9/23/94

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

SEP 23 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: **Linuron.** Addendum to RED. Storage Stability Study (fresh and cooked carrots and fresh and cooked asparagus)
DP Barcode: D206666; CBRS No. 14229; MRID Nos.: 432883-01 and 432883-02; Case No. 0047.

FROM: David J. Miller, SA HSO, US Public Health Service
Special Review Section II
Chemistry Branch II--Reregistration Support
Health Effects Division (H7509C)

THRU: Francis Suhre, Section Head
Special Review, Section II
Chemistry Branch II--Reregistration Support
Health Effects Division (H7509C)

TO: Karen Jones, PM Team 73
Reregistration Branch
Special Review and Reregistration Division (H7508W)

CBRS has been requested to review a recently-submitted update to a study depicting the storage stability of linuron in carrots (fresh and cooked) (MRID 43288301; 1994) and asparagus (fresh and cooked) (MRID 43288302; 1994). This study was submitted to the Agency by Du Pont Agricultural Products, Inc. (Du Pont) as required by the Agency in memoranda dated October 5, 1993 (D. McNeilly, CBRS No. 12553) and March 30, 1994 (D. McNeilly, CBRS No. 13160): Du Pont, at these times, had submitted interim data on asparagus covering storage intervals of 0, 3, 6, and 12 months and on carrots covering storage intervals of 0, 2, and 12 months. In both of these instances, CBRS indicated its intention to await submission of the final storage stability report prior to drawing any conclusions concerning adequacy of the previously

Recycled/Recyclable
Printed with Soy/Canola ink on paper that contains at least 50% recycled fiber

submitted data.

CONCLUSIONS

CBRS has reviewed the submitted data concerning the storage stability of linuron in/on asparagus (fresh and cooked) and carrots (fresh and cooked). The data indicate that residues of linuron (as measured by its 2,4-DCA analyte) in samples fortified at 0.2 ppm and stored frozen are stable for storage intervals of at least 24 months in asparagus (fresh and cooked) and 21 months in carrots (fresh and cooked).

In accordance with Storage Stability Guidance document (1/93) concerning translation of crop stability data to crop-groupings, the available data support the storage intervals of at least 24 months for leafy vegetables and 21 months for root crops.

RECOMMENDATIONS

The RED document should be updated to reflect these additional submissions. The necessary changes are indicated (via redlining and strikeouts) in the Attachment to this review.

2

DETAILED ANALYSIS

Sample Preparation and Analysis

Asparagus: Ten grams of fresh or cooked asparagus were added to glass bottles. Five sample jars were prepared for each matrix and each sampling interval. For each matrix two of the five jars were spiked with 0.02 ppm of linuron. The jars were sealed and labeled. The 0-month samples were analyzed immediately, while the other samples were placed in a freezer within 30 minutes, and stored for appropriate periods.

The method used to determine the concentration of linuron was "Determination of Linuron in Crops and Soils" (Morse Laboratories, Inc. SOP# Method-42, Revision 3). Briefly, linuron and all metabolites that hydrolyze to 3,4-dichloroaniline (3,4-DCA) using alkaline reflux are detected. The hydrolyzed extracts are distilled into concentrated acid, neutralized and cleaned-up using a C-18 cartridge. Analysis was by GC equipped with a atomic emission detector. The method detection limit was reported as 0.05 ppm. Method recoveries in all tested commodities were acceptable, averaging ca. 93% (see Table 1 under Fresh Fortification Recoveries). Raw data, sample calculations, and representative chromatograms were provided.

Carrot: Carrot tops were removed and half of the carrots were cooked in boiling water until soft (ca. 10 minutes). Fresh and cooked carrots were cut into small pieces and a 10-g sample of each matrix was separately weighed into labeled jars. Ten samples were fortified with 200 ul of a 10 ug/ml solution, i.e., a 0.2 ppm spike. Samples were analyzed immediately after fortification, and after 2, 12, 14, and 21 months in frozen storage.

Storage Stability

The corrected recoveries of linuron from asparagus (cooked and fresh) and carrots (cooked and fresh) following various storage intervals are presented in Table 1. They indicate that residues of linuron (as measured by its 2,4-DCA analyte) in samples fortified at 0.2 ppm and stored frozen are stable for a period of at least 24 months in asparagus and for a period of at least 21 months in carrots. In accordance with Storage Stability Guidance document (1/93) concerning translation of crop stability data to crop-groupings, the available data support the storage intervals of at least 24 months for leafy vegetables and 21 months for root crops.

cc: w/Attachment: SF, List A Rereg. Std. File.
w/o Attachment: RF, Circ., DJM
RDI: FSuhre:9/16/94;MMetger: 9/20/94;EZager:9/22/94.

Table 1. Method Recovery and Storage Stability Data for Linuron in Asparagus (Cooked and Fresh) and Carrots (Cooked and Fresh).

Commodity	Fortification	Storage Period	Stability Spike	Fresh Fortification Recovery		Apparent Recovery from Stored Sample	Corrected Recovery Stored Sample	
				ppm	Percent		ppm	Percent
Asparagus (Cooked)	0.20	0	A	N/A	--	0.18	0.18[a]	90%[a]
	0.20		B	0.20	100%	0.26	0.26	130%
	0.20	1	A	0.21	105%	0.20	0.19	95%
	0.20		B	0.13	65%	0.18	0.28	140%
	0.20	3	A	0.23	115%	0.20	0.17	85%
	0.20		B	0.25	125%	0.17	0.14	70%
	0.20	6	A	0.18	90%	0.25	0.28	140%
	0.20		B	0.14	70%	0.21	0.30	150%
	0.20	12	A	0.14	70%	0.10	0.14	70%
	0.20		B	0.10	50%	0.12	0.24	120%
	0.20	16	A	0.19	95%	0.18	0.19	95%
	0.20		B	0.17	85%	0.18	0.21	105%
	0.20	18	A	0.22	110%	0.16	0.15	75%
	0.20		B	0.23	115%	0.22	0.19	95%
	0.20	24	A	N/A	--	0.16	0.16[a]	80%[a]
	0.20		B	N/A	--	0.17	0.17[a]	85%[a]
Asparagus (Fresh)	0.20	0	A	0.17	85%	0.14	0.16	80%
	0.20		B	0.19	95%	0.16	0.17	85%
	0.20	1	A	0.18	90%	0.14	0.16	80%
	0.20		B	0.12	60%	0.17	0.28	140%
	0.20	3	A	0.22	110%	0.25	0.23	115%
	0.20		B	0.29	145%	0.22	0.15	75%
	0.20	6	A	0.23	115%	0.20	0.17	85%
	0.20		B	0.24	120%	0.16	0.13	65%
	0.20	12	A	0.11	55%	0.14	0.25	125%
	0.20		B	0.12	60%	0.14	0.23	115%

Table 1. Method Recovery and Storage Stability Data for Linuron in Asparagus (Cooked and Fresh) and Carrots (Cooked and Fresh).

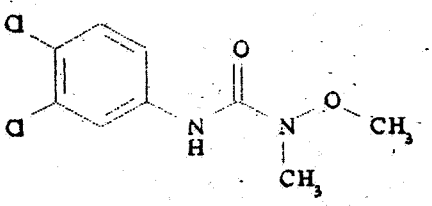
Commodity	Fortification	Storage Period	Stability Spike	Fresh Fortification Recovery		Apparent Recovery from Stored Sample	Corrected Recovery Stored Sample	
				ppm	Percent		ppm	Percent
Asparagus (fresh) (Cont'd)	0.20	16	A	0.16	80%	0.13	0.16	80%
	0.20		B	0.18	90%	0.17	0.19	95%
	0.20	18	A	0.23	115%	0.23	0.20	100%
	0.20		B	0.22	110%	0.28	0.25	125%
	0.20	24	A	0.19	95%	0.18	0.19	95%
	0.20		B	0.16	80%	0.20	0.25	125%
Carrots (Cooked)	0.20	0	A	0.20	100%	0.23	0.23	115%
	0.20	2	A	0.16	80%	0.22	0.28	140%
	0.20	12	A	0.27	135%	0.19	0.14	70%
	0.20	14	A	0.26	130%	0.26	0.20	100%
	0.20	21	A	0.15	75%	0.17	0.23	115%
Carrots (Fresh)	0.20	0	A	0.18	90%	0.23	0.26	130%
	0.20	2	A	0.21	105%	0.26	0.25	125%
	0.20	12	A	0.19	95%	0.16	0.17	85%
	0.20	14	A	0.28	140%	0.22	0.16	80%
	0.20	21	A	0.19	95%	0.20	0.21	105%

N/A: Not available

* Method spike (fresh fortification recovery) data were not available. Calculation of recoveries assume 100% method recovery.

ATTACHMENT

LINURON



REREGISTRATION ELIGIBILITY DOCUMENT

RESIDUE CHEMISTRY CONSIDERATIONS

PC Code: 035506; Case 0047

(CBRS No. 12392; DP Barcode D194477)

TASK 2B

INTRODUCTION

Linuron [3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea] is a substituted urea herbicide registered for use on asparagus, carrots, celery, corn (field and sweet), cottonseed (DuPont has voluntarily dropped use), parsley, parsnips, potatoes, sorghum, soybeans, and wheat (winter). Linuron may be applied preplant, preemergence, postemergence, or post-transplant using ground or aerial equipment. The registered modes of application are band treatment, directed spray, or broadcast spray. Linuron is a restricted use pesticide and may be applied only by certified applicators or personnel under their direct supervision. (*Source: LUIS General Chemical Report for Linuron, 5/20/92*).

