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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OS 558 3

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

AUG 23 1991

MEMORANDUM

SUBJECT: Review of CIBA-GEIGY's Ninety-Day Response
to the Atrazine Data Call-In

FROM: Silvia C. Termes, Chemist
Chemistry Review Section #3
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division

TO: Lois Rossi/Connie Childress
Reregistration Branch, PM #74
Special Review and Reregistration Division (H7508W)

THRU: Henry M. Jacoby, Chief
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

In correspondence dated 3/11/91, CIBA-GEIGY Corporation responded to the Agency's Data Call-In by indicating that they will submit the new studies and/or additional information according to the following schedule:

I. New Studies

	<u>Interim Report</u>	<u>Final Report</u>
<u>161-2</u> Photodegradation in Water	n/a	10/19/91
<u>161-3</u> Photodegradation on Soil	n/a	10/19/91
<u>162-1</u> Aerobic Soil Metabolism	10/19/91	10/19/92

II. Additional Information/Studies

A. For the 163-1 (Mobility in Soil) data requirement, the registrant had already submitted the information requested by EFGWB on soil series names for the soils used in the batch-equilibrium adsorption/desorption studies reviewed on 3/6/90. After reviewing the submission on soil series names (EFGWB review of 5/8/91), the 163-1 data requirement was considered fulfilled.

B. For the Terrestrial Field Dissipation, Short-term (164-1) data requirement, CIBA-GEIGY believes that the available data are already adequate to address, at least partially, the dissipation of atrazine in soils and proposes to provide the Agency with the following additional data on atrazine and its primary degradates.

1. Deficiencies in the existing terrestrial field dissipation studies will be addressed to the extent possible. CIBA-GEIGY will also provide the Agency a corn/bareground study conducted two-years ago, but which have not been submitted yet. According to CIBA-GEIGY, the Georgia study gives more complete information on the fate and recoveries of atrazine residues in the field than the previously submitted/reviewed studies. EPA due date for submission is 10/19/92; proposed date listed by the registrant is 7/19/91.

EFGWB Response: The Branch will review the addressed deficiencies and the study conducted in Georgia. The results of the reviews will then determine the status of the 164-1 data requirement. A major deficiency found in the previously reviewed terrestrial field dissipation studies (EFGWB's Second Round Review; 11/18/88) was the apparent lack of a suitable analytical method. This issue will be addressed by CIBA-GEIGY in the response.

2. CIBA-GEIGY proposes addressing the fate of the major degradates by providing additional ground-water monitoring data on degradates (CIBA-GEIGY does not believe that it is technically feasible at the present time to address the fate of the degradates in the soil by methods other than those previously used; no further explanations were provided).

The registrant plans to obtain samples in sites from their ongoing monitoring programs and from states and other agencies where monitoring activities are underway. The samples will be analyzed for parent atrazine and for the major degradates. By analyzing for degradates, the registrant expects to obtain the necessary data for noncrop, crop, and turf areas without of conducting additional, new 164-1 studies (that is, the registrant expects to address the movement of degradates in the field by the proposed approach). CIBA-GEIGY has requested a meeting with the Agency to discuss this approach and set suitable timeframes for the studies.

EFGWB Response: In principle, analyzing for parent and major degradates in ground water will provide important information about the movement of parent and degradates to ground water. However, EFGWB believes that, if ground water samples are going to be analyzed for parent and degradates in samples from ongoing monitoring studies, the registrant should submit their protocols for sampling/analytical methodology for approval by the Branch prior starting their proposed approach. EFGWB believes that this approach should be also extended to monitoring activities in surface waters. EFGWB agrees to meet with CIBA-GEIGY to discuss the requirements for the protocols.

- C. For the Forestry Field Dissipation study (164-3), CIBA-GEIGY will update the existing study. An extension to complete this task (from 4/19/91 to 7/19/91) was requested.

EFGWB Response: In the Second Round Review (11/18/88), the Branch determined that this study may be upgradable. If the additional information is acceptable, then the study may be used to fulfill data requirements. EFGWB has no objections to the time extension.

