	30	6.4(1%OM)	M	9DUPON
<0.0023*	WATER	25	7	M	9DUPON
Vapor pressure (mPa):					
8.5		86		M	9DUPON,1999
<1.3E-S		25		M	9DUPON,1999

Water solubility (ppm):	-temp-	-source-	-reference-
29800	25 5,7,9	M	9DUPON,1999
Organic solubility (ppm):			
7.9E05* ACETONE	25	H	9PMED8
9.4E05* BENZENE	25	H	9PMED8
3.88E6* CHLOROFORM	25	H	9PMED8
8.36E5* DIMETHYL FORMAMIDE	25	H	9PMED8
3E03* HEXANE	25	H	9PMED8
2.65E6* METHANOL	25	H	9PMED8
3.86E5* TOLUENE	25	H	9PMED8
Henrys law (Pa m3/mol):			
1.1E-7*	25 5,7,9	M	9DUPON,1999
Octanol/water partitioning (log Kow):			
1.17(1.16-1.19)	25	M	9DUPON
Acid dissociation (pKa):			
2.2*			
Soil sorption:			

soiltype	temp.	Kd	Koc	%om	pH	source	reference
SANDY LM(CA)	25	0.24	41	1.0	6.4	M	9DUPON
SANDY LM(MD)	25	0.45	37	2.1	6.5	M	9DUPON
SILT LM(IL)	25	1.03	41	4.3	5.4	M	9DUPON
LOAM(CA)	25	10.80	<300	0.8	8.0	M	9DUPON
SANDY LM(NJ)	25	0.18	34	0.9	6.4	M	9DUPON,1999
SANDY LM(ID)	25	0.56	74	1.3	8.3	M	9DUPON,1999
LOAM(CA)	25	0.59	54	1.9	7.7	M	9DUPON,1999
SILT LOAM(IL)	25	0.53	38	2.4	6.8	M	9DUPON,1999

Field Dissipation halflife(days):

value	test area	pH	%OM	source	reference
<30				E	SCSFAD 44:18-24,1985
90				M	9DUPON
79(30-180)*					

75	SILT LOAM(DE)	6.4	2.7	M	9DUPON
75	SILT LOAM(IL)	5.0	4.0	M	9DUPON
154	SILT LOAM(MS)	7.0	0.7	M	9DUPON,1999
123	LOAM(DE)	6.3	1.5	M	9DUPON,1999
140	SANDY LOAM(CA)	8.1	1.1	M	9DUPON,1999

Halflife in soil:

Soiltype	aerobic	anaerobic	source	reference
	88*		M	9DUPON
SANDY LOAM	216DARK		M	9DUPON,1999
SILT LOAM	39-54		M	9DUPON,1999
SANDY LOAM	27-72		M	9DUPON,1999

NORFLURAZON

ARS PESTICIDE PROPERTIES last update May 1999
name:NORFLURAZON **CASRN: 27314-13-2**
molecular formula: C12H9CLF3N3O
molecular weight : 303.7
physical state : S
(L=liquid; G=gas; S=solid)
reference:

Key to sources: (M)Manufacturer, (R)eview, (H)andbook, (E)xperiment,
(C)alculated, (U)nknown, (P)EPA data, (W)auchope
* denotes a selected value where multiple values of a property are listed.

-value-	-medium-	-temp-	-pH-	-source-	-reference-
Boiling point(deg C):					
-					
Melting point(deg C):					
174 - 180				H	9ACHB2
Decomposition point(deg C):					
-					
Heat of vaporization(deg C):					
--RATE CONSTANTS--					
Hydrolysis (per day):					
STABLE		25	5-9	M	6SANDO
Photolysis (per day):					
0.792	SOIL	25		M	6SANDO
16	WATER	25		M	6SANDO
0.41	SOIL	25		M	6SANDO
6.7	WATER	25		M	6SANDO
0.0169*	SOIL	25			
0.68*	WATER	25			
Vapor pressure (mPa):					
1.6E-3		20		M	6SANDO
3.7E-2		40		M	6SANDO
5.5E-1		60		M	6SANDO
5.9		80		M	6SANDO
51		100		M	6SANDO
0.00387*		25		M	6SANDO
Water solubility (ppm):		-temp-		-source-	-reference-
34*		25			
33.7		25		M	6SANDO
28.0		23		H	9HERBH
				H	JAFCAU 30:1032-1035,1982
28		25		R	EESADV
Organic solubility (ppm):					
5E04*	ACETONE	25		M	6SANDO
1.4E05*	ETHANOL	25		M	6SANDO
2.5E03*	XYLENE	25		M	6SANDO
Henrys law (Pa m3/mol):					
3.46E-5*		25		M	6SANDO
Octanol/water partitioning (log Kow):					
2.45*		25		M	6SANDO
Acid dissociation (pKa):					

Soil sorption:

soiltype	temp.	Kd	Koc	%om	pH	source	reference
CLAY LOAM	23	8.8	490	1.8	7.4	M	6SANDO
SANDY LOAM	23	2.6	430	0.6	7.9	M	6SANDO
SILT LOAM	23	2.6	370	0.7	5.7	M	6SANDO
SAND	23	0.73	120	0.6	7.4	M	6SANDO
			353*				

Field Dissipation halflife(days):

value	test area	pH	%OM	source	reference
163*	MS(COTTON)			M	6SANDO

Halflife in soil:

Soiltype	aerobic	anaerobic	source	reference
LOAM(MS)	130*	~240	M	6SANDO

PROMETON

ARS PESTICIDE PROPERTIES last update May 1999
name:PROMETON **CASRN: 1610-18-0**
molecular formula: C10H19N5O
molecular weight : 225.3
physical state : S
(L=liquid; G=gas; S=solid)
reference: 9CIBAG

Key to sources: (M)Manufacturer, (R)eview, (H)andbook, (E)xperiment,
(C)alculated, (U)nknown, (P)EPA data, (W)auchope
* denotes a selected value where multiple values of a property are listed.

-value-	-medium-	-temp-	-pH-	-source-	-reference-
Boiling point(deg C):					
-					
Melting point(deg C):					
89 - 91				M	9CIBAG
Decomposition point(deg C):					
-					
Heat of vaporization(deg C):					
--RATE CONSTANTS--					
Hydrolysis (per day):					
STABLE*		25	5-9	M	9CIBAG
Photolysis (per day):					
0.015	SOIL**	22-27		M	9CIBAG
0.026	SOIL***	21.5-26.2		M	9CIBAG
STABLE	WATER	25		M	9CIBAG
Vapor pressure (mPa):					
1.028		25		M	9CIBAG
10.5E-1		30		M	9CIBAG
10.1		50		M	9CIBAG
3.10E-1		20		H	9ACHB2,2ND ED.,1987
7.90E-2		10		H	9HERBH,5TH ED.,p.391,1983
Water solubility (ppm):		-temp-		-source-	-reference-
720*		22		M	9CIBAG
620		20		H	9PMED8,8TH ED.,p.698,1987
Organic solubility (ppm):					
3.5E+5*	DICHLOROMETHANE	20		H	9ACHB2,2ND ED.,1987
2.5E+5*	TOLUENE	20		H	9ACHB2,2ND ED.,1987
3.0E+5*	ACETONE	20		H	9PMED8,8TH ED.,p.698,1987
6.0E+5*	METHANOL	20		H	9PMED8,8TH ED.,p.698,1987
1.5E+5*	N-OCTANOL	20		H	9PMED8,8TH ED.,p.698,1987
Henrys law (Pa m3/mol):					
3.2E-4		25		M	9CIBAG
Octanol/water partitioning (log Kow):					
2.69*		25		M	9CIBAG
Acid dissociation (pKa):					
4.33		20		M	9CIBAG

Soil sorption:

soiltype	temp.	Kd	Koc	%om	pH	reference
SAND		0.38	218	0.3	5.4	9CIBAG
SILT LOAM		0.580	91	1.1	7.0	9CIBAG
SANDY LOAM		0.373	32	2.0	7.5	9CIBAG
SILTY CLAY LOAM		0.747	51	2.5	6.6	9CIBAG
SILTY CLAY LOAM		0.85	103	1.4	7.8	9CIBAG
			300			9HFEDP
			60			8CREAM
			99			9CIBAG
SANDY LOAM		2.61	150	3.0	6.1	9CIBAG
LOAM		2.90	172	2.9	6.9	9CIBAG
SANDY CLAY LOAM		2.4	83	5.0	7.0	9CIBAG

SANDY LOAM	1.2	98	2.1	7.0	9CIBAG
	0.398	86	0.8	5.6	9CIBAG
	0.40	95*			

Field Dissipation halflife(days):

value	test area	pH	source	reference
309	CA BARE(SL)		M	9CIBAG
938	NE BARE(SI L)		M	9CIBAG
789	NY BARE (SI L)		M	8CIBAG
459-1123			P	8EPAGR
>365			P	8EPAGR
531-2058			P	8EPAGR
1123	NE		P	8EPAGR
459	CA		P	8EPAGR
300-1000			M	9CIBAG
264			M	9CIBAG
3084			M	9CIBAG
1300*				

Halflife in soil:

Soiltype	aerobic	anaerobic	source	reference
SILTY CLAY LOAM	932*	557	M	9CIBAG 01/12/94

Comments:

PHOTOLYSIS: **ARTIFICIAL LIGHT
***NATURAL LIGHT

SIMAZINE

ARS PESTICIDE PROPERTIES last update May 1999

name:SIMAZINE **CASRN: 122-34-9**

molecular formula: C7H12CLN5
molecular weight : 201.66
physical state : S
(L=liquid; G=gas; S=solid)
reference: 9ACHB2

Key to sources: (M)Manufacturer, (R)eview, (H)andbook, (E)xperiment,
(C)alculated, (U)nknown, (P)EPA data, (W)auchope
* denotes a selected value where multiple values of a property are listed.