Tolerances for residues of linuron in/on plant and animal commodities are expressed in terms of linuron *per se* [40 CFR §180.184(a) and (b)]. No food/feed additive tolerances have been established for linuron residues. The established tolerances listed in 40 CFR §180.184 range from 0.25 ppm to 3 ppm. The HED Metabolism Committee has concluded that the residues of concern are linuron and its metabolites convertible to 3,4-dichloroaniline, expressed as linuron (D. McNeilly, 11/17/93); residues of 3,4-dichloroaniline *per se* need not be regulated separately. Adequate enforcement methods are available for the determination of linuron residues of concern in/on plant and animal tissues. The current enforcement methods determine linuron and all metabolites hydrolyzable to 3,4-dichloroaniline.

Linuron was the subject of a Reregistration Standard Guidance Document dated 6/84 and a Product and Residue Chemistry Reregistration Standard Update dated 6/20/90. The Agency initiated a Special Review in 1984 because linuron exceeded the oncogenicity risk criteria; the Agency was concerned about applicator exposure and dermal penetration. The Special Review effort ceased in 1988, and in the Federal Register, (6/29/90) the Agency revised the toxicological classification of linuron from a quantifiable Group C carginogen to an unquantifiable Group C carcinogen. The information contained in this document outlines the Residue Chemistry Science Assessments with respect to the reregistration of linuron.

SUMMARY OF SCIENCE FINDINGS

GLN 171-3: Directions for Use: A REFS search conducted 9/14/93 indicated that there are 15 linuron end-use product (EPs) with food/feed uses which are registered to E.I. du Pont de Nemours and Company, Griffin Corporation, Drexel Chemical Company, Platte Chemical Company, and Micro-Flo Company. These linuron EPs are listed in Table A.

Table A. Currently registered linuron end-use products.

Registrant EPA Reg. No.	Acceptance Date	Formulation Class	Product Name
E.I. du Pont de Nemours and Company			
352-270	1/13/93	50% WP	Lorox® Herbicide
352-394	3/15/93	50% DF	Lorox® DF Herbicide
352-562 (including SLN Nos. CA820042 and TX820021)	3/15/93	50% DF	Lorox® SP Herbicide
352-544	2/4/93	55.4% DF	Gemini® Herbicide
352-543	3/15/93	56.9% DF	Lorox Plus® Herbicide
352-391	1/13/93	4 lb/gal FlC	Lorox® L Herbicide
Griffin Corporation			
1812-320	5/5/93	50% DF	Linex® 50DF
1812-245	4/28/93	4 lb/gal FlC	Linex® 4L
Drexel Chemical Company			
19713-79	6/30/92	30.8% WP	Atrazine Plus Linuron WP
19713-251	10/7/91	50% DF	Linuron DF Herbicide
19713-97	10/7/91	4 lb/gal FlC	Linuron 4L
Platte Chemical Company			
34704-703	2/6/91	4 lb/gal FlC	Linuron 4L Herbicide
Micro-Flo Company			
51036-78	7/24/86	4 lb/gal FlC	Linuron 4L Weed Killer

A comprehensive summary of the registered use patterns of linuron, based on these product labels, is presented in Table B. A tabular summary of the residue chemistry science assessments for reregistration of linuron is presented in Table C. The conclusions regarding the reregistration eligibility of linuron on the crops listed in Table C are based on the use patterns registered by the basic producers, E.I. du Pont de Nemours and Company, Griffin Corporation, and Drexel Chemical Company. When end-use product DCIs are developed (e.g., at the issuance of the RED), RD should require that all end-use product labels (e.g., MAI labels, SLNs, and products subject to the generic data exemption) be amended such that they are consistent with the basic producer labels. An Agency memorandum (CBRS Nos. 6663 and 6994, 3/26/91, R. Perfetti) required label amendments for products with uses on carrots, celery, cotton, and potatoes; we note that all registrants have modified applicable labels appropriately.

GLN 171-4 (a): Plant Metabolism: The qualitative nature of the residue in plants is adequately understood (D. McNeilly, 11/17/93). Metabolism studies with corn, soybeans, and potatoes indicate that linuron is absorbed from the soil and translocated (i.e., systemic). The metabolic pathway involves demethylation to 3-(3,4-dichlorophenyl)-1-methoxyurea which is further metabolized to 3,4-dichloroaniline; metabolism may also occur through demethoxylation of linuron. The terminal residues of concern are the parent and its metabolites which are convertible to 3,4-dichloroaniline. (MRIDs 00018173, 00018176,

00027624, 00164195, 00164196, 40084801, 41716101, 41716102, 41938101, 42542101, and 42548401).

GLN 171-4 (b): Animal Metabolism: The qualitative nature of the residue in ruminants and poultry is adequately understood (D. McNeilly, 11/17/93). An acceptable metabolism study with goats indicates that linuron is rapidly metabolized by demethylation, demethoxylation, and hydroxylation and is primarily eliminated by excretion. The metabolism of linuron in poultry has been found to be consistent with the goat study. The terminal residues of concern are the parent and its metabolites which are convertible to 3,4-dichloroaniline. (MRIDs 00029932 and 42635401).

GLN 171-4 (c/d): Residue Analytical Methods - Plants/Animals: Adequate enforcement methods are available for the determination of linuron in plant and animal commodities. The Pesticide Analytical Manual (PAM) Vol. II lists a colorimetric method (Method I, Bleidner et. al.) and a paper chromatographic method (Method II). Residues of diuron may interfere in Method I. A modified version of Method I (H. L. Pease, *Journal of Agric. and Food Chem.*, 1962, Vol. 10, p. 279), which includes a cellulose column step to separate linuron from diuron, is currently the preferred method for the enforcement of tolerances. Both these methods determine linuron and all metabolites hydrolyzable to 3,4-dichloroaniline and have limits of detection of 0.05 ppm. A GLC/ECD method for linuron residues in/on asparagus from the CA Department of Food and Agriculture has been validated by the Agency and sent to FDA to be published in PAM Vol. II as Method III. This method determines residues of linuron *per se* and the limit of detection is 0.05 ppm. We note however that this method is inadequate for tolerance enforcement since it does not determine all the residues of concern. In addition, this method uses benzene as the extraction solvent. (MRIDs 00018087, 00018089, 00018127, and 00018176).

The FDA Pestrak Database (PAM Vol. I) contains data concerning the applicability of multiresidue methods D and E (fatty and nonfatty foods) for recovery of linuron and its metabolites 3-(3,4-dichlorophenyl)-1-methoxyurea, 3-(3,4-dichlorophenyl)-1-methylurea, 3,4-dichlorophenyl urea and 3,4-dichloroaniline. Linuron is partially recovered using Multiresidue Method E (fatty and nonfatty foods); recovery using Method D is variable. Linuron metabolites 3-(3,4-dichlorophenyl)-1-methoxyurea, 3-(3,4-dichlorophenyl)-1-methylurea, and 3,4-dichlorophenyl urea are not recovered using Method E (fatty and nonfatty foods); 3-(3,4-dichlorophenyl)-1-methylurea is recovered using Method D but 3-(3,4-dichlorophenyl)-1-methoxyurea is not likely to be recovered using this method. Linuron metabolite 3,4-dichloroaniline is not recovered using Method E (nonfatty foods) and has variable recovery using Method D.

GLN 171-4 (e): Storage Stability: Residues of linuron in potatoes have been shown to be stable for a period of at least 12 months. Residues ~~of linuron~~ in/on soybeans, sugar beet tops, ~~wheat,~~ carrots, and asparagus have been shown to be stable for up to approximately two years of storage at -20 C. CBRS will translate this data in accordance with the Storage Stability Guidance Document (1/93) concerning translation of crop stability data to crop

groupings: CBRS concludes that linuron is stable in oilseeds/nuts, leafy vegetables, and root vegetables for a period of at least two years. The conclusion regarding this latter crop grouping assumes that the registrant submits acceptable 18 month storage interval data for the potato and processed potato commodity storage stability study currently in progress.

~~Storage stability data for the following commodities remain outstanding: carrots (raw and cooked; 19 months); field corn processed commodities (12 months); potatoes, and cooked and processed potato commodities (20 months); sorghum and sorghum processed commodities (12 months); and soybean processed commodities (6 months). Additional storage stability data are required to support outstanding field residue and processing studies.~~

Linuron has been shown to be stable in corn grain, corn oil, sorghum grain, and sorghum starch for a period of at least 3 months (D. McNeilly, CBRS No. 13160, 3/30/94). The registrant has indicated that additional storage data for a 12-month interval for these commodities will be submitted as supplemental information. If acceptable 12-month storage stability data are provided to CBRS, CBRS will conclude that linuron is stable on non-oily grain crops for a period of at least one year.

CBRS concludes that additional storage stability data (beyond those already promised to CBRS) will not be necessary provided that storage intervals do not exceed one year for non-oily grains and two years for oilseeds/nuts, leafy vegetables, and root crops: the registrant has provided (or will provide) sufficient data to indicate that significant linuron residue declines are not expected to occur in oilseeds/nuts, leafy vegetables, root vegetables, and non-oily grains over short to intermediate storage intervals. Since residues have been shown to be stable in several matrices, ~~the additional required storage stability data are considered confirmatory~~ of several different crop groupings, no additional storage data other than studies currently in progress discussed above will be required, provided that linuron is not registered for use on fruits, fruiting vegetables, or citrus.

(MRIDs 00159802, 41716103, 42836701, ~~and~~ 42836702, 43040001, 42913301, and 42974401).

GLN 171-4 (k): Magnitude of the Residue in Plants: All data for magnitude of the residue in parsley, parsnips, potatoes, and sorghum grain have been evaluated and deemed adequate to reassess tolerances for these commodities.

