



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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

May 4, 2000

MEMORANDUM

Subject: Tolerance Reassessment of **Lactofen**: Product and Residue Chemistry Considerations;
PC Code: 128888; DP Barcode: D263857

From: Christine L. Olinger, Chemist
Reregistration Branch I
Health Effects Division (7509C)

Through: Whang Phang, Ph.D., Branch Senior Scientist
Reregistration Branch I
Health Effects Division (7509C)

and

William J. Hazel, Ph.D., Chemist
Reregistration Branch I
Health Effects Division (7509C)

To: Susan Stanton
Herbicide Branch
Registration Division (7503C)

and

Christina Scheltema, Chemical Review Manager
Reregistration Branch 3
Special Review and Reregistration Division (7508W)

Attached are product chemistry and residue chemistry considerations for the tolerance reassessment of the herbicide lactofen. Reregistration is not yet required as it was registered after 1984. The following studies remain as data gaps:

- ! The following physical/chemical properties studies are required for the for the 76%T (EPA Reg. No. 59639-94): 830.6317, 830.6320, 830.7050, and 830.7100.
- ! The following physical/chemical properties studies are required for the for the 60%FI (EPA Reg. No. 59639-70): 830.6302, 830.6303, 830.6304, 830.6313, 830.6314, 830.6315, 830.6316, 830.6317, 830.6319, 830.6320, 830.7000, 830.7050, 830.7100, 830.7200, 830.7220, and 830.7300. These data are required because the product composition has changed significantly as a result of a change in the manufacturing process.
- ! Confined Rotational Crop Study (860.1850)

cc:CLOliger (RRB1), Reg Std. File
7509C:RRB1:CLOliger:clo:CM#2:Rm 722J:305-5406: 4/27/00
RDI: VDobozoy: 5/1/00; ChemSAC 4/26/00

PC Code 128888

Case Name: Lactofen

Registrant: Valent U.S.A. Corporation

Product(s): 76.7% T (EPA Reg. No. 59639-94)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? ¹	MRID Number ²
830.1550	Product identity and composition	Y	44447001
830.1600	Description of materials used to produce the product	Y	44447001
830.1620	Description of production process	Y	44447001
830.1670	Discussion of formation of impurities	Y	44447001
830.1700	Preliminary analysis	Y	44447002
830.1750	Certified limits	Y	44447002, CSF 9/25/97
830.1800	Enforcement analytical method	Y	44447002
830.6302	Color	Y	44447003
830.6303	Physical state	Y	44447003
830.6304	Odor	Y	44447003
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	Y	44447003
830.6314	Oxidation/reduction: chemical incompatibility	N/A ³	
830.6315	Flammability	Y	44447003
830.6316	Explosibility	N/A ³	
830.6317	Storage stability	N	
830.6319	Miscibility	N/A ³	
830.6320	Corrosion characteristics	N	
830.7000	pH	Y	44447003
830.7050	UV/Visible absorption	N ⁴	
830.7100	Viscosity	N	
830.7200	Melting point/melting range	N/A ⁵	44447003
830.7220	Boiling point/boiling range	Y	44447003
830.7300	Density/relative density/bulk density	Y	44447003
830.7370	Dissociation constants in water	Y	PP#5F3299 ⁶
830.7550	Partition coefficient (n-octanol/water), shake flask method	Y	PP#5F3299 ⁶
830.7840	Water solubility: column elution method; shake flask method	Y	44447003 , 44460902 ⁷ , 44460903 ⁷
830.7950	Vapor pressure	Y	44460901 ⁷

¹ Y = Yes; N = No; N/A = Not Applicable. The database summarized above reflects amended registration in support of a change in the product composition resulting from a new manufacturing process. These data supercede all previously submitted product chemistry data, which reflected use of a different manufacturing process. Based on these data, the manufacturing process for the technical product differs significantly from the manufacturing process for the 60% FI (EPA Reg. No. 59639-70). In addition we note, that although REFS identifies this product as a 71.7% formulation, it is correctly identified as a 76.7% formulation.

² **Bolded** references were reviewed by the Registration Division under D241826, 1/16/98, H. Podall and D242411, 1/22/98, A. Smith; and all other references were reviewed as noted.

³ Data are not required according to RD Memorandum D241826, 1/16/98, H. Podall.

⁴ The OPPTS Series 830, Product Properties Test Guidelines require data pertaining to UV/visible absorption for the PAI.

⁵ Data are not required because the TGAI is a liquid at room temperature.

⁶ PP#5F3299, CB No. 1492, 12/27/85, M. Firestone; physical/chemical data for the PAI.

⁷ RD Memorandum, D242241, 2/5/98, S. Mathur.