- D. For the Spray Drift studies (201-1/202-1), CIBA-GEIGY requested to use the data generated by the Spray Drift Task Force (of which CIBA-GEIGY is a member) to fulfill the Spray Drift data requirements.

EFGWB Response: The Branch is concerned about the following issues, which are possibly related to drift of atrazine:

- a. Atmospheric transport of atrazine residues.
- b Evidence of adverse effects to phytoplankton in surface waters, but for which the extent of drift contribution versus run-off contribution is not well understood at the present time.

If the Ecological Effects Branch (EEB) requires exposure assessment that will need to take into account drift contributions, then EFGWB will require that the Spray Drift data for atrazine be submitted prior to completion of the Task Force report.

General Recommendation

As requested earlier for the adsorption/desorption studies, EFGWB is requiring that the soil series names for all the soils used in the studies be included in the pertinent report. The registrant should include, when possible, the horizon from which the soil was sampled. Locality (site, county, state name) should also be reported. Clay minerals in the clay fractions should be reported by name (for example, montmorillonite, kaolinite, etc.). The method by which cation exchange capacity was determined should be indicated in the report.

For each of the major degradates of atrazine, EFGWB needs information on their aqueous solubility.

cc: A.L. Barton

March 11, 1991

Document Processing Desk (DCI-0062)
Special Review and
Reregistration Division
Office of Pesticide Programs - H7504C
U.S. Environmental Protection Agency
1921 Jefferson Davis Highway
Crystal Mall 2 - Room 266A
Attention: Constance Childress

Dear Ms. Childress:

SUBJECT: NINETY-DAY RESPONSE
ATRAZINE DATA CALL-IN
RECEIVED OCTOBER 19, 1990

Enclosed please find the following information in response to the subject data call-in notice. Please note that CIBA-GEIGY's 90-day response due date was extended until March 31, 1991 in a December 31, 1990 letter from the Agency.

1. Data Call-In Response Sheet (Attachment B).
2. Requirements Status and Registrant's Response Form Table A Generic Data Requirements for Atrazine (Attachment C), and two Attachments.
3. Confidential Statements of Formula (EPA Form 8570-4) for EPA Reg. Nos. 100-529, -521, and -581.

This response also includes recommendations which were the subject of a December 19, 1990 meeting between CIBA-GEIGY and the EPA. Refer to the Attachment to the Table A Generic Data Requirements for Atrazine for detailed explanations regarding the various proposals.

Also please note that in many cases we are requesting new due dates for protocols, interim reports, and final reports, based on the various proposals contained in the Attachment to Table A. These revised due dates are also included in this submission.

Since CIBA-GEIGY is requesting a large number of such changes, we request quick feedback from the Agency so appropriate studies can be quickly initiated. In several instances, meetings will be needed to discuss further these proposals before developing the full program. Some of the meetings which are anticipated include:

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1. Aquatic Residue Monitoring Study (EEB and EF&GWB)
2. Mutagenicity (Atrazine) repeats and Chronic Feeding/Oncogenicity (Hydroxyatrazine) (HED)
3. Field Dissipation alternate testing proposals for water monitoring for cropland and turf sites. ■

These meetings will need to take place in March-April 1991 if we hope to meet our projected timeframes. I will call regarding establishing these meetings soon.

If there are any questions concerning matters contained in this submission, please do not hesitate to contact us.

Sincerely,

Thomas J. Parshley
Senior Regulatory Specialist

CC: Jude Andreasen
Robert J. Taylor

Enclosures

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ATTACHMENT FOR TABLE A GENERIC DATA REQUIREMENTS
FOR ATRAZINE

PRODUCT CHEMISTRY

Section 61-1

There was no information identified for any CIBA-GEIGY products in the data call-in document for this requirement. The requirement listed within the science review chapter was nominal concentration for Technical Atrazine, EPA Reg. No. 100-529. This requirement will be satisfied under 62-2 with the certification of limits which appear on the enclosed Confidential Statement of Formula for EPA Reg. No. 100-529. Clarification of this item is requested.