Field residue data remain outstanding for the following crops: asparagus; carrots; corn, field, grain; corn, field, forage and fodder; corn, sweet (K + CWHR); corn, sweet, forage; sorghum forage and fodder; soybeans; wheat, grain; and wheat forage and straw. (MRIDs 00018067, 00018076, 00018087, 00018089, 00018148, 00018171, 00018172, 00018175, 00018206, 00018375, 00018382, 00018443, 00018450, 00027635, 00163267, 40210901, 40537601, 41189801, 41377601, 41452601, 41452701, 41501501, 41503401, 41569901, and 42605901).

Sufficient data to reassess tolerances for these commodities are not available at this time. Although sufficient field trial data are not available to reassess tolerances for all crops, sufficient data are available to do a reliable exposure assessment.

Two additional field residue studies on corn (1990; MRID 41510501) and soybeans (1990; MRID 41591801) have been submitted. However, data from these submissions were not evaluated because they were generated by Craven Laboratories. Replacement data are currently being prepared for submission.

GLN 171-4 (l): Processed Food/Feed: All data for magnitude of the residue in processed food/feed have been evaluated and deemed adequate except that a full processing study is required for cottonseed (R. Perfetti, 3/26/91) and additional data are required to upgrade an existing potato processing study (S. Knizner, 9/2/92). DuPont in a letter to the Agency (Marie Chubb, 7/23/91) stated that they are cancelling linuron use on cotton. Apparantly no other registrants have come forward to support this use, therefore, CBRS recommends that the registered use on cotton be cancelled. In this case, the cottonseed processing study will no longer be required.

Outstanding potato processing data are considered confirmatory; sufficient data are available to reassess tolerances and estimate dietary exposure for potato processed products. Food additive tolerances must be proposed for potato chips and granules, and feed additive tolerances must be proposed for wet and dry peel waste.

NOTE: Linuron is assessed as a c-nonquantifiable oncogen, therefore Delany issues are involved. (MRIDs 00018206, 40049201, 41241202, 42397201, 42462901, 42542102, and 42560001).

GLN 171-4 (j): Magnitude of the Residue in Meat, Milk, Poultry and Eggs: All data for magnitude of the residues in meat, milk, poultry, and eggs have been evaluated and deemed adequate. No tolerances are required for poultry and eggs. (MRIDs 00018209, 00018210, 00018375, 00018383, 00018450, 00018775, and 00029932).

Recently the Agency received interim data from DuPont indicating that residues levels of linuron in or on corn fodder exceeded the 1 ppm tolerance. Preliminary data from field trials on corn indicate a tolerance of 6 ppm will be required to cover residues resulting from current registered uses. These data were submitted to the Agency under 6(A) (2) of FIFRA.

Since corn fodder is a major feed item for ruminants throughout the U.S. a revision to the previously estimated dietary burden to ruminants is required. The Residue Chemistry Chapter (6/29/82) to the Linuron Registration Standard previously estimated a "maximum plausible dietary load of 1.4 ppm." This estimate utilized the establish tolerance of 1.0 ppm in or on corn fodder. However, assuming residues are present at levels ca 6 ppm, the level at which tolerances may be required considering the currently available 6 (a)(2) data, a

hypothetical diet based on feeding 50% corn grain and 50% corn fodder would result in a dietary burden of ca. 3.1 ppm.

Based on available ruminant feeding studies CBRS concludes that established tolerances for meat and milk are adequate to cover the increased dietary burden of 3.1 ppm. It should be noted however that the estimated residue level in ruminant liver (0.81 ppm) and kindey (0.81 ppm) are approaching the established tolerances of 1.0 ppm. Should the currently estimated ruminant dietary burden of 3.1 ppm be increased, established linuron tolerances for ruminant liver and kidney will need to be reassessed.

A final determination concerning the adequacy of meat and milk tolerances cannot be made until all the replacement corn data are submitted.

GLNs 165-1 and 165-2: Confined/Field Rotational Crops: All data for nature of the residue in confined rotational crops have been evaluated and deemed adequate. The requirement for field rotational crop studies has been waived. (MRIDs 40104101 and 40730101). The following are rotational crop restrictions:

> If initial seeding fails to produce a stand, crops registered for the rate of "Lorox" that has been applied may be planted into the treated area.
>
> Unless otherwise directed, any crop may be planted after 4 months except for cereals where only barley, oats, rye, and wheat may be planted.

GLN 171-5: Reduction of Residues: All data for reduction of residues have been evaluated and deemed adequate except that additional information is required to upgrade existing potato and carrot cooking studies. (MRIDs 41241201, 42379901, 42397201, 42462901, and 42462902).

> The asparagus cooking study shows washing with water reduces residues by 40%. Boiling removes an additional 25% of the residues, while steaming had little or no effect on reducing residue levels in or on asparagus (Ref: D. McNeilly, 3/18/93).
>
> A carrot cooking study was reviewed (C. Olinger, 10/31/89) and found to be unacceptable due to residues below the limit of quantitation. However, the study does indicate that cooking in boiling water does reduce overall residues.
>
> The potato cooking study shows that linuron residues concentrate in or on oven baked potatoes (1.5X) and microwave baked potatoes (1.6X), but are reduced in or on boiled potatoes (0.48X) (S. Knizner, 9/2/92).

Table B. Parameters of linuron food/feed use patterns registered to E.I. du Pont de Nemours and Company, Griffin Corporation, Drexel Chemical Company, Platte Chemical Company, and Micro-Flo Company.[1]

Site	Formulation	EPA Reg. No.	Maximum Single Application Rate (lb ai/A)	Maximum Seasonal Rate (lb ai/A)	PHI[2] (Days)	Use Limitation
Asparagus	50% WP	352-270	2.0	2.0	--	Use limited to CA, MI, MN, NC, OR, and WA for a single preemergence application and up to two postemergence applications to direct seeded or newly planted crowns using ground equipment.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703				
	50% WP	352-270	4.0	4.0	1	Use limited to CA, MI, MN, NC, OR, and WA for a single preemergence application (2.0 lb ai/A) and up to four postemergence applications to established beds, and a single postemergence directed spray application to the fern stage of asparagus using ground equipment. A one year plant-back interval has been established for any other crop if more than 2.0 lb ai/A/season is applied.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703				

(continued; footnotes follow)

Table B *(continued)*.

Site	Formulation	EPA Reg. No.	Maximum Single Application Rate (lb ai/A)	Maximum Seasonal Rate (lb ai/A)	PHI[2] (Days)	Use Limitation
Carrots	50% WP	352-270	1.5	2.0	14	Use limited to FL (maximum of 1.0 lb ai/A for du Pont and Drexel products) and MI, OH, and WI for a single preemergence application using ground equipment. Multiple foliar applications for use in the entire U.S. using ground equipment. Postemergence applications are to be made after carrots reach 3 inches in height. A maximum seasonal application rate of 1.5 lb ai/A has been established for areas west of the Rocky Mountains. No PHI has been established for EPA Reg. No. 51036-78.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703 51036-78				
	50% DF	CA820042	1.0	1.5	0	Use limited to CA for a single preemergence application using ground equipment.
	50% DF	1812-320	0.25	--	--	Use limited to NY for multiple broadcast applications made postemergence using ground equipment.
	4 lb/gal FlC	1812-245				
Celery	50% WP	352-270	1.5	1.5	--	Use limited to east of the Rocky Mountains for a single foliar post-transplant application using ground equipment. Application is to be made before celery reaches 8 inches in height. A 4-month plant-back interval has been established for crops other than celery and carrots. No PHI has been established due to the post-transplant nature of the application.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703 51036-78				

(continued; footnotes follow)

Table B *(continued)*.

Site	Formulation	EPA Reg. No.	Maximum Single Application Rate (lb ai/A)	Maximum Seasonal Rate (lb ai/A)	PHI[2] (Days)	Use Limitation
Corn, field	30.8% WP	19713-79	1.54	1.54	--	A single broadcast or band application made postplant, preemergence, or postemergence using ground equipment. Postemergence application is to be made before corn reaches 12 inches in height. A 6-month plant-back interval for crops other than corn has been established. Rotating crops to sugar beets, tobacco, or other vegetables following treated corn crop is prohibited.
	50% WP	352-270	1.5	3.0	--	Tank mix use limited to east of the Rocky Mountains for a single preemergence application using ground equipment. In addition, a single postemergence directed spray application to field corn at least 15 inches in height may be made using ground equipment. No PHI has been established.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703 51036-78				
Corn, sweet	50% WP	352-270	1.5	1.5	--	A single postemergence directed spray application to sweet corn at least 15 inches in height using ground equipment. No PHI has been established.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703 51036-78				

(continued; footnotes follow)

Table B *(continued)*.

Site	Formulation	EPA Reg. No.	Maximum Single Application Rate (lb ai/A)	Maximum Seasonal Rate (lb ai/A)	PHI[2] (Days)	Use Limitation
Cottonseed	50% DF	1812-320 19713-251	1.5	1.5	--	Use limited to east of the Rocky Mountains for one or two postemergence directed spray applications (0.75 lb ai/A) made after cotton is at least 8 inches tall or a single postemergence directed spray application made after the last cultivation (layby) when cotton is 20 inches tall using ground equipment. Feeding forage or gin trash from treated areas to livestock and grazing treated fields are prohibited.
	4 lb/gal FlC	1812-245 19713-97 34704-703 51036-78				
Parsley	50% DF	TX920021	1.5	1.5	--	Use limited to TX (TX920021) for a single preemergence broadcast soil application using ground equipment.
Parsnips	50% WP	352-270	1.5	1.5	--	A single preemergence broadcast or band application using ground equipment.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703 51036-78				
Potatoes	50% WP	352-270	2.0	2.0	--	Use limited to east of the Rocky Mountains for a single preemergence application after final "drag off" or "hilling" using ground equipment. In the Northeast, application may be made alone or as a tank mix with other herbicides. In WI (central sands area) a single preemergence application at 1.0 lb ai/A made be made after "drag off" or "hilling" using ground equipment.
	50% DF	352-394 352-562				
	4 lb/gal FlC	352-391 51036-78				

(continued; footnotes follow)

Table B *(continued)*.