-value-	-medium-	-temp-	-pH-	-source-	-reference-
Boiling point(deg C):					
-					
Melting point(deg C):					
225 - 227				H	9ACHB2
Decomposition point(deg C):					
-					
Heat of vaporization(deg C):					
--RATE CONSTANTS--					
Hydrolysis (per day):					
STABLE*		20	5-9	M	9CIBAG
Photolysis (per day):					
4.5E-3	SOIL	25	7.3	M	9CIBAG
1.8E-E	WATER	25	7	M	9CIBAG
Vapor pressure (mPa):					
1.2E-4		10		M	9CIBAG
8E-04		20		M	9CIBAG
5E-03		30		M	9CIBAG
0.12		50		M	9CIBAG
0.003*		25			

Water solubility (ppm):	-temp-	-source-	-reference-
3.5	20	H	9HERBH
84	85	H	9HERBH
6.2*	22	M	9CIBAG
5		C	JPFCD2 22:55-69,1987
Organic solubility (ppm):			
900* CHLOROFORM	20	H	9PMED8
300* ETHER	20	H	9PMED8
400* METHANOL	20	H	9PMED8
2 * LT.PETROLEUM	20	H	9PMED8
Henrys law (Pa m3/mol):			
9.8E-05	25	M	9CIBAG
Octanol/water partitioning (log Kow):			
2.10*	25	M	9CIBAG
Acid dissociation (pKa):			
1.62		M	9CIBAG

Soil sorption:

soiltype	temp.	Kd	Koc	%om	pH	reference
			138			ETOCDK 8:339-357,1989
						9EINSP PP.23-67
						9HFEDP
			230			8GLEAM
			112			8CREAM
			160			JPFCD2 22:55-69,1987
CLAY		4.31	155	4.8	5.9	9CIBAG
SAND		0.65	124	0.9	6.5	9CIBAG
			115			9CIBAG
			114			9CIBAG
			140*			JEVQAA 16:422-428,1987

					SCSFAD 44:1-8,1985
		144			8INSFO
SANDY LOAM	1.27	114	1.9	7.5	
LOAM	0.48	103	0.8	6.7	

Field Dissipation halflife(days):

value	test area	pH	source	reference
26	FL CROP, SAND		M	9CIBAG
87	FL BARE, SAND		M	9CIBAG
125	OR BARE, LOAM		M	9CIBAG
69	MO CROP, LOAM		M	9CIBAG
55	MO BARE, LOAM		M	9CIBAG
186	MN BARE, LOAM		M	9CIBAG
44	FL BARE		M	9CIBAG
149	CA BARE, SNDY LM		M	9CIBAG
119	OR CROP, LOAM		M	9CIBAG
33	FL CROP, SAND		M	9CIBAG

89(26-186)*

Halflife in soil:

Soiltype	aerobic	anaerobic	source	reference
	91	58	M	9CIBAG

Attachment II – TFD Half-Life Raw Data and Calculations

Raw Data and Regression Analysis from Submitted Data Volumes to Determine TFD Half-life Values

Atrazine TFD dissipation Studies

Atrazine volume 220-106 record number 67385.
The value recorded in PESTCHEM is from record number 69062 which was an additional volume of data sumbitted for the degradation product hdyroxyatrazine and not the parent. This was recorded onto soil metabolism data sheet as sequence 20 and entered into PESTCHEM as 69.8 days for atrazine.
Data in italics is for atrazine in record 67385 but the analysis for the resubmitted study in volume 220-414 supercedes this data.
The registrant reported a 58 day half-life for only the 0-6 inch, which is on page 51 of the original report.

Site location: *Ripon, CA*
Soil type *Sandy Loam*
Application rate *3.96 ai/acre*
Application Date: *6/23/1986*
Corn crop

Day	*0-6 in*	*6-12 in*	*12-18 in*	*Total*	*Ln ppm*
	ppm (0.05 mdl)				
0	*1.15*	*0*	*0*	*1.15*	*0.139762*
1	*1.3*	*0*	*0*	*1.3*	*0.262364*
7	*2.82*	*0.03*	*0*	*2.85*	*1.047319*
14	*1.18*	*0.02*	*0*	*1.2*	*0.182322*
28	*1.04*	*0.06*	*0*	*1.1*	*0.09531*
60	*0.5*	*0*	*0*	*0.5*	*-0.69315*
90	*0.37*	*0.04*	*0*	*0.41*	*-0.8916*
120	*0.24*	*0.09*	*0*	*0.33*	*-1.10866*
180	*0.23*	*0.11*	*0*	*0.34*	*-1.07881*
267	*0.06*	*0.05*	*0*	*0.11*	*-2.20727*
358	*0.02*	*0.02*	*0*	*0.04*	*-3.21888*
slope					*-0.00982*
1/2-life					***70.56136***
r-sq					*0.922546*

Soil Information

Depth	0-1 feet	1-2 feet	2-3 feet	3-4 feet
Soil Texture	Sandy L	Sandy L	Sandy L	Sandy L
Sand %	55	55	50	55
Silt %	32.5	32.5	37.5	36
Clay %	12.5	12.5	12.5	9
OM	1.3	1	0.6	0.7
CEC	12.2	10.8	11.2	10.3
pH	7.3	7.2	7.1	6.7

Atrazine volume 220-414 (and 220-119) which is resubmission of 220-106 record number 67385 and indicated as Vol 24 of 26 with registration record number 139124.
The data for the 6-12 inch depth sample was different than the original submission above.

Site location: Ripon, CA
Soil type Sandy Loam
Application rate 3.96 ai/acre
Application Date: 6/23/1986
Corn crop

Day	0-6 in	6-12 in	12-18 in	Total	Ln ppm
	ppm (0.05 mdl)				
0	1.147	0	0	1.147	0.13715
1	1.298	0	0	1.298	0.260825
7	2.824	0.064	0	2.888	1.060564
14	1.183	0.055	0	1.238	0.213497
28	1.037	0.078	0	1.115	0.108854
60	0.496	0	0	0.496	-0.701179
90	0.365	0.059	0	0.424	-0.858022
120	0.244	0.085	0	0.329	-1.111698
180	0.226	0.114	0.075	0.415	-0.879477
267	0.079	0.083	0	0.162	-1.820159
358	0.052	0.056	0	0.108	-2.225624
slope					-0.007541
1/2-life					**91.92174**
r-sq					0.843833

Soil Information

Depth	0-1 feet	1-2 feet	2-3 feet	3-4 feet
Soil Texture	Sandy L	Sandy L	Sandy L	Sandy L
Sand %	55	55	50	55
Silt %	32.5	32.5	37.5	36
Clay %	12.5	12.5	12.5	9
OM	1.3	1	0.6	0.7
CEC	12.2	10.8	11.2	10.3
pH	7.3	7.2	7.1	6.7

Atrazine Continued:

Atrazine volume 220-107 record number 67386 but additional sampling submitted in 220-414 was noted as Vol 25 of 26 with registration record number 139128.
Data were recorded onto pesticide chemistry data sheets as sequence number 29 and in PESTCHEM as 102 days
On page 50 of the original report, half-life lives were determined for only the 0-6 inch segement at 119 and 102 days, with and without day 180, respectively

Site location: Ripon, CA
Soil type Sandy Loam
Application rate 9 ai/acre
Application Date: 6/23/1986
Bare soil ppm (0.05 mdl)

Day	0-6 in	6-12 in	12-18 in	Total	Ln ppm
0	4.75	0	0	4.75	1.558145
14	2.46	0	0	2.46	0.900161
28	1.22	0	0	1.22	0.198851
60	1.05	0	0	1.05	0.04879
90	1.05	0	0	1.05	0.04879
120	0.67	0	0	0.67	-0.400478
180	5.31	0.93	0	6.24	1.83098
267	0.5	0	0	0.5	-0.693147
358	0.2	0.13	0	0.33	-1.108663
460	1	0	0	1	0
552	0.085	0	0	0.085	-2.465104
726	0	0	0	**0.025**	-3.688879
873	0	0	0	**0.025**	-3.688879
1045	0	0	0	**0.025**	-3.688879
slope - all and 180 included					-0.004962
1/2-life					**139.6845**
r-sq					0.809305

slope - 0 to 726 days and 180 included -0.005484
1/2-life **126.3987**
r-sq 0.693836

slope 180 to 726 -0.008587
1/2-life **80.7171**
r-sq 0.787192

Day	0-6 in	6-12 in	12-18 in	Total	Ln ppm
0	4.75	0	0	4.75	1.558145
14	2.46	0	0	2.46	0.900161
28	1.22	0	0	1.22	0.198851
60	1.05	0	0	1.05	0.04879
90	1.05	0	0	1.05	0.04879
120	0.67	0	0	0.67	-0.400478
267	0.5	0	0	0.5	-0.693147
358	0.2	0.13	0	0.33	-1.108663
460	1	0	0	1	0
552	0.085	0	0	0.085	-2.465104
726	0	0	0	**0.025**	-3.688879

slope 180 excluded -0.004921
1/2-life **140.843**
r-sq 0.776864

Soil Information

Depth	0-1 feet	1-2 feet	2-3 feet	3-4 feet
Soil Texture	Sandy L	Sandy L	Sandy L	Sandy L
Sand %	55	55	50	55
Silt %	32.5	32.5	37.5	36
Clay %	12.5	12.5	12.5	9
OM	1.3	1	0.6	0.7
CEC	12.2	10.8	11.2	10.3
pH	7.3	7.2	7.1	6.7

Bromacil TFD Dissipation Studies

Bromacil Volume 210 -0044 and recorded as record number 88916.
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence numbers 19, 20, 21, and 22.
Data for Delaware recorded in 19 and 20 where 19 is for 0-10 cm soil depth with TFD at 155 days and 20 is for 0-30 cm soil depth with TFD at 168 days.