Section 62-1

Analyses for nitrosamines is identified as a requirement for manufacturing-use products in both the data call-in and the science review chapters; however, the registration number 100-529 was not specifically quoted and therefore it was unclear if this requirement applied to this product. CIBA-GEIGY believes the requirement does apply for EPA Reg. No. 100-529; however clarification by the Agency is requested.

Section 62-2

As requested from the science review chapters the certification of ingredient limits are being supplied on EPA Form 8570-4 (Rev. 2/85) for CIBA-GEIGY products, 100-529, 100-521, and 100-581. An explanation of how the certified limits were determined must be provided according to the science review chapters. However, the DCI did not indicate this information as being required. Clarification is requested.

Section 63

From the data call-in document and the science review chapters, EPA has requested that we determine the density and stability of our unregistered TGAI.

 Therefore, we propose at this time that the EPA reconsider requiring these studies on the unregistered TGAI.

MANUFACTURING PROCESS INFORMATION IS NOT INCLUDED

From the science review chapters, the following studies are required for the products indicated. These studies were not required in the data call-in document.

pH	100-521, 100-529, and 100-581
oxidizing/reducing action	100-521, 100-529, and 100-581
flammability	100-521, 100-529, and 100-581
explodability	100-521, 100-529, and 100-581
storage stability	100-521 and 100-529
corrosion characteristics	100-521, 100-529, and 100-581

Clarification of these items is requested.

ENVIRONMENTAL FATE

161-2 Adsorption/Desorption

In a previous submission, CIBA-GEIGY provided a new set of these data. EPA reviewed these data and in a June 14, 1990 letter indicated we should provide the soil series classification for soils used in the study. CIBA-GEIGY provided this information on July 30, 1990 (copy enclosed), and we believe the current studies should now be acceptable.

164-1 and 164-3 Field/Forestry Dissipation

CIBA-GEIGY believes that the accumulation of field dissipation data is adequate to address the dissipation of atrazine in soil and that the various concerns about the studies can be at least partially addressed. The recovery concerns for hydroxyatrazine are inherent in the properties of the material in that it readily binds to soil. Performing additional dissipation studies will do little to improve on this issue. As a result of these concerns we propose the following to provide the Agency with additional data on atrazine and its primary degradates.

1. CIBA-GEIGY will provide comments to upgrade the existing forestry dissipation study. Refer to the due date summary for an extension request for providing these data.
2. CIBA-GEIGY will respond to deficiencies in the other field dissipation studies to the extent possible. It is our feeling these data, taken in total, are scientifically acceptable and provide the Agency with good data on atrazine fate. In addition, CIBA-GEIGY will provide a corn/bareground study from Georgia which was completed two years ago, but as yet has not been submitted to EPA. This study is considered to be more complete relative to fate and recoveries. These data will be provided under the timeframe noted in the due date summary sheet.

3. Since it is technically not feasible at the present time to address the fate of major degradates in the soil other than by the methods previously used, CIBA-GEIGY also proposes that we address degradates through providing additional ground water data on degradates. This will be accomplished by obtaining samples from a variety of areas where monitoring is ongoing. We will interact with states and agencies to obtain samples from their monitoring programs and will conduct analyses to determine the presence of possible atrazine degradates as well as parent atrazine. This effort will be accomplished in lieu of additional dissipation studies on non-crop, crop and turf areas. We propose to discuss this approach further in a meeting with the Agency in March/April, 1991. Once this meeting is held, then decisions on suitable timeframes can be discussed with the Agency based on when agreement is reached on a program.

201-1 and 202-1 Droplet Size Spectrum/Drift Field Evaluation

CIBA-GEIGY is a member of the Spray Drift Task Force and therefore requests that the Agency allow data generated by this group to be provided in fulfillment of these requirements.