Site	Formulation	EPA Reg. No.	Maximum Single Application Rate (lb ai/A)	Maximum Seasonal Rate (lb ai/A)	PHI[2] (Days)	Use Limitation
Potatoes, continued	50% DF	1812-320 19713-251	2.0	2.0	--	Use limited to east of the Rocky Mountains for a single preemergence application after "drag off" or "hilling" using ground or aerial equipment. Application must be made in a minimum of 3 gal/A when using aerial equipment. In the Northeast, application may be made alone or as a tank mix with other herbicides. In WI (central sands area) a single preemergence application at 1.0 lb ai/A made be made after "drag off" or "hilling" using ground or aerial equipment.
	4 lb/gal FlC	1812-245 19713-97 34704-703				
Sorghum	50% WP	352-270	1.0	2.0	90 PGI[3]	Tank mix use limited for a single preemergence application using ground equipment. In addition, a single postemergence directed spray application to sorghum at least 12 inches in height may be made using ground equipment. Rotating crops to fall crops, sugar beets, tobacco, potatoes, or other vegetables following treated sorghum crop is prohibited for EPA Reg. Nos. 1812-245, 1812-320, and 51036-78.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703 51036-78				
	50% DF	19713-251	1.5	1.5	--	Use limited to Great Plains as a tank mix use for a single preemergence application using ground equipment. A 4-month plant-back interval for crops other than sorghum or field corn has been established. Grazing or feeding forage or silage from treated fields to dairy animals is prohibited.
	4 lb/gal FlC	19713-97 51036-78				

(continued; footnotes follow)

Table B *(continued)*.

Site	Formulation	EPA Reg. No.	Maximum Single Application Rate (lb ai/A)	Maximum Seasonal Rate (lb ai/A)	PHI[2] (Days)	Use Limitation
Soybeans	50% WP	352-270	1.5-3.0	2.5-4.0	60	A single preemergence application using ground or aerial (Griffin and Micro-Flo formulations only) equipment for conventional, minimum, or no-tillage systems. Application must be made in a minimum of 2-3 gal/A when using aerial equipment. The lower application rates are to be used for conventional tillage systems and higher application rates for minimum or no-tillage systems. Application may be made alone or as a tank mix with other herbicides. In addition, a maximum of two postemergence directed spray applications at 0.5 lb ai/A to soybeans a least 8 inches in height using ground equipment with a 7-day retreatment interval for conventional, minimum, or no-tillage systems. Feeding of treated forage or hay to livestock is prohibited. A 4-month plant-back interval for crops other than soybeans has been established.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 34704-703 51036-78				
	55.4% DF	352-544	0.83	0.83	--	A single early preplant, preplant incorporated, or preemergence application using ground equipment for conventional, minimum, or no-tillage systems. Application may be made alone or as a tank mix with other herbicides. Plant-back intervals for rotational crops other than soybeans are determined by geographical location, soil pH, application rate, and posttreatment interval. The grazing of treated fields or harvesting of forage or hay for livestock is prohibited.
	56.9% DF	352-543	0.64	0.64		

(continued; footnotes follow)

Table B *(continued)*.

Site	Formulation	EPA Reg. No.	Maximum Single Application Rate (lb ai/A)	Maximum Seasonal Rate (lb ai/A)	PHI[2] (Days)	Use Limitation
Wheat, winter (drill planted)	50% WP	352-270	0.75	0.75	--	Use limited to ID, OR, and WA for a single preemergence, early postemergence, or semi-dormant application made in the fall or winter using ground equipment. Application may be made alone or as a tank mix with other herbicides. Grazing or feeding immature plants to livestock is prohibited. A 5-6 month plant-back interval for any rotational crop has been established.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 51036-78				
	50% WP	352-270	0.63	0.63	--	Use limited to ID, OR, and WA (east of the Cascades) for a single postemergence broadcast application made in the spring using ground equipment. Application may be made alone or as a tank mix with other herbicides. Grazing or feeding immature plants to livestock is prohibited. A 5-6 month plant-back interval for any rotational crop has been established.
	50% DF	352-394 352-562 1812-320 19713-251				
	4 lb/gal FlC	352-391 1812-245 19713-97 51036-78				
	4 lb/gal FlC	1812-245 51036-78	1.75	1.75	--	Use limited to ID, OR, and WA (west of the Cascades) for a single preemergence application using ground equipment. Grazing or feeding immature plants to livestock is prohibited. A 5-6 month plant-back interval for any rotational crop has been established.

1 The following general rotational crop restrictions have been established: (i) unless otherwise stated, any crop may be planted after 4 months (EPA Reg. No. 51036-78); (ii) unless otherwise stated, any crop may be planted after 4 months except for cereals where only barley, oats, rye and wheat may be planted; West of the Rocky Mountains, carrots or celery may be planted after 4 months and no other crop may be planted within one year (EPA Reg. Nos. 352-270, 352-394, 352-562, 1812-245, 1812-320, 19713-251, and 34704-703); (iii) West of the Rocky Mountains, carrots or celery may be planted after 4 months and no other crop may be planted within one year (EPA Reg. No. 19713-97).

2 PHI = preharvest interval.

3 PGI = pregrazing interval.

Table C. Residue chemistry science assessments for reregistration of linuron.

GLN: Data Requirements	Tolerance, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
171-4 (a): Plant Metabolism		No	00018173, 00027624, 00018176, **00164195** **00164196**, 40084801[2] 41716101[3], 41716102[3] 41938101[4],42542101[5] 42548401[6]
171-4 (b): Animal Metabolism		No	00029932, 42635401[7]
171-4 (c/d): Residue Analytical Methods		No	00018087, 00018089, 00018127, 00018176
171-4 (e): Storage Stability		Yes[8]	00159802,[9] 41716103,[3] 42836701[10], 42836702[10] 43040001, 42913301, 42974401
171-4 (k): Magnitude of the Residue in Plants			
Root and Tuber Vegetable Group			
- Carrots	1 [180.184(a)]	Yes[11]	00018172, 00027635, 00163267,[12] 40210901,[13] **40537601**, 41503401[14]
- Parsnips	0.5 [180.184(a)]	No[15]	00018171
- Parsnips, tops	0.5 [180.184(a)]	No[16]	
- Potatoes	1 [180.184(a)]	No	00027635, 00163267,[12] 40210901,[13] 41452701[14]
Leafy Vegetables Group			
- Celery	0.5 [180.184(a)]	No[17]	00018443, **40537601**, 41501501[14]
- Parsley	0.25 [180.184(b)]	No	41189801[18]
Legume Vegetables Group			
- Soybeans	1 [180.184(a)]	Yes[19]	00018076, 00018206, 00027635, 00163267,[12] 40210901[13]
Foliage of Legume Vegetables Group			
- Soybean forage and hay	1 [180.184(a)]	No[20]	00018076, 00018206, 00027635

(continued; footnotes follow)

Table C *(continued)*.

GLN: Data Requirements	Tolerance, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
Cereal Grains Group			
- Barley, grain	0.25 [180.184(a)]	No[21]	
- Corn, field, grain	0.25 [180.184(a)]	Yes[22]	00018171, 00018206, 00018375, 00018382, 00018450, 00163267,[12] 40210901,[13] **40537601**
- Corn, pop, grain	0.25 [180.184(a)]	No[23]	
- Corn, sweet (K + CWHR)	0.25 [180.184(a)]	Yes[24]	00018171, 00018206, 00018375, 00018382, 00018450
- Sorghum, grain	0.25 [180.184(a)]	No	00018171, 00018148, **40537601, 41377601**
- Wheat, grain	0.25 [180.184(a)]	No[25]	00018171, 0001817540537601, 42605901[28]
- Oats, grain	0.25 [180.184(a)]	No[26]	
- Rye, grain	0.25 [180.184(a)]	No[27]	
Forage, Fodder, and Straw of Cereal Grains Group			
- Barley, forage, hay and straw	1 [180.184(a)]	No[29]	
- Corn, field, forage and fodder	1 [180.184(a)]	Yes[30]	00018171, 00018206, 00018375, 00018382, 00018450, 00163267,[12] 40210901,[13] **40537601**
- Corn, pop, forage and fodder	1 [180.184(a)]	No[20]	
- Corn, sweet, fodder	1 [180.184(a)]	No[31]	
- Corn, sweet, forage	1 [180.184(a)]	Yes[32]	00018171, 00018206, 00018375, 00018382, 00018450
- Oats, forage, hay and straw	1 [180.184(a)]	No[33]	
- Rye, forage, hay and straw	1 [180.184(a)]	No[34]	
- Sorghum forage and fodder	1 [180.184(a)]	Yes[35]	00018171, 00018148, **40537601**

(continued; footnotes follow)

Table C *(continued)*.

GLN: Data Requirements	Tolerance, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
- Wheat forage and straw	0.5 [180.184(a)]	Yes[36]	00018171, **40537601**, 42605901[23]
- Wheat, hay	0.5 [180.184(a)]	No[37]	
Miscellaneous Commodities			
- Asparagus	3 [180.184(a)]	Yes[38]	00018087, 00018089, 00163267,[12] 40210901,[13] 41452601[14]
- Cotton, seed	0.25 [180.184(a)]	No[39]	00018067, 41569901[14]
171-4 (l): Magnitude of the Residue in Processed Food/Feed			
- Corn, field	--	No	42560001[40]
- Cotton, seed	--	Yes[41]	
- Potatoes	--	Yes[42]	40049201,[43] 42397201[44]
- Sorghum, grain	--	No	42542102[5]
- Soybeans	--	No	00018206, 41241202,[45] 42462901[46]
- Wheat, grain	--	No[47]	
171-4 (j): Magnitude of the Residue in Meat, Milk, Poultry, and Eggs			
- Cattle	1 (fat, meat, and meat byproducts) [180.184(a)]	No	00018209, 00018210, 00018375, 00018450, 00018775
- Goats	1 (fat, meat, and meat byproducts) [180.184(a)]		00029932
- Hogs	1 (fat, meat, and meat byproducts) [180.184(a)]		
- Horses	1 (fat, meat, and meat byproducts) [180.184(a)]		

(continued; footnotes follow)

Table C *(continued)*.