Site location: Newark, Delaware
Soil type Silty Clay Loam(0-30 cm)
Application rate 12 lbs ai/acre
Application Date: 6/22/1988

mdl=0.01 ppm	Total PPM	Ln of Total	0-10 cm				10-20 cm				20-40- cm				40-60 cm			
Day	Recovered	Recovere	Rep 1	Rep 2	Rep 3	Avg	Rep 1	Rep 2	Rep 3	Avg	Rep 1	Rep 2	Rep 3	Avg	Rep 1	Rep 2	Rep 3	Avg
-1			<0.01	<0.01	<0.01		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	
0	10.11	2.313855	9.89	9.77	9.48	9.71	0.19	0.26	0.22	0.22	0.14	0.16	0.22	0.17	0	0	0.01	0.0033
7	8.47	2.136924	7.58	7.57	9.6	8.25	0.17	0.29	0.1	0.19	0.02	0.08	0.01	0.04	0	0	0	0
14	6.58	1.884541	6.15	5.44	7.3	6.30	0.33	0.29	0.09	0.24	0.02	0.04	0.09	0.05	0	0	0	0
30	4.74	1.55674	4.23	4.44	5.4	4.69	0.05	0.09	0.02	0.05	0	0	0	0.00	0	0	0	0
61	4.37	1.475525	2.44	6.14	4.54	4.37	0	0	0	0.00	0	0	0	0.00	0	0	0	0
90	4.03	1.393766	4.18	3.04	4.76	3.99	0.04	0.02	0.05	0.04	0	0	0	0.00	0	0	0	0
125	4.11	1.414234	3.02	4.69	4.52	4.08	0.01	0.03	0.03	0.02	0	0.02	0.02	0.01	0	0	0	0
149	3.61	1.283708	2.54	4.08	4.14	3.59	0	0.03	0.04	0.02	0	0	0	0.00	0	0	0	0
181	4.44	1.490654	3.37	5.77	3.37	4.17	0.25	0.04	0.26	0.18	0.26	0	0	0.09	0	0	0	0
210	3.28	1.186827	2.81	3.4	3.07	3.09	0.19	0.18	0.18	0.18	0	0	0	0.00	0	0	0	0
243	3.14	1.143161	2.32	2.08	3.84	2.75	0.28	0.33	0.48	0.36	0.02	0.03	0.03	0.03	0	0	0	0
299	2.62	0.963174	2.14	1.97	2.64	2.25	0.16	0.48	0.36	0.33	0.02	0.04	0.04	0.03	0	0.01	0	0.0033
359	2.14	0.760806	1.51	1.89	2.5	1.97	0.13	0.19	0.12	0.15	0.01	0.02	0.04	0.02	0	0	0.01	0.0033
418	1.77	0.57098	1.22	1.73	1.4	1.45	0.68	0.11	0.15	0.31	0	0	0.02	0.01	0	0	0	0
538	0.47	-0.755023	0.4	0.44	0.38	0.41	0.03	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0	0	0.02	0.0067
slope ®	-0.004154																	
1/2-life	**166.8446**																	
r-sq	0.8745225																	

Soil Information
Depth 0-30 cm
Soil Texture SiCL
Sand % 8
Clay % 29.6
Silt % 62.4
OM 1.1
CEC 11.8
pH 5.3

Data for California recorded in 21 and 22 where 21 is for 0-10 cm soil depth with TFD at 124 days and 22 is for 0-30 cm soil depth with TFD at 137 days.

Site location: Madera, CA
Soil type Loam
Application rate 12 lbs ai/acre

	Total PPM	Ln of Total	0-10 cm				10-20 cm				20-40- cm				40-60 cm			
Day	Recovered	Recovere	Rep 1	Rep 2	Rep 3	Avg	Rep 1	Rep 2	Rep 3	Avg	Rep 1	Rep 2	Rep 3	Avg	Rep 1	Rep 2	Rep 3	Avg
-1			<0.01	<0.01	<0.01		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	
0	8.68	2.161405	9.21	8.04	7.58	8.28	0.37	0.06	0.5	0.31	0.1	0.01	0.17	0.09	0	0	0.01	0.0033
7	5.14	1.636404	6.05	3.88	5.06	5.00	0.11	0.09	0.09	0.10	0.03	0.02	0.08	0.04	0	0	0	0
15	3.51	1.255616	1.77	4.87	3.57	3.40	0.08	0.09	0.13	0.10	0	0.01	0.01	0.01	0	0	0	0
29	3.77	1.32619	1.29	5.11	4.55	3.65	0.16	0	0.19	0.12	0	0	0	0.00	0	0	0	0
59	3.08	1.12493	1.26	3.4	4.56	3.07	0.01	0.01	0	0.01	0	0	0	0.00	0	0	0	0
89	2.89	1.062409	2.86	3.37	2.32	2.85	0.06	0.03	0.04	0.04	0	0	0	0.00	0	0	0	0
112	2.99	1.095273	2.98	2.98	2.79	2.92	0.09	0.1	0.03	0.07	0	0	0	0.00	0	0	0	0
152	3.44	1.234502	2.47	2.43	5.03	3.31	0.06	0.28	0.04	0.13	0	0	0	0.00	0	0	0	0
179	3.19	1.160021	2.81	2.93	3.62	3.12	0.09	0.05	0.05	0.06	0.02	0	0	0.01	0	0	0	0
219	2.52	0.925581	2.03	2.56	2.05	2.21	0.41	0.24	0.24	0.30	0.04	0	0	0.01	0	0	0	0
239	2.12	0.752987	1.88	2.29	1.58	1.92	0.22	0.16	0.24	0.21	0	0	0	0.00	0	0	0	0
300	1.51	0.41211	1.33	1.24	1.74	1.44	0.09	0.04	0.09	0.07	0	0	0	0.00	0	0	0	0
358	0.68	-0.385662	0.54	0.55	0.75	0.61	0.06	0.02	0.05	0.04	0.04	0	0.03	0.02	0	0	0	0
415	0.66	-0.415515	0.57	0.41	0.47	0.48	0.15	0.17	0.16	0.16	0.03	0	0	0.01	0.02	0	0	0.0067
slope ®	-0.004732																	
1/2-life	**146.47928**																	
r-sq	0.8419705																	

Soil Information
Depth 0-30 cm
Soil Texture L
Sand % 37.6
Clay % 22.8
Silt % 39.6
OM 1
CEC 18
pH 8.1

Diuron TFD Dissipation Studies

Diuron Volume 106-0045 recorded as record number 89035 in PESTCHEM but actually 89036 in the data volu
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence numbers 17and 19
where 17 is at 102 days and 19 is a recalculation for 0-30 inch depth of soil at 99.9 days.

Site location: Madera, CA
Soil type Sandy Loam
Application rate 12 lbs ai/acre
Application Date: 5/24/1988

Day	Total PPM Recovered	Avg
-1	<0.01 ppm	
0	2.8	1.029619
7	2.3	0.832909
15	2.4	0.875469
29	2.3	0.832909
59	1.4	0.336472
89	1.3	0.262364
112	0.92	-0.083382
152	1	0
179	0.73	-0.314711
219	0.92	-0.083382
239	0.57	-0.562119
300	0.28	-1.272966
358	0.17	-1.771957
415	0.18	-1.714798
slope		-0.006738
1/2-life		**102.8724**
r-sq		0.954824

Soil Information

Depth	0-12 IN	12-24 IN
Soil Texture	Sandy L	L
Sand %	54	46
Silt %	28.4	36.4
Clay %	17.6	17.6
OM	1.3	0.9
CEC	17.1	25.8
pH	7.5	8.2
WHC 1/3 Ba	19.20%	24.3
15 Bar	7.10%	9.2

Diuron Volume 106-0045 should be recorded as record number 89035.
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence numbers 18and 20
where 18 is at 134 days and 20 is a recalculation for 0-30 inch soil depth at 127 days.