Special Studies-Applicator Exposure

CIBA-GEIGY representatives participated in the design and development of the Pesticide User Exposure Data Base. The information for this data base have been provided to the Agency, although it has not yet been validated by EPA. We understand this is a priority project of the Health Effects Division. This data base covers a wide variety of crop and application techniques, aerial and ground. We would propose that the Agency use this data base in lieu of requiring CIBA-GEIGY to generate additional exposure data specific to atrazine. Please also note the following.

1. Sugarcane - CIBA-GEIGY does not believe that applications to this commodity are any different than row crops, i.e., ground boom. In the early 1980's, CIBA-GEIGY provided data on this use of atrazine, which the Agency has not acknowledged. This study shows very low exposure potential. It is recommended that the Agency review these data prior to requiring further data.

2. Macadamia Nuts - In the December 19 meeting, CIBA-GEIGY proposed to exclude backpack sprayer use from the label in lieu of generating data on this crop. Feedback from the Agency is requested on this matter.

3. Turf - CIBA-GEIGY will conduct a turf exposure study with liquid product applied by handgun only. Additionally, a

representative granular formulation will also be evaluated for dermal and inhalation exposure. Refer to the due date summary for an extension request.

ECOLOGICAL EFFECTS

72-7 Simulated/Actual Field Testing-Aquatic

In response to the Atrazine Special Data Call-In, CIBA-GEIGY provided a comprehensive summary of residue monitoring data from several sources. This data were provided to the Agency as part of a large submission dated April 10, 1989 (EPA MRID NO. 41065205). We do not believe this information has been reviewed by the Ecological Effects Branch. It is suggested that this data be reviewed and feedback obtained from the Agency prior to a request for any further residue aquatic monitoring data.

It is also suggested that a meeting be held with the Agency to discuss the above noted data and the data base we have already to determine what additional work should be carried out to fulfill this requirement. This meeting will be set up in March-April.

RESIDUE CHEMISTRY/METABOLISM

171-4 Residue Analytical Method

In the December 19 meeting it was noted that any metabolite with an intact triazine ring is of concern to the Agency. While there is methodology for conversion of triazines to cyanuric acid, this methodology is not specific in that it cannot discern triazine residues from atrazine from triazine sources other than atrazine, i.e., cyanuric acid derived from both other pesticide and non-pesticide sources which have been demonstrated to be present in the environment. Despite over twenty years of efforts by CIBA-GEIGY to apply cyanuric acid methodology to crop and animal residue analysis, backgrounds of residues on the order of 1 ppm in crops and animal tissues and fluids have been encountered in numerous substrates derived from carefully controlled field trials and animal studies. Moreover, these background levels are extremely variable. Therefore, such an approach to quantitation of total atrazine residues is not considered feasible. Please note the following:

1. Our proposal is to use marker residues in crops to increase residue accountability. Current chlorotriazine methodology accounts for 5-10% of the total residue. Based on data from field-derived ¹⁴C atrazine metabolism studies, adding methodology for hydroxyatrazine (G-34048) and the de-ethylated hydroxy metabolite (GS-17794) would increase the accountability

of the total residue significantly.

The proposed enforcement methods then would account for the four chlorotriazine moieties (atrazine, G-28279, G-30033 and G-28273) and the two major hydroxytriazine metabolites (G-34048 and GS-17794), for a total of six metabolites. Both the chlorotriazine and hydroxytriazine methodology will be applied to representative samples from each of the three ¹⁴C-treated corn and sorghum studies, described in 171-4 Plant Residue/Metabolism studies noted below, to determine the extractability, accountability and suitability of these methods for tolerance enforcement purposes using a marker residue concept. The proposed hydroxytriazine methodology will also be subjected to method ruggedness trials by third party laboratories.