GLN: Data Requirements	Tolerance, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
- Sheep	1 (fat, meat, and meat byproducts) [180.184(a)]		
- Poultry and Eggs	--		00018383
171-4 (f): Magnitude of the Residue in Potable Water		N/A	
171-4 (g): Magnitude of the Residue in Fish		N/A	
171-4 (h): Magnitude of the Residue in Irrigated Crops		N/A	
171-4 (i): Magnitude of the Residue in Food Handling Establishments		N/A	
171-5: Reduction of Residues		Yes[48]	41241201,[33, 33] 42397201,[32] 42379901,[49] 42462901,[34]42462902[34]
165-1: Rotational Crops (Confined)		No	40104101, 40730101
165-2: Rotational Crops (Field)		No[50]	

1. Bolded reference(s) were reviewed in the Update of 6/20/90. Unbolded references were reviewed in the Residue Chemistry Science Chapter of the Registration Standard dated 6/30/82. All other references were reviewed as noted.

2. CBRS No. 2838, 12/24/87, L. Propst; review of corn metabolism data.

3. CBRS No. 7523, DP Barcode D160079, 4/25/91, R. Perfetti.

4. CBRS No. 8391, DP Barcode D167107, 5/21/92, P. Deschamp.

5. CBRS No. 11358, DP Barcode D187993, 11/18/93, D. McNeilly; review of potato metabolism data.

6. CBRS No. 11359, DP Barcode D187998, 11/18/93, D. McNeilly; review of soybean metabolism data.

7. CBRS No. 11361, DP Barcode D188002, 11/18/93, D. McNeilly; review of poultry metabolism data.

8. ~~Additional storage stability data are required to support outstanding field residue and processing studies (see page 4).~~ CBRS tentatively concludes that the registrant has submitted adequate storage stability data for the following crop groupings (i) oilseeds/nuts, leafy vegetables, and root vegetables to support a storage interval of two years; and (ii) non-oily grain crops to support a storage interval of at least one year, pending

(continued; footnotes follow)

Table C *(continued)*.

submission of an acceptable data from the ongoing 18 month potato study and 12 month corn grain/corn oil/sorghum grain/sorghum starch storage stability studies.

CBRS recommends that any future crop field trial (magnitude of the residue) studies include the collection of concurrent storage stability data.

9. CBRS No. 1244, 8/12/85, J. Garbus.

10. CBRS No. 12553, DP Barcode D195090, 10/5/93, D. McNeilly.

11. Griffin and Drexel must submit data reflecting application of the 4 lb/gal FlC formulation at the maximum registered rate (Reference 14). E.I. du Pont de Nemours Inc. must submit revised product labels, establishing a 14-day PHI.

12. CBRS No. 1317, 10/29/86, J. Garbus.

13. CBRS No. 2333, 6/2/87, J. Garbus.

14. CBRS Nos. 6663 and 6994, 3/26/91, R. Perfetti.

15. Data requirements pertaining to the use of a DF or FlC formulation on parsnips have been waived (4/25/90, E. Zager). Residue data for field trials conducted from 1986 to 1988 on asparagus, carrots, celery, corn, cotton, potatoes, sorghum, soybeans, and wheat indicate similar residue patterns regardless of formulation.

16. Parsnip tops are no longer considered as a separate raw agricultural commodity.

17. Registered use is only for East of the Rocky Mountains. End-Use labels should prohibit use of linuron West of the Rockies (R. Perfetti, 3/26/91).

18. CB No. 5658, 10/5/89, F. Griffith. Regional registration for all states east of the Mississippi river.

19. Craven data were submitted to support reregistration of linuron on soybeans. This data is being replaced (see R. Lascola, 9/9/91). Data reflecting postemergence application of the 50% DF or 4 lb/gal FlC formulation at the maximum registered rate remain outstanding.

20. Because restrictions against the feeding of treated soybean forage and hay exist on all pertinent product labels, no data are required and the established tolerances for soybean forage and hay should be revoked.

21. There are no registered uses of linuron on barley. Applicable tolerances should be revoked.

22. Craven data were generated to support the reregistration of linuron on corn. These data are being replaced. Data reflecting a single postemergence application of the 50% DF formulation at the maximum registered rate remain outstanding. In addition, data pertaining to linuron residues of concern in grain dust must be submitted (Reference 28).

23. There are no registered uses of linuron on pop corn. Applicable tolerances for commodities of popcorn should be revoked.

Table C *(continued)*.

24. No data have been submitted in response to the Update. Data reflecting a single postemergence application of the 50% DF formulation at the maximum registered rate remain outstanding.

25. See D. McNeilly, 5/10/93.

26. There are no registered uses of linuron on oats. Applicable tolerances should be revoked.

27. There are no registered uses of linuron on rye. Applicable tolerances should be revoked.

28. CBRS No. 11362, DP Barcode D188028, 5/10/93, D. McNeilly.

29. There are no registered uses of linuron on barley. Applicable tolerances should be revoked.

30. Craven data were generated to support the reregistration of linuron on corn. These data are being replaced. DuPont has recently submitted 6(a)(2) data (D. McNeilly, 12/15/93) from these replacement studies indicating residues will exceed the established tolerance. Data pertaining to residues in/on field corn forage and fodder following a single postemergence application of the 50% DF formulation at the maximum registered rate remain outstanding.

31. No longer considered a raw agricultural commodity.

32. No data have been submitted in response to the Update. Data pertaining to residues in/on sweet corn forage following a single postemergence application of the 50% DF formulation at the maximum registered rate remain outstanding.

33. There are no registered uses on oats. Applicable tolerances should be revoked.

34. There are no registered uses on rye. Applicable tolerances should be revoked.

35. No data have been submitted in response to the Update. Data pertaining to residues in/on sorghum forage and fodder following a single postemergence application of the 50% DF formulation at the maximum registered rate remain outstanding.

36. At the request of the Agency DuPont, has submitted a petition (PP#4F4293) to amend the use on wheat and increase linuron tolerances on wheat straw.

37. No longer considered a raw agricultural commodity.

38. Data reflecting application of the 4 lb/gal FIC formulation at the maximum registered rate remain outstanding. In addition, a higher tolerance for asparagus must be proposed (Reference 14).

39. A Federal Register Notice (3/4/92) was issued cancelling use of products 352-270, 352-391, and 352-394 on cotton (DuPont products).

40. CBRS No. 11360, DP Barcode D188001, 7/13/93, D. McNeilly.

41. No data have been submitted in response to the Update. Data depicting residues in cotton meal, hulls, soapstock, and crude and refined oil remain outstanding. DuPont in a letter to the Agency stated that they are cancelling linuron use on cotton (M. Chubb, 7/23/91). If these uses are cancelled (i.e., other registrant

Table C *(continued)*.

also cancel use on cotton), additional data for cottonseed commodities will not be required:

42. Additional information pertaining to sample storage, the processing protocol, and limit of quantitation determination, as well as an explanation for low method recoveries from potato chips, are required to upgrade the submitted potato processing study (CBRS No. 10368, DP Barcode D181454, 9/2/92, S. Knizner).

43. CBRS No. 2279, 6/2/87, J. Garbus.

44. CBRS No. 10368, DP Barcode D181454, 9/2/92, S. Knizner.

45. CBRS No. 5858, 10/31/89, C. Olinger.

46. CBRS No. 10586, DP Barcode D182595, 3/18/93, D. McNeilly.

47. The requirement for a wheat processing study has been waived (CBRS No. 11063, DP Barcode D185892, 1/15/93, R. Perfetti).

48. Additional information on sample storage, the cooking protocol, and the determination of limits of quantitation is required to upgrade the potato cooking study (Reference 32).

Additional information on the determination of limits of quantitation and an adequate description of the cooking procedure are required to upgrade the carrot cooking study (Reference 37).

49. CBRS No. 10370, DP Barcode D181455, 9/8/92, S. Knizner.

50. The requirements for field rotational crop studies have been waived based on the results of the Confined Rotational Crop (GLDN 165-1) study.

TOLERANCE REASSESSMENT SUMMARY

Tolerances Listed Under 40 CFR §180.184(a)

The tolerances listed under 40 CFR §180.184(a) for residues of linuron in/on plant and animal commodities are expressed in terms of residues of linuron *per se*. The tolerance expression under 40 CFR §180.184(a) should be revised as follows: "Tolerances are established for the combined residues of the herbicide linuron (3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea) and its metabolites convertible to 3,4-dichloroaniline, calculated as linuron, in or on the following raw agricultural commodities:". A summary of the reassessment of tolerances listed in 40 CFR §180.184(a) is presented in Table D.

Sufficient data are available to support the established tolerances for the following crops: celery; cottonseed; parsnips; potatoes; and sorghum, grain.

Additional residue data are required if all registered uses of linuron are to be covered under established tolerances for: asparagus; carrots; corn, field, grain; corn, field, forage and fodder; corn, sweet (K + CWHR); corn, sweet, forage; sorghum forage and fodder; soybeans; wheat, grain; and wheat forage and straw. In addition, grain dust data remain outstanding for field corn.

A processing study remains outstanding for cottonseed, if registrants other than DuPont decide to support this use.