Site location: Newark, DE
Soil type Silty Clay Loam
Application rate 12 lbs ai/acre

Day	Total PPM Recovered	Avg
-1	<0.01 ppm	
0	2.3	0.832909
7	1.9	0.641854
14	2.1	0.741937
30	1.3	0.262364
61	0.5	-0.693147
90	0.53	-0.634878
124	0.4	-0.916291
149	0.47	-0.755023
181	0.7	-0.356675
210	0.43	-0.84397
243	0.32	-1.139434
299	0.55	-0.597837
359	0.37	-0.994252
418	0.11	-2.207275
slope		-0.005202
1/2-life		**133.2439**
r-sq		0.70092

Soil Information

Depth	0-30 cm	30-60 cm
Soil Texture	SICL	SICL
Sand %	8	6
Silt %	64.4	66.4
Clay %	27.6	27.6
OM	0.8	0.2
CEC	9.7	12.6
pH	5.7	5.2
WHC 1/3 Ba	26.90%	29.6
15 Bar	7.70%	8.8

Hexazinone TFD Dissipation Studies

Hexaxinone Volume 396-0060 record number 116836 - NOT CURRENTLY IN PEST CHEM
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence number 12

Site location: Madera, CA
Soil type Sandy Loam
Application rate 12 lbs ai/acre
Application Date: 4/18/1991
Bare Soil Dupont data

Day	Total PPM Recovered	Avg	ND as 0	ln Avg
0	3.26	1.181727	3.26	1.181727
1	2.92	1.071584	2.92	1.071584
7	2.83	1.040277	2.83	1.040277
14	2.55	0.936093	2.52	0.924259
29	2.77	1.018847	2.77	1.018847
60	4.07	1.403643	4.01	1.388791
120	2.02	0.703098	1.93	0.65752
180	1.07	0.067659	0.93	-0.072571
slope ®		-0.004925		-0.005611
1/2-life		140.7432		**123.5245**
r-sq		0.656021		0.689611

Soil Information

Depth	0-30 cm	30-60 cm	60-90 cm
Soil Texture	Sandy L	Sandy L	Sandy L
Sand %	64	72	72
Silt %	24	18	20
Clay %	12	10	0.8
OM	1.1	0.7	0.8
CEC	15.95	16.39	14.46
pH	7.9	8.3	8.2
Moisture (%)	10.40%	10.9	12.2

Note: data taken from Dupont has .029 added in for less than detected values in lower depths. Recaclutuion adds 0

0	1.181727
1	1.071584
7	1.040277
14	0.924259
29	1.018847
120	0.65752
180	-0.072571
Slope - 60 day excluded	-0.005786
1/2-life	**119.8009**
r-sq	0.90914

Hexaxinone Volume 396-0061and recorded as record number 116846
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence number 11
The value was recorded as 123 days on the sheet but as "Approx. 123 days" in the PestChem database

Site location: Newark, DE
Soil type Silt Loam
Application rate 12 lbs ai/acre
Application Date: 6/27/1990
Bare Soil Dupont data

Day	Total PPM Recovered	Avg	ND as 0	Avg
0	4.04	1.396245	3.96	1.376244
1	2.79	1.026042	2.68	0.985817
6	2.58	0.947789	2.47	0.904218
14	3.18	1.156881	3.1	1.131402
28	1.5	0.405465	1.41	0.34359
60	1.15	0.139762	1.06	0.058269
121	0.54	-0.616186	0.45	-0.798508
182	0.4	-0.916291	0.35	-1.049822
359	0.32	-1.139434	0.27	-1.309333
448	0.16	-1.832581	0.07	-2.65926
539	0.17	-1.771957	0.08	-2.525729
slope ®		-0.005597		-0.006919
1/2-life		123.8443		**100.1857**
r-sq		0.857272		0.898918

Soil Information

Depth	0-30 cm	30-60 cm	60-90 cm
Soil Texture	Loam	Silt Loam	Silt Loam
Sand %	29.6	17.6	31.6
Silt %	46	58	42
Clay %	24.4	24.4	26.4
OM	1.5	1	0.9
CEC	7.79	9.29	9.06
pH	6.3	4.9	4.9
Moisture (%)	16.20%	15.3	15.3

Hexazinone Continued

Hexaxinone Volume 396-0061and recorded as record number 116843
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence number 10
The value was recorded as 154 days on the sheet but as "Approx. 154 days" in the PestChem database

Site location: Greenville Mississippi
Soil type Silt Loam
Application rate 12 lbs ai/acre
Application Date: 3/21/1990
Bare Soil

	Dupont data Total PPM			
Day	Recovered	Avg	ND as 0	Avg
0	2.62	0.963174	2.62	0.963174
1	1.83	0.604316	1.83	0.604316
7	3.83	1.342865	3.77	1.327075
14	2.61	0.95935	2.55	0.936093
29	2.56	0.940007	2.56	0.940007
58	2.36	0.858662	2.33	0.845868
120	1.08	0.076961	1.05	0.04879
180	0.865	-0.145026	0.95	-0.051293
365	0.61	-0.494296	0.58	-0.544727
450	0.33	-1.108663	0.27	-1.309333
540	0.24	-1.427116	0.15	-1.89712
slope		-0.004495		-0.005093
1/2-life		154.2166		**136.0987**
r-sq		0.932324		0.947787

Soil Information

Depth	0-30 cm	30-60 cm	60-90 cm
Soil Texture	Silt Loam	Silty Clay Loar	Silty Clay Loa
Sand %	14.4	8.4	10.4
Silt %	26.4	36.4	36.8
Clay %	59.2	55.2	52.8
OM	0.7	0.7	0.6
CEC	15.7	25.2	25.7
pH	6.8	7.1	7.2
Moisture (%)	14.80%	18.4	18.7

Norflurazon TFD Dissipation Studies

Norflurazon Volume 356-0062 recorded as record number 85464.
Originally not accepted but volume 356-0066 submitted for rebuttal and study was accepted.
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence numbers 10, and 11.
Pesticide Chemistry data base contains two values for this study at 180 and 304 days corresponding to 0-10 cm and 0-40 cm soil depths, respectively.

Site location: Donalsonville, GA
Soil type Tifton Sandy Loam
Application rate 1.5 lbs ai/acre
Date 6/17/1987
Peanut crop

Soil Information

Depth	0-1 ft	1-2 ft	2-3 ft	3-4 ft
Soil Texture	Sandy Loam	Sandy Clay Loam	Sandy Clay Loam	Sandy Clay Loam
Sand %	78	68.8	62.4	58
Silt %	10.6	9	8.6	13.2
Clay %	11.4	22.2	29	28.8
OM	1.2	0.3	0.2	0.1
CEC	9.8	9.7	9.2	10.2
pH	4.7	4.7	5.2	4.5

Analyses conducted on the mass of norflurazon recovered - registration had used total which added desmethyl norflurazon.

Day (Page 16 Table 5)	Total ug Recovered	ln ug
0	3.04	1.11185752
1	8.35	2.12226154
15	4.86	1.58103844
30	7.84	2.05923883
60	12.3	2.50959926
120	14.35	2.66374994
180	4.25	1.44691898
271	9.01	2.19833507
361	3.27	1.18478998
547	1.44	0.36464311
slope - all		-0.00228084
1/2-life		**303.899594**
r-sq		0.34247254
Correlation - r		-0.58521153
slope - day 120 to 1547		-0.00464463
1/2-life		**149.236125**
r-sq		0.75517827
Correlation - r		-0.86900994

Norlfurazon Continued

Norflurazon Volume 356-0060 recorded as record number 73729.
Pesticide Chemistry data base value is 33 days and the data sheet indicates the calculation was until 186 days.
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence number 09.

Site location: Kerman, CA
Soil type Sandy Loam
Application rate 2.0 lbs ai/acre
Date 1/29/1987
Appears that a second application was made to the soil see day 277
vineyard crop

Soil Information

Depth	0-30 cm
Soil Texture	Sandy Loam
Sand %	75
Silt %	17
Clay %	8
OM	1
CEC	5.1
pH	7.4
BD	1.58

Data in Table were reported in PPM on weight weight basis so converted to **ug dry mass** per core as (PPM (1+%mois/100)) x BD x 7.5 cm core volume

Day (Page 27 Table IV 0.01ppm	total ppm dry	**ug conversion**	**ln ug**	0-7.5 cm	%mois	ppm dry	7.5-15	%mois	ppm dry	15-22.5	%mois	ppmdry	22.5-30	%mois	ppm dry
0	3.308723	160.91114	5.08085229	3.13	5.71	3.3087	0	5.56	0	0	5	0	0	5	0
1	2.609232	126.893214	4.843345901	2.28	14.44	2.6092	0	13.8	0	0	5	0	0	5	0
15	1.92375	93.5565795	4.538566382	1.71	12.5	1.9238	0	8.95	0	0	5	0	0	5	0
32	1.2710509	61.8142558	4.124134014	1.2	3.25	1.239	0.031	3.39	0.0321	0	5	0	0	5	0
57	0.6248064	30.3858348	3.413976538	0.58	5.54	0.6121	0.012	5.62	0.0127	0	5	0	0	5	0
124	0.1652897	8.03843481	2.084234388	0.146	5.21	0.1536	0.011	6.21	0.0117	0	5	0	0	5	0
186	0.066758	3.24660176	1.177608837	0.052	4.3	0.0542	0.012	4.35	0.0125	0	5	0	0	5	0
277	0.9713264	47.237934	3.855197257	0.916	6.04	0.9713	0	4.69	0	0	5	0	0	5	0
365	0.5118338	24.8917061	3.214534659	0.432	4.17	0.45	0.047	4.74	0.0492	0.012	4.93	0.0126	0	5	0
547	0.1147068	5.57846698	1.718914004	0.078	0.44	0.0783	0.023	2.96	0.0237	0	5	0	0.012	5.69	0.0127
slope - all			-0.00458109												
1/2-life			**151.3062708**												
r-sq			0.390429184												
Slope - day 0 to 186			-0.02078342												
1/2-life			**33.3509742**												
r-sq			0.985277598												
Slope - day 277 to 547			-0.00795811												
1/2-life			**87.09952148**												
r-sq			0.999175676												

Norlfurazon Continued

Norflurazon Volume 356-0059 recorded as record number 72281.
Study was not accepted due to lack of storage stability study, rainfall data, only 2 lbs applied, and shape of response curve.