2. Since metabolism studies have indicated that potential dietary exposure of food animals to chlorotriazine residues is extremely low or nonexistent and, in addition, a ruminant feeding study for hydroxyatrazine to determine the potential for transfer and deposition of residues from fed commodities to meat and milk is being proposed as part of this response (see 171-4 Livestock Metabolism, below), CIBA-GEIGY requests that the requirement for hydroxy metabolite enforcement methodology in animal commodities be reserved until the potential for deposition of residues in these tissues has been determined.

3. A multiresidue method testing study, CIBA-GEIGY Report Number ABR-89010 (MRID No. 41423401), has already been submitted to the Agency.

4. Successful method ruggedness trials for Methods AG-484 (MRID No. 41397102) and Method AG-476 (MRID No. 41397103) have been submitted to the Agency. Methodology for milk (AG-436 and AG-496) has been revised and has passed a ruggedness trial but has not yet been submitted. EN-CAS Method 86-284 has not yet successfully passed a method ruggedness trial. These data will be provided to the Agency under the timeframe stipulated in the DCI.

171-4 Plant Residue/Metabolism

EPA reviews indicate plant metabolism is well understood, except for sugarcane for which metabolism studies have not been performed. However, quantification of residues is not well understood. Our proposal is as follows.

1. Using radiolabeled field studies, sugarcane will be treated at maximum use rate preemergence.
2. Analyze for nature and magnitude of residue in sugarcane. Nature and magnitude of residues in processed fractions

(bagasse, sugar, molasses) will be addressed through analyses of nonradiolabeled samples or radiolabeled samples generated in this study. The choice of approach will depend on the observed nature of the residue in sugarcane.

3. Conduct corn/sorghum magnitude of residue radiolabeled field work to include rotationals (limited program).

- 3 plots (NY, IL, MS)
- plant a different variety of corn/sorghum in each of three locations
- treat post emergence only at max. use rate for the soil type at 12" stage (post emergence represents worst-case for potential residues)
- take plant harvests at appropriate times (residues)
- use plots for rotationals to cover representative small grain, leafy vegetable, and root/tuber crops at each location feasible
- monitor soil residues over time after application
- analyze all plant samples with uptake of >0.01 ppm for nature of residue as expressed by current tolerance expression and with particular emphasis on determining the magnitude of the marker metabolites

4. Wheat - The EPA residue chemistry review (dated October 18, 1988) provided by the Agency did not ask for data on wheat, but the DCI did require it. Please clarify this discrepancy. Also a requirement to supply processing data was noted (Footnote 17 in Residue Chemistry Table A). Depending on results of radiolabeled field trials for other commodities, CIBA-GEIGY will provide analyses of existing wheat samples (cold data) using the marker metabolite approach, if the above clarification can be provided by the Agency.

5. Macadamia Nuts - CIBA-GEIGY requests a waiver of the requirement to conduct additional residue trials with this minor crop. Due to accountability problems, it is our proposal to conduct field radiolabeled studies in corn, sorghum, and sugarcane. It is not feasible to conduct radiolabeled studies on macadamia nuts. Therefore, we would request that the Agency rely on our existing data base plus the new proposed research to support the existing tolerance on macadamia nuts.

5. A due date extension for the radiolabeled sugarcane field residue program is being requested, as sugarcane is a two-year crop and field work cannot begin until the fall of 1991. Refer to the attached due date summary. The corn and sorghum data will be provided by the required due date.

6. Crops not being supported by CIBA-GEIGY for reregistration include range grasses, pineapple, and proso millet. Please note these uses have been deleted from our labeling during the

Special Data Call-In, and therefore data to support these uses will not be generated.

7. Processing Studies- In the footnotes for the crops corn, sorghum, wheat, and sugarcane, a requirement to conduct processing studies was noted. CIBA-GEIGY proposes that this requirement be reserved until results of analyses of the grain samples from the proposed field program, noted above, for total radioactivity and/or marker metabolites are obtained. Previous field data using radiolabeled compound on corn indicated that residues were non-detectable. Additionally, a successful trial must first occur for the marker methodology being proposed as well.