Food additive tolerance proposals are required for "potatoes, granules" at 0.8 ppm and "potatoes, chips" at 0.6 ppm, and a feed additive tolerance proposal is required for "potatoes, waste from processing" at 10 ppm. However, Delaney issues may prevent the establishment of these tolerances.

The established tolerances for barley, oats, and rye forage, grain, hay, and straw should be revoked since there are no registered uses of linuron on these commodities. In addition, the established tolerances for sweet corn fodder, parsnips tops, and wheat hay should be revoked since these commodities are not listed in Table II as raw agricultural commodities of sweet corn, parsnips, and wheat, respectively. The established tolerances for soybean forage and hay should be revoked since restrictions against the feeding of these commodities exist on all pertinent linuron product labels.

Tolerances have been proposed for lettuce at 0.1 ppm (PP#1E02486), and ginger and taro at 1 ppm (PP#3E2920). Tolerance revisions have been proposed for potatoes at 0.2 ppm; the meat, fat, and mbyp (except kidney and liver) of cattle, goats, hogs, horses, and sheep at 0.1 ppm; and the liver and kidney of cattle, goats, hogs, horses, and sheep at 1.0 ppm (PP#0F3832).

6(a)(2) data submission indicates linuron residues in or on corn fodder will need to be raised to cover residues up to 5.5 ppm in corn fodder. The current tolerance is 1 ppm.

Tolerances Listed Under 40 CFR §180.184(b)

The tolerance listed under 40 CFR §180.184(b) is with regional restriction and is expressed in terms of residues of linuron *per se*. The tolerance expression under 40 CFR §180.184(b) should be revised as follows: "Tolerances are established for the combined residues of the herbicide linuron (3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea) and its metabolites convertible to 3,4-dichloroaniline, calculated as linuron, in or on the following raw agricultural commodities:". A summary of the reassessment of tolerances listed in 40 CFR §180.184(b) is presented in Table D.

Sufficient data are available to support the established tolerance for parsley.

Dietary Exposure Estimate (Risk Assessment) -

CBRS recommends that anticipated residue estimates provided to DRES in 1987 in connection with the Linuron Special Review be used to estimate dietary risk. Revised anticipated residues estimates are not being provided at this time because linuron is now classified as a nonquantifiable C carcinogen and less than 17% of the RfD is accounted for by current uses.

UNCERTAINTY

Because the metabolism of linuron in plant and animal is adequately understood the uncertainty in estimating residues is lessened. Additionally, available field trials, processing studies, reduction of the residue studies, and animal feeding studies provide sufficient information to estimate exposure and in some cases to evaluate appropriate tolerance levels. This also reduces the uncertainty in estimating exposure.

Field trial data are outstanding for soybeans and corn. Treatment of soybeans is a major linuron use. However, previous dietary exposure estimates conducted in connection with the Special Review indicate that linuron residues in these commodities will be low. Therefore, this source of uncertainty should not significantly affect the linuron risk estimate one way or the other.

Linuron storage stability data are considered confirmatory . Data currently available indicate that linuron residue are stable in frozen storage. Thus these data should not impact the exposure estimate/risk estimate.

Dietary exposure estimates based on residue data from field trial generally reflect a conservative estimate.

Table D. Tolerance Reassessment Summary.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances listed under 40 CFR 180.184(a):			
Asparagus	3	Increase to 7	See R. Perfetti, 3/36/91
Barley, forage	0.5	Revoke	No registered uses.
Barley, grain	0.25	Revoke	No registered uses.
Barley, hay	0.5	Revoke	No registered uses; not a RAC in Table II.
Barley, straw	0.5	Revoke	No registered uses.
Carrots	1	See comment	Tolerance is adequately supported by DuPont provided all labels specify a 14-day PHI. Other companies still need to provide data.
Cattle, fat	1	1	Proposed tolerance revision 0.1 ppm.
Cattle, mbyp	1	1 1	*Cattle, kidney* *Cattle, liver* *Cattle, mbyp (exc. liver and kidney)*/Proposed tolerance revision 0.1 ppm.
Cattle, meat	1	1	Proposed tolerance revision 0.1 ppm.
Celery	0.5	0.5	The available data support use west of the Rocky Mountains, all labels must reflect this restriction.
Corn, field, fodder	1		6(a)(2) data have been submitted by DuPont indicating a higher tolerance 6 ppm in/on fodder is required. This conclusion is tentative pending submission of the final data submission.
Corn, field, forage	1		
Corn, fresh (inc. sweet K + CWHR)	0.25		*Corn, sweet (K + CWHR)*
Corn, grain (inc. pop)	0.25		*Corn, field, grain* Pop corn grain tolerance should be deleted since there are no registered uses.

(continued)

Table D *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances listed under 40 CFR 180.184(a):			
Corn, pop, fodder	1	Revoke	No registered uses.
Corn, pop, forage	1	Revoke	
Corn, sweet, fodder	1	Revoke	Not a RAC in Table II.
Corn, sweet, forage	1		
Cottonseed	0.25	0.25	*Cotton, seed*
Goats, fat	1	1	Proposed tolerance revision to 0.1 ppm.
Goats, mbyp	1	1 1	*Goats, kidney* *Goats, liver* *Goats, mbyp (exc. liver and kidney)*/Proposed tolerance revision to 0.1 ppm.
Goats, meat	1	1	Proposed tolerance revision to 0.1 ppm.
Hogs, fat	1	1	Proposed tolerance revision to 0.1 ppm.
Hogs, mbyp	1	1 1	*Hogs, kidney* *Hogs, liver* *Hogs, mbyp (exc. liver and kidney*/Proposed tolerance revision to 0.1 ppm.
Hogs, meat	1	1	Proposed tolerance revision to 0.1 ppm.
Horses, fat	1	1	Proposed tolerance revision to 0.1 ppm.
Horses, mbyp	1	1 1	*Horses, kidney* *Horses, liver* *Horses, mbyp (exc. liver and kidney*/Proposed tolerance revision to 0.1 ppm.
Horses, meat	1	1	Proposed tolerance revision to 0.1 ppm.
Oats, forage	0.5	Revoke	No registered uses.
Oats, grain	0.25	Revoke	No registered uses.
Oats, hay	0.5	Revoke	No registered uses; not a RAC in Table II.
Oats, straw	0.5	Revoke	No registered uses.

(continued)

Table D *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances listed under 40 CFR 180.184(a):			
Parsnips (with or without tops)	0.5	0.5	*Parsnips, roots*
Parsnips, tops	0.5	Revoke	Not a RAC in Table II.
Potatoes	1	0.2*	Proposed revision to the established tolerance. * - All registrants must submit revised labels prohibiting use west of the Rocky Mountains.
Rye, forage	0.5	Revoke	No registered uses.
Rye, grain	0.25	Revoke	No registered uses.
Rye, hay	0.5	Revoke	No registered uses; not a RAC in Table II.
Rye, straw	0.5	Revoke	No registered uses.
Sheep, fat	1	1	Proposed tolerance revision to 0.1 ppm.
Sheep, mbyp	1	1 1	*Sheep, kidney*, *Sheep, liver* *Sheep, mbyp (exc. liver and kidney)*/Proposed tolerance revision to 0.1 ppm.
Sheep, meat	1	1	Proposed tolerance revision to 0.1 ppm.
Sorghum, fodder	1		
Sorghum, forage	1		
Sorghum, grain (milo)	0.25	0.25	*Sorghum, grain*
Soybeans, (dry or succulent)	1		*Soybeans*
Soybeans, forage	1	Revoke	Feeding restrictions exist.
Soybeans, hay	1	Revoke	Feeding restrictions exist.
Wheat, forage	0.5		
Wheat, grain	0.25		
Wheat, hay	0.5	Revoke	Not a RAC in Table II.
Wheat, straw	0.5		Registrant is petitioning for amended use and increased tolerance (PP#4F4393).
Tolerances listed under 40 CFR 180.184(b):			
Parsley	0.25	0.25	

(continued)

Table D *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances listed under 40 CFR 180.184(a):			
Tolerances to be proposed under 40 CFR 185 and 186[1]			
Potatoes, chips	--	0.6	
Potatoes, granules	--	0.8	
Potatoes, waste from processing	--	10	

[1] Delaney issues may prevent the establishment of these tolerances.

CODEX HARMONIZATION

No Codex MRLs have been established for linuron; therefore, issues of compatibility between Codex MRLs and U.S. tolerances do not exist.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No.: 1244
Subject: Linuron: Reregistration and Special Review: Storage Stability Data. Accession No. 258681
From: J. Garbus
To: R. Taylor/J. Miller and I. Sunzenauer
Dated: 8/12/85
MRID(s): 00159802

CBRS No.: 1317
Subject: ID. No. 035506: Linuron: Reregistration and Special Review: Response to Data Call-In. Additional Residue Data for Soybeans, Corn, Carrots, Asparagus, and Potatoes. Access. No. 264383
From: J. Garbus
To: I. Sunzenauer and R. Taylor
Dated: 10/29/86
MRID(s): 00163267

CBRS No.: 2279
Subject: ID. No. 0035506: Linuron: Reregistration and Special Review: Potato Processing Protocol.
From: J. Garbus
To: M. Boodee
Dated: 6/2/87
MRID(s): 40049201

CBRS No.: 2333
Subject: ID. No. 0035506: Linuron: Reregistration and Special Review: Response to Data Call-In. Additional Residue Data for Soybeans, Corn, Carrots, Asparagus, and Potatoes.
From: J. Garbus
To: M. Boodee
Dated: 6/2/87
MRID(s): 40210901

CBRS No.: 2838
Subject: Metabolism of ^{14}C-Linuron by Corn Plants. Data Requirement for the Linuron Registration Standard.
From: L. Propst
To: R. Taylor and M. Boodee and Toxicology Branch
Dated: 12/24/87
MRID(s): 40084801

CBTS No.: 5658
Subject: PP#6E3416 Linuron on Parsley. Evaluation of the July 10, 1989 Amendment. (MRID #411898-01 (HED Project #9-1934)
From: F. Griffith
To: H. Jamerson
Dated: 10/5/89
MRID(s): 41189801

CBRS No.: 5858
Subject: Review of Linuron Cooking Studies (Carrots, Asparagus, Potatoes) and Soybean Processing Studies, ID No. 035506; Record No. 253170
From: C. Olinger
To: R. Hundemann
Dated: 10/31/89
MRID(s): 41241201 and 41241202

CBRS No.: None
Subject: Linuron Reregistration: Data Waiver Request for Residues of Lorox® on Parsnips
From: E. Zager
To: L. Rossi
Dated: 4/25/90
MRID(s): None.