Site location: Porterville, CA
Soil type Sandy Loam
Application rate 2.0 lbs ai/acre
Date 2/11/1987
Peach Orchard

Soil Information

Depth	surface
Soil Texture	sandy loam
Sand %	32.8
Silt %	45.6
Clay %	21.6
OM	1.85
CEC	10.7
pH	7.9

Table III Page 16 (0.01ppm mdl) reports ppm on a wet weight basis. Table IV is total ug also wet weight with moisture reported in Table 1..

Day	Total ppm dry	ug conversion	ln ug	0-10 cm	% mois	ppm dry	10-20 cm	% mois	ppm dry	20-30 cm	% mois	ppm dry	30-40 cm	% mois	ppm dry	40-50 cm	% mois	ppm dry	50-60 cm	% mois	ppm dry
0	1.05558	55.9879632	4.0251367	0.964	9.5	1.056	0	9.5	0	0	9.1	0	0	5	0	0	5	0	0	5	0
1	0.274012	14.5335965	2.676463	0.244	12.3	0.274	0	9.1	0	0	9.1	0	0	5	0	0	5	0	0	5	0
15	1.3603	72.150312	4.2787516	1.22	11.5	1.36	0	9.5	0	0	9.7	0	0	5	0	0	5	0	0	5	0
30	2.07411	110.010794	4.7005785	1.53	10.8	1.695	0	9.1	0	0.346	9.5	0.379	0	5	0	0	5	0	0	5	0
60	3.404206	180.559086	5.1960581	1.82	3.1	1.876	0.588	5.5	0.62	0.149	7.1	0.16	0.427	6.5	0.455	0.246	7.8	0.265	0.026	7.4	0.028
120	3.7412	198.433248	5.2904528	1.82	8.2	1.969	1.24	7.2	1.329	0.408	8.5	0.443	0	8.9	0	0	8.4	0	0	9	0
270	2.638323	139.936652	4.9411898	1.06	8.1	1.146	1.02	7.9	1.101	0.123	7.1	0.132	0	6.9	0	0	7.5	0	0.242	7.5	0.26
360	0.756353	40.1169631	3.6917993	0.649	7.9	0.7	0.042	7.6	0.045	0	8	0	0.01	8.9	0.011	0	8.9	0	0	7.9	0
slope - all data			0.000723																		
1/2-life			**Not Possible**																		
r-sq			0.0047598																		
slope - day 60 to 360			-0.004638																		
1/2-life			**149.4605**																		
r-sq			0.8168142																		
slope 120 to 360			-0.006219																		
1/2-life			**111.45726**																		
r-sq			0.8047755																		

Norflurazon Continued

Norflurazon Volume 356-0112.
Study was not reviewed by Registration
Site location: Alfred , FL
Soil type Fine Sand
Application rate 8.0 lbs ai/acre
Date 2/5/1987
Citrus Orchard

Soil Information - Astatula Fine Sand

Depth	2-12 in	12-45	43-91	91-152	152-279		
Soil Texture							
Sand %	96.5	96.8	97.5	97.8	97.6		
Silt %	2	1.7	1.2	0.8	1.2		
Clay %	1.5	1.5	1.3	1.4	1.2		
OM	0.36	0.16	0.08	0.04	0.03		
CEC	1.3	0.7	0.5	0.3	0.3		
pH	5.6	5.7	5.7	5.5	5.4		
BD	1.3	1.52	1.5	1.52	1.6	1.488	Used for determination of mass

Table III Page 16 (0.01ppm mdl) reports ppm on a wet weight basis. Table IV is total ug also wet weight with moisture reported in Table 1..

Day	Total ppm dry	ug conversion	ln ug	0-10 cm	% mois	ppm dry	10-20 cm	% mois	ppm dry	20-30 cm	% mois	ppm dry	30-40 cm	% mois	ppm dry	40-50 cm	% mois	ppm dry	50-60 cm	% mois	ppm dry
0	3.11298	188.990261	5.241695485	3.07	1.4	3.113	0	2.8	0	0	4.5	0	0	5	0	0	5	0	0	5	0
1	4.071363	247.174076	5.510092851	4	1.5	4.06	0.011	3.3	0.011	0	4	0	0	5	0	0	5	0	0	5	0
15	3.97194	241.138066	5.485369658	3.86	2.9	3.972	0	3.2	0	0	3.8	0	0	5	0	0	5	0	0	5	0
30	5.128508	311.353772	5.740929796	3.54	2.5	3.629	0.044	3.2	0.045	0	3.4	0	1.4	3.9	1.455	0	3.5	0	0	3	0
60	4.063794	246.714559	5.508232038	2.05	2.7	2.105	0.813	4.4	0.849	0.147	4.3	0.153	0.901	0.9	0.909	0.046	2.7	0.047	0	3.3	0
120	2.294135	139.277854	4.936470884	1.68	4.3	1.752	0.214	3	0.22	0.015	3.5	0.016	0.29	5.5	0.306	0	4.6	0	0	5.1	0
180	3.50378	212.715885	5.359957404	2.54	3.6	2.631	0.5	2.6	0.513	0.06	3	0.062	0.29	2.6	0.298	0	3.7	0	0	3.6	0
270	3.02946	183.919728	5.214499404	1.16	5.5	1.224	1.06	4.6	1.109	0.335	5.1	0.352	0.213	7.5	0.229	0.07	5.2	0.074	0.04	5.5	0.042
360	3.032384	184.097246	5.215464127	1.02	2.5	1.046	1.053	3	1.085	0.581	1.9	0.592	0.236	3.5	0.244	0.049	3	0.05	0.015	3.5	0.016
523	2.696815	163.724717	5.098186465	0.911	2.5	0.934	0.663	2.5	0.68	0.696	3.5	0.72	0.176	5.5	0.186	0.124	4.5	0.13	0.031	4.5	0.032
574	2.466792	149.759929	5.009033539	1.11	1.7	1.129	0.63	4.9	0.661	0.19	6.1	0.202	0.059	4.6	0.062	0.102	5	0.107	0.106	3.6	0.11
slope - all data			-0.00075338																		

			60-70 cm	% mois	ppm dry	70-80 cm	% mois	ppm dry	80-90	% mois	ppm dry	90-100	% mois	ppm dry	100-110	% mois	ppm dry	110-120	% mois	ppm dry
1/2-life		**920.0526722**																		
r-sq		0.422816822	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
Correlation - r		-0.65024366	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
Sope - day 60 to 574		-0.00051515	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
1/2-life		**1345.536015**	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
r-sq		0.261833902	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
Correlation - r		-0.51169708	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
Slope - Day 120 excluded		-0.00082989	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
1/2-life		**835.2245278**	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
R-sq		0.671714088	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
Correlation - r		-0.81958165	0.015	3	0.015	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
			0.045	3.2	0.046	0.048	4.4	0.05	0.058	4.5	0.061	0.012	4.6	0.013	0.015	4.3	0.016	0.011	4.3	0.011

Norflurazon Continued

Norflurazon Volume 356-115 recorded as record number 163189. An incomplete copy is attached to 356-112 Study was not reviewed by Registration. The reporting is lacking but Appendix X appears to present a complete calculation for Norflurazon residues in each soil segment.

Site location: Greenville, MS
Soil type Silt Loam
Application rate 4 lbs ai/acre applied in two split applications
Application Date: first application noted as 6/17/1986 at 2.5 lb ai/acre and then right after planting on same sme at 1.5
Cotton Crop

Soil Information

Depth	0-12 IN
Soil Texture	Silt Loam
Sand %	23
Silt %	57
Clay %	20
OM	0.5
CEC	8.9
pH	6.8

Day	ug Norflurzon	ln ug	ug Desmethyl norflurazon	Sampled Depth
1	114.07	4.7368123	4	1
30	42.04	3.73862155	6.2	2
94	48.13	3.87390568	7.8	3
134	53.19	3.97387041	11.1	4
268	55.9	4.02356438	7.68	
365	45.42	3.81595254	20.8	
601	24.33	3.19171016	19.3	
slope		-0.00156589		
1/2-life		**442.654484**		
r-sq		0.53784649		

day

1		30		94		134		268		365		601	
ppm	ug	ppm	ug	pm	ut	ppm	ug	ppm	ug	pm	ug	ppm	ug
2.1	112	0.78	41.62	0.89	47.49	0.93	49.62	0.978	52.18	0.51	20.41	0.284	15.15
0.038	2.028	0.012	0.64	0.012	0.64	0.046	2.454	0.057	3.041	0.538	21.53	0.172	9.177
0	0	0	0	0	0	0.021	1.12	0.014	0.747	0.072	2.881	0	0
	0	0	0		0		0		0	0.015	0.6		0
	114.1		42.26		48.13		53.2		55.97		45.42		24.33

Note for 10 cm sample depth BD=1.3 and volume=41.043 cc For 7.5 cm sample depth diameter=30.

Prometon TFD Dissipation Studies

Prometon Volume 50170-0030 recorded as record number 51029
Six separate numbers entered into the data bases but they are just treatments from the same study.
Data recorded onto soil metabolism sheets as sequence numbers 8, 9, 10, 11, 12, and 13.