171-4 Storage Stability

Because we are proposing that some of the due dates for residue data be extended, and since storage stability data cannot start until samples have been collected from field studies, it is logical to extend the due date for the storage stability data for corn, sorghum, and sugarcane and their fractions. Please note this on the due date attachment.

171-4 Livestock Metabolism

In the science reviews received as part of the DCI, it was noted that sufficient data on parent atrazine was available to characterize metabolism in animals, and therefore metabolism in animals was well understood. However, the DCI requested additional metabolism data on poultry and ruminants to characterize parent hydroxyatrazine's fate. Also concerns about plant metabolites were noted.

Based on our December 19 meeting, CIBA-GEIGY proposes to conduct a ¹⁴C hydroxyatrazine feeding study in ruminants (goat) only. Through administration of parent hydroxyatrazine at levels in excess of expected residues in forage commodities, it will likely be possible to generate other hydroxytriazine metabolites of concern and measure as well their potential contribution to possible residues in meat and milk.

CIBA-GEIGY does not believe it is prudent to conduct a poultry study because feeding treated grain to poultry will not result in sufficient residues to adequately characterize. Note that grain is all that is feed to poultry, whereas grain and silage can be fed to ruminants. Consequently there will not be high enough residues of atrazine in grain treated according to use rates on the label (< 0.06 ppm). This is reflected in the data we have provided in the past. For this reason, we ask that a poultry study not be required.

Further, a due date extension for these data is also requested (Refer to the attached due date summary). This is needed because of the anticipated difficulties in completing the marker method validation noted above, plus the difficulties of synthesizing sufficient ¹⁴C hydroxyatrazine for conducting this study on a very short timeframe.

TOXICOLOGY

84-2 and 84-4 Mutagenicity

1. Dominant Lethal Assay - the positive mouse study reported in the literature, for which data are not available to CIBA-GEIGY, is noted as the reason for conducting such a study. CIBA-GEIGY will meet with EPA to discuss a number of issues involved in the protocol. The dominant lethal test is not normally part of the standard battery of tests required by EPA.

2. The UDS Assay submitted by CIBA-GEIGY was originally deemed acceptable by the Agency, then was rereviewed and found to be unacceptable. CIBA-GEIGY would like to discuss a protocol for this assay which would be acceptable to the Agency.

83-1 and 83-2 Chronic Rat Feeding/Oncogenicity

CIBA-GEIGY proposed in the meeting of December 19 to conduct an additional study using the parent hydroxyatrazine metabolite. This study would be conducted to address the oncogenic potential of hydroxyatrazine metabolites which has led to the DCI request for their inclusion in the tolerance expression. Hydroxyatrazine is representative of the major moieties that man would be exposed to by consumption of atrazine treated commodities or meat/milk products fed commodities treated with atrazine. CIBA-GEIGY commits to conduct such a study for this DCI, and will also be requesting a meeting to discuss a protocol.

85-1 General Metabolism

Additional data on existing studies was required in the data tables. This additional data will be provided as requested; however additional time (3 months) will be needed to complete this work. Refer to the attached due date summary sheet.