CBRS Nos.: 6663 and 6994
Subject: E.I. du Pont de Nemours and Co., Inc.: Response to the Linuron Reregistration Standard: Cropfield Trials
From: R. Perfetti
To: R. Engler and L. Rossi
Dated: 3/26/91
MRID(s): 41376601, 41452601, 41452701, 41569901, 41503401 and 41501501

CBRS No.: 7523; DP Barcode D160079
Subject: E.I. du Pont de Nemours and Co., Inc.: Response to the Linuron Reregistration Standard: Residue Chemistry
From: R. Perfetti
To: R. Engler and L. Rossi
Dated: 4/25/91
MRID(s): 41716101-41716103

CBRS No.: 8391; DP Barcode D167107
Subject: Reregistration of Linuron. Qualitative Nature of the Residue in Plants (potato metabolism study).
From: P. Deschamp
To: L. Rossi/ C. Peterson
Dated: 5/21/92
MRID(s): 41938101

CBRS No.: 10368; DP Barcode D181454
Subject: Linuron. Section 6(a)(2) Data. Review of "Residues of Lorox Herbicide in Potatoes and their Processed Fractions, Du Pont Project No. AMR 1698-90".
From: S. Knizner
To: L. Rossi and B. Burnam
Dated: 9/2/92
MRID(s): 42397201

CBRS No.: 10370; DP Barcode D181455
Subject: Linuron. Review of "Residues of Lorox Herbicide in Carrots as Affected by Cooking. Du Pont Project No. AMR 1701-90".
From: S. Knizner
To: C. Peterson
Dated: 9/8/92
MRID(s): 42379901

CBRS No.: 11063; DP Barcode D185892
Subject: Response to the Linuron Reregistration Standard: Residue Chemistry Data Waiver request
From: R. Perfetti
To: L. Rossi and E. Saito
Dated: 1/15/93
MRID(s): None

CBRS No.: 10586; DP Barcode D182595
Subject: Linuron: Soybean processing and an asparagus cooking study.
From: D. McNeilly
To: C. Peterson
Dated: 3/18/93
MRID(s): 42462901 and 42462902

CBRS No.: 11362; DP Barcode D188028
Subject: Linuron: Wheat Residue Data and a Waiver Request for Wheat Processing Study.
From: D. McNeilly
To: P. Perreault
Dated: 5/10/93
MRID(s): 42605901

CBRS No.: 11360; DP Barcode D188001
Subject: Linuron:: Corn Processing Study.
From: D. McNeilly
To: P. Perreault
Dated: 7/13/93
MRID(s): 42560001

CBRS No.: 11358; DP Barcode D187993
Subject: Linuron: Potato Metabolism Study, Sorghum Grain Processing Data, and a Waiver

request for the Sorghum Grain Dust Study.
From: D. McNeilly
To: P. Perreault
Dated: 11/18/93
MRID(s): 42542101 and 42542102

CBRS No.: 11359; DP Barcode D187998
Subject: Linuron Soybean Metabolism Study.
From: D. McNeilly
To: P. Perreault
Dated: 11/18/93
MRID(s): 42548401

CBRS No.: 11361; DP Barcode: D188002
Subject: Linuron Poultry Metabolism Study.
From: D. McNeilly
To: P. Perreault
Dated: 11/18/93
MRID(s): 42635401

CBRS No.: 12553; DP Barcode: D195090
Subject: Storage Stability: Asparagus and Wheat.
From: D. McNeilly
To: P. Perreault
Dated: 9/5/93
MRID(s): 428367-01 and 428367-02

MASTER RECORD IDENTIFICATION NUMBERS

References (used to support established tolerances)

00018067 E.I. du Pont de Nemours & Company (1961) Residue Data - Linuron - Sweetcorn. (Unpublished study received Apr 8, 1963 under unknown admin. no.; CDL:124702-B)

00018076 E.I. du Pont de Nemours & Company (1967) Residue Information. (Unpublished study received Jan 10, 1968 under 352-270; CDL:124701-A)

00018087 California. Department of Food and Agriculture (19??) Determination of Linuron Residues on Asparagus. Undated method. (Unpublished study/received Mar 20, 1973 under 3E1373; CDL:093663-B)

00018089 California. Department of Agriculture (1974) Linuron Recoveries from Asparagus by Alkaline Hydrolysis (200 gram samples). Method dated Jul 31, 1974. (Unpublished study received on unknown date under 3E1373; CDL:093662-B)

00018127 E.I. du Pont de Nemours and Company (1962) Determination of 3-(3,4-Dichlorophenyl)-1-methoxy-1-methylurea (Linuron) in Soils and Plant Tissue. (Unpublished study received Nov 8, 1962 under 352-270; CDL:026676-D)

00018148 E.I. du Pont de Nemours & Company (1970) Residue Data: Table A. (Unpublished study received Sep 16, 1971 under 352-270; CDL:125817-A)

00018171 E.I. du Pont de Nemours & Company, Incorporated (1966) Results of Tests on the Amount of Residue in Crops Grown on Treated Soil. (Unpublished study received Oct 5, 1966 under 7F0542; CDL:090665-C)

00018172 E.I. du Pont de Nemours & Company, Incorporated (1963) Residue Data: Linuron - Carrots: Pre-emergence Treatment. (Unpublished study received Oct 5, 1966 under 7F0542; CDL:090665-D)

00018173 Belasco, I.J. (1967) Absence of Tetrachloroazobenzene in Soils Treated with Diuron and Linuron. (Unpublished study received on unknown date under 7F0542; submitted by E.I. du Pont de Ne-mours & Co., Inc., Wilmington, Del.; CDL:092830-A)

00018175 E.I. du Pont de Nemours and Company (19??) Residue Data: Linuron - Diuron: Cereal Grains. (Unpublished study received Oct 14, 1966 under 7F0542; CDL:092830-D)

00018176 Reasons, K.M.; Furtick, W.R.; Atkeson, G.A.; et al. (1966) Additional Data in Support of Petition. (Unpublished study received Oct 14, 1966 under 7F0542; submitted by E.I. du Pont de Nemours& Co., Inc., Wilmington, Del.; CDL:092830-G)

00018206 E.I. du Pont de Nemours and Company (1962) Results of Tests on the Amount of Residue in Crops Grown on Treated Soil: [Linuron]. (Unpublished study received Apr 13, 1963 under PP0356; CDL:092640-E)

00018209 E.I. du Pont de Nemours & Company, Incorporated (1954?) Feeding Study at 1 PPM in Corn Fodder. (Unpublished study received Apr 13, 1963 under PP0356; CDL:092640-I)

00018210 E.I. du Pont de Nemours & Company, Incorporated (1954?) Feeding Study at 50 PPM in Total Daily Diet. (Unpublished study received Apr 13, 1963 under PP0356; CDL:092640-J)

00018375 E.I. du Pont de Nemours and Company (1962) Linuron Livestock Feeding Studies: Milk and Meat. (Unpublished study received Feb 7, 1963 under PP0356; CDL:090386-B)

00018382 E.I. du Pont de Nemours & Company (1962) Residue Data: Linuron - Sweetcorn -

1962. (Unpublished study received Apr 13, 1962 under 352-270; CDL:090385-D)

00018383 E.I. du Pont de Nemours and Company (1963) Linuron: Poultry Feeding Studies: Residue Data - Tissues and Eggs. (Unpublished study received Apr 13, 1962 under 352-270; CDL:090385-E)

00018443 E.I. du Pont de Nemours & Company, Incorporated (1970) The Results of Tests on the Amount of Linuron Residue Remaining on or in Celery including a Description of the Analytical Method Used. (Unpublished study received Apr 18, 1971 under 1E1148; submitted by Interregional Research Project No. 4, New Brunswick, N.J.; CDL:090935-A)

00018450 E.I. du Pont de Nemours and Company, Incorporated (1961) Du Pont Herbicide 326 - Corn. (Unpublished study received on unknown date under PP0356; CDL:098656-A)

00018775 E.I. du Pont de Nemours and Company, Incorporated (1961) Linuron - Livestock Feeding Studies. (Unpublished study received on unknown date under PP0356; CDL:098656-B)

00027635 E.I. du Pont de Nemours & Company, Incorporated (1963) Results of Tests on the Amount of Residue in Crops Grown on Treated Soil: [Linuron]. (Unpublished study received Feb 18, 1963 under PP0413; CDL:090447-B)

00027624 E.I. du Pont de Nemours and Company (1966) Name, Chemical Identity, and Composition: [Linuron]. (Unpublished study received Oct 14,1966 under 7F0542; CDL:092830-E)

00029932 Belasco, I.J. (1979) The Metabolism of 14C-Phenyl Labeled Linuron in the Lactating Nanny Goat. (Unpublished study received Jan 21, 1980 under 352-270; submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:241635-C)

00159802 E.I. du Pont de Nemours & Co., Inc. (1978) Linuron Freezer Storage Study on Soybean and Sugarbeet Tops. Unpublished study. 14 p.