Site location: Fresno, CA
Soil type Sandy Loam
Application rate 10 and 20 lbs active ingredient/acre and with comparisons to multiple yearly applications
Product used was Parametol 25E is 25% by weight prometon
Application Date: 6/15/1976
Condition: Bare ground?
Analyses conducted on PPM dry mass

Calculation of predicted soil concentration in 0-6 inch soil segment after application:

Megagrams in 6-inches soil in 1 acre at BD of 1.4 = 863.233224
863.233224
AT 10 lbs per acre = 4540 grams a.I.
Concentration in ppm = **5.2593**
At 20 lbs per acre = 9080 grams a.I.
Concentration in ppm = **10.5186**

For record numbers 51029 and 51030, the first year application rate is low but later years appear on target
For record number 51031, the first year application rate appears on target but later dates are greater.

Soil Information

Texture	andy Loam
% Sand	57.2
% Silt	31.2
%Clay	11.6
% OM	7.4
pH	6.7
CEC Meg/100g	7.4

One treatment with no additional applications

PPM Dry Mass - 0.05

Day	1x Application Rate					2x Application Rate				
	0-6 in	6-12 in	12-18 in	Total	LN(PPM)	0-6 in	6-12 in	12-18 in	Total	LN(PPM)
0	2.06	0	0	2.06	0.722706	3.9	0	0	3.9	1.360977
69	1.11	0.13	0	1.24	0.215111	3.98	0.67	0.08	4.73	1.553925
181	0.87	0.21	0.09	1.17	0.157004	2.76	0.43	0.44	3.63	1.289233
370	0.67	0.06	0.06	0.79	-0.23572	1.33	0.32	0.12	1.77	0.57098
518	0.62	0.11	0.07	0.8	-0.22314	1.17	0.43	0.2	1.8	0.587787
734	0.43	0.11	0	0.54	-0.61619	0.62	0.11	0	0.73	-0.31471
958	0	0	0	0.025	-3.68888	0.49	0.12	0.06	0.67	-0.40048
1092	0.06	0	0	0.06	-2.81341	0.46	0.15	0	0.61	-0.4943
slope - all					-0.00346					-0.002
1/2-life					**200.5633**					**347.1092**
r-square					0.804802					0.942095
slope - 0 to 958 days with 1/2 MDL					-0.00353					-0.00217
1/2-life					**196.5973**					**319.6757**
r-square					0.735482					0.940683
slope - censored due to asymtopte 0 to 370 days					-0.00226					
1/2-life					**306.5127**					
r-square					0.862697					
slope - censored due to asymtopte 0 to 518 days					-0.00166					
1/2-life					**418.5398**					
r-square					0.891246					

Prometon Continued

Prometon Volume 50170-0030 Continued

Superimposed treatment Year 2 - reported data

Day											
	0	4.89	0	0	4.89	1.587192	10.26	0	0	10.26	2.328253
	64	2.28	0.37	0.17	2.82	1.036737	5.64	1.18	0.37	7.19	1.972691
	148	1.75	0.52	0.28	2.55	0.936093	5.15	0.83	0.46	6.44	1.862529
	364	1.92	0.24	0.19	2.35	0.854415	3.14	0.81	0.41	4.36	1.472472
slope						-0.00159					-0.00214
1/2-life						**437.211**					**323.8836**
r-square						0.578097					0.928837

Superimposed treatment Year 2 - data for previous sampling at day 370 used as background for lower depths.

Day											
	0	4.89	**0.06**	**0.06**	5.01	1.611436	10.26	**0.32**	**0.12**	10.7	2.370244
	64	2.28	0.37	0.17	2.82	1.036737	5.64	1.18	0.37	7.19	1.972691
	148	1.75	0.52	0.28	2.55	0.936093	5.15	0.83	0.46	6.44	1.862529
	364	1.92	0.24	0.19	2.35	0.854415	3.14	0.81	0.41	4.36	1.472472
slope						-0.00163					-0.00222
1/2-life						**424.829**					**312.208**
r-square						0.570778					0.910336

Superimposed treatment Year 3 - reported data

Day											
	0	4.18	0	0	4.18	1.430311	6.37	0	0	6.37	1.851599
	61	5.28	0.29	0.09	5.66	1.733424	5.46	1.04	0.38	6.88	1.928619
	224	1.8	0.41	0.08	2.29	0.828552	10.42	1	0.58	12	2.484907
	358	1.5	0.83	0.71	3.04	1.111858	5.9	0.76	0.74	7.4	2.00148
slope						-0.00167					No Degradati
1/2-life						**416.0558**					
r-square						0.474644					

Superimposed treatment Year 3 - data for previous sampling at day 364 used as background for lower depths.

Day											
	0	4.18	0.24	0.19	4.61	1.528228	6.37	0.81	0.41	7.59	2.026832
	61	5.28	0.29	0.09	5.66	1.733424	5.46	1.04	0.38	6.88	1.928619
	224	1.8	0.41	0.08	2.29	0.828552	10.42	1	0.58	12	2.484907
	358	1.5	0.83	0.71	3.04	1.111858	5.9	0.76	0.74	7.4	2.00148
slope						-0.00187					No Degradati
1/2-life						**371.4615**					
r-square						0.55069					

Prometon Continued

Prometon Volume 50170-0031 recorded as record number 51030
Data was not recorded onto soil metabolism and does not appear to have been reviewed.
Study design was the same as for Volume 50170-0029
Site location: Columbia, NY
Soil type Silt Loam
Application rate 10 and 20 lbs active ingredient/acre and with comparisons to multiple yearly applications
Product used was Parametol 25E is 25% by weight prometon
Application Date: 8/4/1976
Condition: Bare ground?
Analyses conducted on PPM dry mass

Soil Information	
Texture	Silt Loam
% Sand	35
% Silt	52
%Clay	13
% OM	2.8
pH	6.3
CEC Meg/100g	9.1

One treatment with no additional applications

PPM Dry Mass - 0.05

Day	1x Application Rate					2x Application Rate				
	0-6 in	6-12 in	12-18 in	Total	LN(PPM)	0-6 in	6-12 in	12-18 in	Total	LN(PPM)
0	1.65	0	0	1.65	0.500775	3.1	0	0	3.1	1.131402
63	1.24	0.19	0.08	1.51	0.41211	4.71	0.2	0.15	5.06	1.621366
251	0.81	0.08	0.1	0.99	-0.01005	2.33	0.24	0.08	2.65	0.97456
365	0.88	0.12	0	1	0	1.49	0.1	0	1.59	0.463734
626	0.89	0.09	0	0.98	-0.0202	1.49	0.11	0.09	1.69	0.524729
740	0.88	0.08	0	0.96	-0.04082	2.1	0.12	0.05	2.27	0.81978
1095	1	0.36	0	0.025	-3.68888	1.33	0.6	0	1.93	0.65752
slope - all					-0.00299					-0.00065
1/2-life					**231.7901**					**1062.338**
r-square					0.646191					0.406472
slope - censored due to asymtopte 0 to 251 days					-0.00208					
1/2-life					**332.6871**					
r-square					0.993536					
slope - censored due to asymtopte 0 to 365 days					-0.00153					-0.0023
1/2-life					**453.5059**					**301.2767**
r-square					0.914626					0.658756

Prometon Continued

Prometon Volume 50170-0031 continued

Superimposed treatment Year 2 - reported data

Day										
0	3.46	0	0	3.46	1.241269	4.98	0	0	4.98	1.60543
60	3.73	0.43	0.11	4.27	1.451614	5.36	0.73	0.1	6.19	1.822935
255	2.78	0.18	0.39	3.35	1.20896	4.16	0.29	0.28	4.73	1.553925
365	2.23	0.39	0	2.62	0.963174	3.97	0.46	0.07	4.5	1.504077
slope					-0.00093					-0.00056
1/2-life					**746.2493**					**1243.757**
r-square					0.619466					0.452584

Superimposed treatment Year 2 - data for previous sampling at day 365 used as background for lower depths

Day										
0	3.46	**0.12**	**0**	3.58	1.275363	4.98	**0.1**	**0**	5.08	1.625311
64	3.73	0.43	0.11	4.27	1.451614	5.36	0.73	0.1	6.19	1.822935
148	2.78	0.18	0.39	3.35	1.20896	4.16	0.29	0.28	4.73	1.553925
364	2.23	0.39	0	2.62	0.963174	3.97	0.46	0.07	4.5	1.504077
slope					-0.0011					-0.00057
1/2-life					**630.5894**					**1224.514**
r-square					0.743976					0.411413

Superimposed treatment Year 3 - reported data

Day										
0	5.27	0	0	5.27	1.66203	9.67	0	0	9.67	2.269028
60	3.68	0.58	0.1	4.36	1.472472	6.43	0.55	0.13	7.11	1.961502
365	3.89	0.68	0.1	4.67	1.541159	5.68	1.01	0.15	6.84	1.922788
slope					-0.00015					-0.00068
1/2-life					**4612.355**					**1017.126**
r-square					0.093937					0.494294

Superimposed treatment Year 3 - data for previous sampling at day 364 used as background for lower depths.