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ATRAZINE DATA CALL-IN

DATA REQUIRED

Study	Interim Report		Final Report		
	EPA Due Date	Proposed Date	EPA Due Date	Proposed Date	
<u>Product Chemistry</u>					
61-1	Ingredients Disclosure	NA	NA	CLARIFICATION	?
62-1	Preliminary Analysis	NA	NA	CLARIFICATION	?
63-7	Density, Bulk Density on Specific Gravity	NA	NA	10/19/91	WAIVER
63-13	Stability	NA	NA	10/19/91	WAIVER
63-12, 63-14, 63-15, 63-16, 63-17, and 63-20		NA	NA	CLARIFICATION	?
<u>Residue Chemistry</u>					
171-4(a)	Plant Metabolism	10/19/91	10/19/92	10/19/92	10/19/93
171-4(b)	Animal Metabolism	10/19/91	10/19/92	10/19/92	10/19/93
171-4(c)	Plant Analytical Method Confirmatory Trial	10/19/91	10/19/91	10/19/92	10/19/92
171-4(d)	Animal Analytical Method	10/19/91	ON HOLD	10/19/92	ON HOLD
171-4(e)	Storage Stability	10/19/91	10/19/92	10/19/92	10/19/93
171-4(k)	Residue Studies				
	Macadamia Nuts	10/19/91	WAIVER	10/19/92	WAIVER
	Corn (Field/Sweet and Forage/Fodder)	10/19/91	10/19/91	10/19/92	10/19/92
	Sorghum and Sorghum Forage/Fodder	10/19/91	10/19/91	10/19/92	10/19/92
	Wheat (and Forage/Fodder) Straw	10/19/91	10/19/92	10/19/92	10/19/93
	Sugarcane	10/19/91	10/19/92	10/19/92	10/19/93
171-4	Meat/Fat/Milk	10/19/91	10/19/91	10/19/92	10/19/92
	Cattle/Goats/Hogs/Horses				
	Sheep				
	Poultry/Eggs	10/19/91	WAIVER	10/19/92	WAIVER
171-4	Rotational Crops Protocol	10/19/91	10/19/92	10/19/92 4/19/91	10/19/93 8/19/93

Study	Interim Report		Final Report		
	EPA Due Date	Proposed Date	EPA Due Date	Proposed Date	
<u>Environmental Fate</u>					
161-2	Water Photolysis	NA	NA	10/19/91	10/19/91
161-3	Soil Photolysis	NA	NA	10/19/91	10/19/91
161-2	Aerobic Soil Metabolism	10/19/91	10/19/91	10/19/92	10/19/92
163-1	Leaching/Adsorption Desorption	NA	NA	See Discussion	See Discussion
164-1	Field Dissipation (Also in Turf)	10/19/91	*	10/19/92	7/19/91*
164-3	Forestry Dissipation	NA	NA	4/19/91	7/19/91*
<u>Spray Drift</u>					
201-1	Droplet Size Spectrum	NA	NA	10/19/91	See Discussion
202-1	Drift Field Evaluation	10/19/91	See Discussion	10/19/92	See Discussion
<u>Special Studies</u>					
Applicator Exposure		10/19/91	See Discussion	10/19/92	See Discussion
Dermal/Inhalation Exposure (Protocol)		NA	NA	1/19/91	
Ground Water Monitoring		NA	See Discussion	NA	See Discussion
<u>Toxicology</u>					
81-3	Acute Inhalation (Rat)	NA	NA	10/19/91	10/19/91
82-2	21-Day Dermal	NA	NA	10/19/91	10/19/91
83-5	Combined Rat Chronic Feeding/Oncogenicity (Hydroxyatrazine)	NA	See Discussion	NA	See Discussion
84-2	Chromosomal (Dominant Lethal - Mice)	NA	10/19/91**	10/19/91	10/19/92**
84-4	Other Mechanisms of Mutagenicity	NA	10/19/91**	10/19/91	10/19/92**
85-1	General Metabolism	NA	NA	4/19/91	10/19/91

*See discussion of this requirement in the Attachment for Table A being provided as part of this submission. This due date is meant to apply to information to upgrade the existing studies plus supply one additional study in GA.

**See discussion. Timeframes projected based on protocol approval in May, 1991.

Study	Interim Report		Final Report	
	EPA Due Date	Proposed Date	EPA Due Date	Proposed Date
<u>Ecotoxicity</u>				
72-2 Freshwater Invertebrate Acute Toxicity (80% WP)	NA	NA	10/19/91	10/19/91
72-5 Fish Life Cycle	10/19/91	10/19/91	10/19/92	10/19/92
72-7 Simulated on Actual Field Testing - Aquatic Protocol	10/19/91 10/19/92	See Discussion See Discussion	10/19/93 8/19/91	See Discussion See Discussion
71-4 Avian Reproduction	10/19/91	10/19/91	10/19/92	10/19/92