00163267 E. I. du Pont de Nemours & Co., Inc. (1986) Linuron Residue Study: Response to Special Review/Reregistration Guidance Document - EPA Case No. 47 (6/29/84). Unpublished compilation. 159 p.

00164195 Fuesler, T. (1986) Metabolism of Carbon 14 -Linuron in Field-grown Soybean Plants: Document No. AMR-570-86. Unpublished study prepared by E. I. du Pont de Nemours & Co., Inc. 49 p.

00164196 Ferguson, E. (1986) Metabolism of Carbon 14 -Linuron by Potato Plants: Document No. AMR-559-86. Unpublished study prepared by E. I. du Pont de Nemours & Co., Inc. 35 p.

40049201 McIntosh, C. (1986) Linuron Processing Studies - Potatoes: Du Pont Study No.

AMR-587-86 No. 1. Unpublished study prepared in cooperation with National Food Laboratory and Enviro-Bio-Tech., Ltd. 33 p.

40084801 Ferguson, E. (1986) Metabolism of Carbon 14 -Linuron by Corn Plants: Laboratory Project ID. AMR-642-86. Unpublished study prepared by E. I. du Pont de Nemours and Co., Inc. 64 p.

40104101 Erbes, D. (1986) Confined Accumulation Study of Phenyl(U)-carbon 14 Linuron on Rotational Crops: Laboratory Project ID:AMR-609-86. Unpublished study prepared by E. I. du Pont de Nemours & Co., Inc. 53 p.

40210901 E.I. du Pont de Nemours & Co. (1987) Linuron Residue Study: Supplement: Response to Special Review/Reregistration Guidance Document: Lab Project ID: 47. Unpublished compilation prepared in cooperation with Enviro-Bio-Tech, Ltd. 676 p.

40537601 E. I. du Pont de Nemours & Co., Inc. (1988) Linuron Residue Study: Response to Special Review/Reregistration: Du Pont EPA Case No. 47. Unpublished study prepared by Enviro-Bio-Tech, Ltd. 268 p.

40730101 Erbes, D. (1988) Supplement to: Confined Accumulation Study of [Phenyl(U)-[Carbon 14]] Linuron on Rotational Crops ...: Laboratory Project ID: AMR 609-86. Unpublished study prepared by E.I. du Pont de Nemours and Co., Inc. 85 p.

41189801 Baron, J. (1989) Linuron: Magnitude of Residue on Parsley: Project ID: IR-4 PR No. 925/3035/3629. Unpublished study prepared by Cornell University, IR-4 Northeast Region. 74 p.

41241201 Fujinari, E.; Guinivan, R. (1989) Reduction of Linuron Residues During Cooking of Carrots, Asparagus, and Potatoes: Laboratory Project ID AMR-587-86. Unpublished study prepared by E.I. du Pont de Nemours and Co., Inc. in cooperation with Enviro-Bio-Tech., Ltd. 83 p.

41241202 Guinivan, R. (1989) Magnitude of Residues of Linuron in Soybeans and Processed Products: Laboratory Project ID AMR-969-87. Unpublished study prepared by E.I. du Pont de Nemours and Co., Inc. in cooperation with The National Food Laboratory, Inc. and Enviro-Bio-Tech. Ltd. 66 p.

41377601 Eble, J. (1989) Magnitude of Lorox L and Lorox DF Herbicide Residues in Sorghum: Lab Project Number: AMR/1131/88. Unpublished study prepared by Morse Laboratories. 47 p

41452601 Elbe, J. (1990) Magnitude of Lorox L and Lorox DF Herbicide Residues in Asparagus: Lab Project No: ML89-0125-DUP: AMR-1134-88. Unpublished study prepared by Morse Laboratories. 51 p.

41452701 Elbe, J. (1990) Magnitude of Lorox L Herbicide Residues in Potatoes: Lab Project Number: AMR-1132-88. Unpublished study prepared by Morse Laboratories. 47 p.

41501501 Eble, J. (1989) Magnitude of Lorox L and Lorox DF Herbicide Residues in Celery: Lab Project Number: AMR-1133-88. Unpublished study prepared by E. I. du Pont de Nemours & Co., Inc. 42 p.

41503401 Eble, J. (1990) Magnitude of Lorox L and Lorox DF Herbicide Residues in Cotton: Lab Project Number: AMR-1130-88. Unpublished study prepared by du Pont Agric. Products Dept., Glasgow Residue Lab. 47 p.

41569901 Eble, J. (1990) Magnitude of Lorox L and Lorox DF Herbicide Residues in Cotton: Lab Project Number: AMR-1130-88. Unpublished study prepared by E.I. du Pont de Nemours & Co. 47 p.

41716101 Brown, A. (1986) Supplement No. 1 to: Metabolism of [carbon 14] - Linuron by Potato Plants: Lab Project Number: AMR 559-86. Unpublished study prepared by E.I. du Pont de Nemours and Co., Inc. 20 p.

41716102 Brown, A. (1986) Supplement No. 1 to Metabolism of [carbon 14] - Linuron in Field-grown Soybean Plants: Lab Project Number: AMR 570-86. Unpublished study prepared by E.I. du Pont de Nemours and Co., Inc. 25 p.

41716103 E.I. du Pont de Nemours and Co. (1990) Supplement No. 1 to: Linuron Residue Study: Supplement: Response to Special Review/Reregistration Guidance Document-EPA Case No. 47 (6/29/84): Lab Project Number: 47. Unpublished study prepared by Enviro-Bio-Tech, Ltd. 33 p.

41938101 Brown, A. (1991) Supplement #2 to: Metabolism of [Carbon 14] Linuron by Potato Plants (MRID 00164196): Lab Project Number: AMR 559-86. Unpublished study prepared by E.I. du Pont de Nemours and Co. 30 p.

42379901 McClory, J.; Tomic, D. (1992) Residues of Lorox Herbicide in Carrots as Affected by

Cooking: Lab Project Number: AMR 1701-90: ML91-0259-DUP. Unpublished study prepared by E. I. du Pont de Nemours and Comp., Morse Laboratories. 81 p.

42397201 McClory, J.; Tomic, D. (1992) Residues of Lorox Herbicide in Potatoes and their Processed Fractions: Lab Project Number: AMR 1698-90: 65388-01: ML90-0211-DUP. Unpublished study prepared by E. I. du Pont de Nemours and Co., Arthur D. Little, Inc., and Others. 180 p.

42462901 McClory, J.; Jones, W.; Sund, R. et al. (1992) Residues of Lorox Herbicide in Soybeans and Its Processed Fractions: Lab Project Number: AMR 1699-90. Unpublished study prepared by E. I. du Pont de Nemours and Co. in cooperation with The Texas A&M University System. 68 p.

42462902 McClory, J.; Tomic, D. (1992) Residues of Lorox Herbicide in Asparaggus as Affected by Cooking: Lab Project Number: AMR 1700-90: ML90-0258-DUP. Unpublished study prepared by E. I. du Pont de Nemours and Co. in cooperation with Morse Laboratories, Inc. 70 p.

42542101 Brown, A. (1992) Plant Metabolism Study of [Phenyl(U)-carbon 14] Linuron in Potatoes: Lab Project Number: AMR 2236-91. Unpublished study prepared by E.I. du Pont de Nemours and Company. 53 p.

42542102 McClory, J.; Devine, P. (1992) Residues of Lorox Herbicide in Grain Sorghum Seed and Its Processed Fractions: Lab Project Number: AMR 1918-91: LOR-1918-91: ML92-0324-DUP. Unpublished study prepared by E.I. du Pont de Nemours and Company, Texas A&M, and Morse Labs, Inc. 88 p.

42548401 Brown, A. (1992) Plant Metabolism Study of [Phenyl(U)-carbon 14] Linuron in Soybeans: Lab Project Number: AMR 2159-91. Unpublished study prepared by E.I. du Pont de Nemours and Co. 60 p.

42560001 McClory, J.; Tomic, D. (1992) Residues of Lorox Herbicide in Field Corn Grain and its Processed Fractions: Lab Project Number: AMR 1916-91: LOR-1916-91: ML92-0294-DUP. Unpublished study prepared by E.I. DuPont de Nemours and Co. 116 p.

42605901 McClory, J.; Tomic, D. (1992) Residues of Linuron in Wheat and Wheat Straw Following Application of Lorox DF Herbicide: Lab Project Number: AMR 2136-92: LOR-2136-92. Unpublished study prepared by E. I. du Pont de Nemours and Co. and The Texas A &M University System. 59 p.

42635401 Hawkins, D.; Elsom, L.; Dighton, M.; et al. (1993) The Metabolism of (carbon 14)-Linuron in Laying Hens: Lab Project Number: HRC/DPT 267/921558: AMR-2200-91. Unpublished study prepared by Huntingdon Research Centre Ltd. 101 p.

42836701 McClory, J.; Jones, W.; Tomic, D. (1993) Freezer Storage Stability of Linuron on

Fresh and Cooked Asparagus: Lab Project Number: AMR 2339-92. Unpublished study prepared by DuPont Agricultural Products. 44 p.

42836702 McClory, J.; Jones, W.; Tomic, D. (1993) Freezer Storage Stability of Linuron on Wheat Straw and Grain: Lab Project Number: AMR 2623-93. Unpublished study prepared by DuPont Agricultural Products. 40 p.

43288301 Jones, W.; (1994) Freezer Storage Stability of Linuron on Fresh and Cooked Carrots (Supplement No. 1). Lab Project Number: AMR 2442-92. Unpublished study prepared by DuPont Agricultural Products. 31 p.

43288302 Jones, W. (1994) Freezer Storage Stability of Linuron on Fresh and Cooked Asparagus (Supplement No. 1). Lab Project Number: AMR 2339-9293. Unpublished study prepared by DuPont Agricultural Products. 46 p.