Day										
0	5.27	**0.39**	**0**	5.66	1.733424	9.67	**0.46**	**0.07**	10.2	2.322388
60	3.68	0.58	0.1	4.36	1.472472	6.43	0.55	0.13	7.11	1.961502
365	3.89	0.68	0.1	4.67	1.541159	5.68	1.01	0.15	6.84	1.922788
slope					-0.00028					-0.00078
1/2-life					**2455.448**					**888.4914**
r-square					0.166845					0.480036

Prometon Continued

Prometon Volume 50170-0031 recorded as record number 51031
Data was not recorded onto soil metabolism and does not appear to have been reviewed.
Study design was the same as for Volume 50170-0029
Site location: York, Nebraska
Soil type Silt Loam
Application rate 10 and 20 lbs active ingrediet/acre and with comparisons to multiple yearly applications
Product used was Parametol 25E is 25% by weight prometon
Application Date: 6/25/1976
Condition: Bare ground
Analyses conducted on PPM dry mass

Soil Information

Texture	Silt Loam
% Sand	20.4
% Silt	58.6
%Clay	21
% OM	2.9
pH	6.4
CEC Meg/100g	14

One treatment with no additional applications

PPM Dry Mass - 0.05

Day	1x Application Rate					2x Application Rate				
	0-6 in	6-12 in	12-18 in	Total	LN(PPM)	0-6 in	6-12 in	12-18 in	Total	LN(PPM)
0	3.85	0	0	3.85	1.348073	9.3	0	0	9.3	2.230014
61	3.24	0.2	0.15	3.59	1.278152	8.71	0.27	0.15	9.13	2.211566
183	3.81	0.44	0.22	4.47	1.497388	7.57	1.08	0.38	9.03	2.200552
365	5.55	0.36	0.22	**6.13**	1.813195	10.41	1.47	1.18	**13.06**	2.569554
542	2.17	0.2	0.25	2.62	0.963174	6.55	2.01	0.21	8.77	2.171337
727	3.12	0.29	0.19	3.6	1.280934	7.03	0.19	0.95	8.17	2.100469
888	2.89	0.59	0.12	3.6	1.280934	6.85	2.13	0.67	9.65	2.266958
1093	2.32	0.66	0.27	3.25	1.178655	6.6	2.56	0.73	9.89	2.291524
slope - all					-0.00022					-5.3E-06
1/2-life					**3220.095**					**130847.6**
r-square					0.120991					0.000229
slope - censored due to hump at day 365					-0.00053					-0.00025
1/2-life					**1318.592**					**2727.878**
r-square					0.229022					0.762187

Superimposed treatment Year 2 - reported data

Day									
0	15.16	0	0	15.16	2.71866	28.3	0	0	28.3	3.342862
60	11.07	1.39	0.2	12.66	2.538447	17.55	2.68	0.79	21.02	3.045474
176	4.22	0.27	0.3	4.79	1.56653	16.58	2.27	1.32	20.17	3.004196
361	2.62	0.82	0.41	3.85	1.348073	13.18	1.67	0.42	15.27	2.72589
slope					-0.00402					-0.00149
1/2-life					**172.2763**					**464.2661**
r-square					0.869011					0.883302

Prometon Continued

Prometon Volume 50170-0031 Continued

Superimposed treatment Year 2 - reported data

Day											
	0	15.16	0	0	15.16	2.71866	28.3	0	0	28.3	3.342862
	60	11.07	1.39	0.2	12.66	2.538447	17.55	2.68	0.79	21.02	3.045474
	176	4.22	0.27	0.3	4.79	1.56653	16.58	2.27	1.32	20.17	3.004196
	361	2.62	0.82	0.41	3.85	1.348073	13.18	1.67	0.42	15.27	2.72589
slope						-0.00402					-0.00149
1/2-life						**172.2763**					**464.2661**
r-square						0.869011					0.883302

Superimposed treatment Year 2 - data for previous sampling at day 365 used as background for lower depths.

Day											
	0	15.16	**0.36**	**0.22**	15.74	2.756205	28.3	1.47	1.18	30.95	3.432373
	64	11.07	1.39	0.2	12.66	2.538447	17.55	2.68	0.79	21.02	3.045474
	148	4.22	0.27	0.3	4.79	1.56653	16.58	2.27	1.32	20.17	3.004196
	364	2.62	0.82	0.41	3.85	1.348073	13.18	1.67	0.42	15.27	2.72589
slope						-0.00393					-0.00167
1/2-life						**176.25**					**415.0082**
r-square						0.798322					0.831854

Superimposed treatment Year 3 - reported data

Day											
	0	10.58	0	0	10.58	2.358965	24.49	0	0	24.49	3.198265
	61	4.53	0.76	0.29	5.58	1.719189	15.78	0.82	1.26	17.86	2.882564
	159	4.85	0.82	0.29	5.96	1.78507	12.95	1.56	0.61	15.12	2.716018
	365	6.9	2.15	0.78	9.83	2.285439	14.78	3.06	1.43	19.27	2.958549
slope						0.000406					-0.00041
1/2-life						**-1706.63**					**1677.908**
r-square						0.038342					0.108576

Superimposed treatment Year 3 - data for previous sampling at day 365 used as background for lower depths.

Day											
	0	10.58	**0.82**	**0.41**	11.81	2.468947	24.49	**1.67**	**0.42**	26.58	3.280159
	61	4.53	0.76	0.29	5.58	1.719189	15.78	0.82	1.26	17.86	2.882564
	159	4.85	0.82	0.29	5.96	1.78507	12.95	1.56	0.61	15.12	2.716018
	365	6.9	2.15	0.78	9.83	2.285439	14.78	3.06	1.43	19.27	2.958549
slope						0.000196					-0.00057
1/2-life						**-3529.97**					**1217.509**
r-square						0.007215					0.147898

Simazine TFD Dissipation Studies

Simazine Volume 213 -0055 and recorded as record number 50876 .
Pesticide Chemistry data base contains two values for this study at 83.5 and 9.05 days for crop a
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence numbers 2(
Data for sequence number 21 was transcribed incorrectly because it was noted as 9.05 x 10^{1} on t

Site location: Hillboro, Oregon
Soil type Loam
Application rate 4 lbs ai/acre
Application Date: 5/30/1985
Crop Raspberries

Soil Information

Depth	0-12 in	12-24 in	24-36 in	36-48 in
Soil Texture	Loam	clay loam	Loam	Loam
OM %	2.2	0.5	0.4	0.2
pH	5.4	5.9	6	5.9
CEC (meg/100 g)	16.2	17.4	18.3	20.8
Water Holding Cap	2.4	2.12	2.61	2.45
Bulk Density	1.19	1.23	1.19	1.22
Sand %	33.6	31.2	35.6	45.6
Silt %	45.8	41.2	42.8	38.8
Clay %	14	27.6	21.6	15.6

Cropped (mdl 0.05 ppm)	Day	Cropped - AVG corrected PPM 0-8	8-16	16-24	Total	Avg PPM LN
	0	3.6	0.3	0.27	4.17	1.427916
	1	2.6	0	0	2.6	0.955511
	4	4.7	0.11	0	4.81	1.570697
	8	2.2	0	0	2.2	0.788457
	15	1.7	0	0	1.7	0.530628
	29	2.4	0.085	0	2.485	0.910273
	60	2.5	0.33	1.02	3.85	1.348073
	90	0.95	0.13	0	1.08	0.076961
	180	0.69	0.051	0	0.741	-0.299755
	slope					-0.008128
	1/2-life					**85.27568**
	r-sq					0.604097

Bare Soil	Day	Bare - AVG corrected PPM 0-8	8-16	16-24	Total	Avg PPM
	0	1.55	0.115	0.027	1.692	0.525911
	1	2.7	0	0	2.7	0.993252
	4	2.4	0.28	0	2.68	0.985817
	8	2.6	0.26	0	2.86	1.050822
	15	3.45	0.083	0	3.533	1.262147
	29	2.4	0	0	2.4	0.875469
	60	4.4	0.28	0	4.68	1.543298
	90	1	0	0	1	0
	180	0.67	0.053	0	0.723	-0.324346
	slope					-0.007179
	1/2-life					**96.55679**
	r-sq					0.512456

Simazine Continued

Simazine Volume 213 -0074 and recorded as record number 71428
Data recorded onto pesticide chemistry data sheets under soil metabolism sequence numbers 22, and 23
Two values were entered in PESTCHEM where one for surface 0-6 inches at 149 dys was accepted but the the full depth of 0-48 inch caluclation at 244 days was unaccpeted

Site location: Ripon, CA
Soil type Sandy loam
Application rate 18 lbs ai/acre
Application Date: 7/11/1986
Bare Ground

Soil Information

Depth	0-12 in	12-24 in	24-36 in	36-48 in
Soil Texture	Sandy Loam	Sandy Loa	Sandy Loa	Sandy Loam
OM %	1.3	1	0.6	0.7
pH	7.3	7.2	7.1	6.7
CEC (meg/100 g)	12.2	10.8	11.2	10.3
Sand %	55	55	50	55
Silt %	32.5	32.5	37.5	36
Clay %	12.5	12.5	12.5	9

mdl=0.05 ppm

	Bare - AVG corrected PPM					Avg PPM	
Day	0-6 in	6-12 in	12-18 in	18-24 in	24-36 in	Total	
0	7.92	0	0	0	0	7.92	2.069391206
15	3.4	0	0	0	0	3.4	1.223775432
28	4.33	0.04	0	0	0	4.37	1.474763009
61	1.12	0	0	0	0	1.12	0.113328685
90	0.78	0	0	0	0	0.78	-0.248461359
120	0.94	0	0	0	0	0.94	-0.061875404
180	1.62	0.02	0	0	0	1.64	0.494696242
269	2.26	1.18	0.14	0	0	3.44	1.235471471
376	0.23	0	0	0	0	0.23	-1.46967597
564	0.26	0.06	0.06	0.56	0	0.32	-1.139434283
slope							-0.004530951
1/2-life							**152.9804934**
r-sq							0.520054611

Simazine Continued

Simazine Volume 213 -0055 and recorded as record number 50877
Study appears to have been conducted at the same time as 50977
Not accepted by Registration and not entered into PestChem

Site location: Lake Placid, Florida
Soil type Sand
Application rate 9.6 lbs ai/acre
Application Date: 6/10/1985
Crop Citrus

Soil Information

Depth	0-12 in	12-24 in	24-36 in	36-48 in
Soil Texture	sand	sand	sand	sand
OM %	0.9	0.2	0.3	0.3
pH	7.8	7.6	7.5	6.8
CEC (meg/100 g)	1.4	0.2	0.7	0.3
Water Holding Cap	0.18	0.06	0.08	0.09
Bulk Density	1.52	1.54	152	1.52
Sand %	96	97.6	97.6	95.6
Silt %	0.4	0.8	0.8	0.8
Clay %	3.6	1.6	1.6	3.6

Cropped
mdl=0.05 ppm

Cropped - AVG corrected PPM

Day	0-8	8-16	16-24	Total PPM	LN (PPM)
0	14	0.13	0	14.13	2.6483
2	11.1	0.16	0.21	11.47	2.439735
5	11	0.41	0.09	11.5	2.442347
9	16.1	0.25	0.29	16.64	2.811809
15	16	0.11	0.06	16.17	2.783158
31	4.2	0.16	0	4.36	1.472472
62	0.14	0	0.06	0.2	-1.609438
91	0.34	0	0	0.34	-1.07881
184	0.26	0	0	0.26	-1.347074
slope					-0.026507
1/2-life					**26.1493**
r-sq					0.694753

Bare Grpund

Bare - AVG corrected PPM

Day	0-8	8-16	16-24	Total PPM	LN (PPM)
0	17	0	0	17	2.833213
2	16	0.17	0	16.17	2.783158
5	12	0	0	12	2.484907
9	10	0.2	0	10.2	2.322388
15	8.2	0.2	0.05	8.45	2.134166
31	3.1	0	0.064	3.164	1.151837
62	3.3	0.25	0	3.55	1.266948
91	2.2	0.11	0	2.31	0.837248
184	2	0	0	2	0.693147
slope					-0.01159
1/2-life					**59.80654**
r-sq					0.693175

Simazine Continued

Simazine Volume 213 -0054 and recorded as record number 50976
The data were not recorded onto pesticide chemistry data base and the volume cannot be located.
Wen-lin Chen from Syngenta was contacted on Nov 12, 2008 to ask if electronic copies were available
The response was three PDF files, one for the study in Missouri and the other for another study in Florida
The e-mailed reports are more complete than the submitted reports because sampling for this study was at 544 days and not just for Six Months as indicated in the title for the submitted study.
The study Volume is 213-0173 and the record number for MO is 243279

Site location: Clarence, Missouri
Soil type Sandy loam
Application rate 2.8 lbs ai/acre
Application Date: 5/22/1985
No-Till Corn

Cropped

	PPM dry weight				
Day	0-8 in	8-16 in	16-24 in	Total PPM	LN (PPM)
0	2.5	0	0.056	2.556	0.938444
1	1.8	0	0	1.8	0.587787
3	1.4	0	0	1.4	0.336472
7	0.21	0	0	0.21	-1.560648
14	0.73	0	0	0.73	-0.314711
30	1.4	0.081	0.052	1.533	0.427227
61	0.82	0	0	0.82	-0.198451
90	0.56	0	0	0.56	-0.579818
180	0.17	0	0	0.17	-1.771957
299	0.16	0	0	0.16	-1.832581
366	0.17	0	0	0.17	-1.771957
544	0.054	0	0	0.054	-2.918771
slope - all data					-0.005721
1/2-life					**121.1632**
r-sq					0.706299
slope - 0 to 180					-0.010151
1/2-life					**68.28337**
r-sq					0.420344

mdl=0.05 ppm

Soil Information

Depth	0-12 in	12-24 in	24-36 in	36-48 in
Soil Texture	Loam	Silty Cl Loam	Silty Clay	Silty Cl Loam
OM %	2.1	1.1	0.4	0.5
pH	5.5	4.6	5.5	5.8
CEC (meg/100 g)	18.1	37.2	28.6	22.5
Sand %	25.6	17.6	15.6	19.6
Silt %	48.4	50.8	40.4	42.4
Clay %	26	31.6	44	38
Bulk Density	1.28	1.35	1.22	1.22

Bare Soil

	PPM dry weight				
Day	0-8 in	8-16 in	16-24 in	Total PPM	LN (PPM)
0	1.7	0.14	0	1.84	0.609766
1	1.2	0	0	1.2	0.182322
3	1.7	0.059	0	1.759	0.564745
7	0.84	0	0	0.84	-0.174353
14	3.1	0	0	3.1	1.131402
30	0.79	0.079	0	0.869	-0.140412
61	0.97	0.067	0	1.037	0.036332
90	0.44	0	0	0.44	-0.820981
180	0.16	0	0	0.16	-1.832581
299	0.21	0	0	0.21	-1.560648
366	0.11	0	0	0.11	-2.207275
544	0	0	0	**0.025**	-3.688879
slope - all data					-0.00743
1/2-life					**93.2879**
r-sq					0.893043
Slope - 0 to 180 days					-0.012846
1/2-life					**53.95999**
r-sq					0.783995
Slope without day 544					-0.007494
1/2-life					**92.49422**
r-sq					0.802212

Simazine Continued

The data were not recorded onto pesticide chemistry data base and the volume cannot be located.
Wen-lin Chen from Syngenta was contacted on Nov 12, 2008 to ask if electronic copies were available
The response was three PDF files, one for the study in Missouri and the other for another study in Florida
The e-mailed reports are more complete than the submitted reports because sampling for this study was at 549 days and not just for Six Months as indicated in the title for the submitted study.
The study Volume is 213-0173 and the record number for FL is 243280

Site location: Lake Placid, Florida This appears to be a second study conducted in the same year
Soil type Sand
Application rate 9.6 lbs ai/acre
Application Date: 6/27/1985
Citrus
Cropped

PPM dry weight

Day	0-8 in	8-16 in	16-24 in	Total PPM	LN (PPM)
0	15	1.8	0.073	16.873	2.82571471
1	14	1.1	0.055	15.155	2.71833051
4	19	0.38	0	19.38	2.96424161
12	14	0.93	0	14.93	2.70337261
19	11	0.65	0.91	12.56	2.53051716
31	11	0.5	0.2	11.7	2.45958884
62	2.8	0.056	0	2.856	1.04942204
91	1.3	0	0.072	1.372	0.31626953
185	0.16	0	0	0.16	-1.8325815
282	0.069	0	0	0.069	-2.6736488
366	0	0	0	**0.025**	-3.6888795
549	0	0	0	0	#NUM!
slope - day 549 excluded					-0.0191582
1/2-life					**36.1801402**
r-sq					0.96182348
slope - 0 to 185					-0.0264087
1/2-life					**26.246904**
r-sq					0.98460431

Soil Information

Depth	0-12 in	12-24 in	24-36 in	36-48 in
Soil Texture	Sand	Sand	Sand	Sand
OM %	0.7	0.5	0.7	0.7
pH	6.9	5.9	5.4	5.2
CEC (meg/100 g)	0.5	0.4	1.1	0.7
Sand %	95.6	98	95.6	91.2
Silt %	0.8	0.4	0.8	5.6
Clay %	3.6	1.6	3.6	3.2
Bulk Density	1.52	1.52	1.49	1.47

Application Date: 6/28/1985
Application rate 9.4 lbs ai/acre
Bare Soil

PPM dry weight

Day	0-8 in	8-16 in	16-24 in	Total PPM	LN (PPM)
0	9.4	0.26	0	9.66	2.26799365
1	12	0.26	0	12.26	2.50634193
3	4.1	0.14	0	4.24	1.44456327
10	3.3	0	0	3.3	1.19392247
18	5.9	0.34	0.05	6.29	1.83896107
30	2.8	0.19	0	2.99	1.09527339
61	0.65	0.25	0.16	1.06	0.05826891
90	0.23	0.23	0	0.46	-0.7765288
184	0.25	0.11	0	0.36	-1.0216512
274	0.14	0	0	0.14	-1.9661129
365	0	0	0	**0.025**	-3.6888795
548	0	0	0	0	#NUM!
slope - day 548 excluded					-0.0147888
1/2-life					**46.8698721**
r-sq					0.91145034
slope - 0 to 184					-0.0186193
1/2-life					**37.2273279**
r-sq					0.7904411

Soil Information

Depth	0-12 in	12-24 in	24-36 in	36-48 in
Soil Texture	Sand	Sand	Sand	Sand
OM %	0.9	0.2	0.3	0.3
pH	7.8	7.6	7.5	6.8
CEC (meg/100 g)	1.4	0.2	0.7	0.3
Sand %	96	97.6	97.6	95.6
Silt %	0.4	0.8	0.8	0.8
Clay %	3.6	1.6	1.6	3.6
Bulk Density	1.52	1.54	1.52	1.52