PC Code 128888

Case Name: Lactofen

Registrant: Valent U.S.A. Corporation

Product(s): 60% FI (EPA Reg. No. 59639-70)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? ¹	MRID Number ²
830.1550	Product identity and composition	Y	43303501 , 43712901 ³
830.1600	Description of materials used to produce the product	Y	43303501 , 43712901 ³
830.1620	Description of production process	Y	43303501 , 43712901 ³
830.1670	Discussion of formation of impurities	Y	43303501 , 43712901 ³
830.1700	Preliminary analysis	Y	43303502 , 43712902 ³
830.1750	Certified limits	Y	43303502 , 43712902 ³ , CSF 7/6/95 ³
830.1800	Enforcement analytical method	Y	43303502 , 43712902 ³
830.6302	Color	N ⁴	
830.6303	Physical state	N ⁴	
830.6304	Odor	N ⁴	
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	N ⁴	
830.6314	Oxidation/reduction: chemical incompatibility	N ⁴	
830.6315	Flammability	N ⁴	
830.6316	Explosibility	N ⁴	
830.6317	Storage stability	N ⁴	
830.6319	Miscibility	N ⁴	
830.6320	Corrosion characteristics	N ⁴	
830.7000	pH	N ⁴	
830.7050	UV/Visible absorption	N ⁵	
830.7100	Viscosity	N ⁴	
830.7200	Melting point/melting range	N ⁴	
830.7220	Boiling point/boiling range	N ⁴	
830.7300	Density/relative density/bulk density	N ⁴	
830.7370	Dissociation constants in water	Y	PP#5F3299 ⁶
830.7550	Partition coefficient (n-octanol/water), shake flask method	Y	PP#5F3299 ⁶
830.7840	Water solubility: column elution method; shake flask method	N ⁴	
830.7950	Vapor pressure	Y	PP#5F3299 ⁶

¹ Y = Yes; N = No; N/A = Not Applicable. The database summarized above reflects amended registration in support of a change in the product composition resulting from a new manufacturing process. These data supercede all previously submitted product chemistry data, which reflected use of the original manufacturing process. We note that, based on these data, the manufacturing process for the FI differs significantly from the manufacturing process for the 76.7% T (EPA Reg. No. 59639-94).

² **Bolded** references were reviewed under CBTS No. 14171, D206354, 11/1/94, G. Otakie; and all other references were reviewed as noted.

³ RD Memorandum, D217832, 8/14/95, S. Mathur.

⁴ Because the product composition has changed significantly as a result of the change in the manufacturing process, updated data pertaining to the physical and chemical characteristics of the TGAI and MP are required.

⁵ The OPPTS Series 830, Product Properties Test Guidelines require data pertaining to UV/visible absorption for the PAI.

⁶ PP#5F3299, CB No. 1492, 12/27/85, M. Firestone; physical/chemical data for the PAI.

Agency Memoranda Citations

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
12/27/85	None	1492	M. Firestone	R. Mountfort and Toxicology Branch	Acc. Nos. 073855, 073853, 073843, and 073858	PP#5F3299 - Lactofen (Cobra) Herbicide on Soybeans. Evaluation of Analytical Methods and Residue Data.
11/1/94	D206354	14171	G. Otakie	J. Miller	43303501, 43303502	PP#8F3978 - Lactofen Manufacturing Concentrate - Evaluation of Product Chemistry Data/Change in Manufacturing Process.
8/10/95	D217832	None	S. Mathur	J. Miller	43712901, 43712902	Product Chemistry Review of MP; Reg./File Symbol No.: 59639-70; Product Name: Lactofen Manufacturing Concentrate (RD Memorandum).
1/16/98	D241826	None	H. Podall	S. Stanton	44447001-44447003	TGAI Product Chemistry Review/Action: 345; Reg. File Symbol No.: 59639-94; Chemical: Lactofen-76.7% pure; Company: Valent U.S.A. Corp. (RD Memorandum).
1/22/98	D242411	None	A. Smith	S. Stanton	44447001-44447003	Product Chemistry Review of Lactofen Technical (RD Memorandum).
2/5/98	D242241	None	S. Mathur	J. Miller	44460901-44460903	Product Chemistry Review of TGAI; Reg./File Symbol No.: 59639-94; Product Name: Lactofen Technical (RD Memorandum).

LACTOFEN
PC Code 128888
DP Barcode 263857

Tolerance Reassessment Eligibility Decision
Residue Chemistry Considerations

March 3, 2000

Contract No. 68-W-99-053

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA

Submitted by:
Dynamac Corporation
1910 Sedwick Road
Building 100, Suite B
Durham, NC 27713

LACTOFEN

TOLERANCE REASSESSMENT ELIGIBILITY DECISION

RESIDUE CHEMISTRY CONSIDERATIONS

PC Code 128888

(DP BARCODE D263857)

TABLE OF CONTENTS page

A. INTRODUCTION	2
B. USE PATTERN SUMMARY	2
1. Product List	2
2. Use Pattern Table	3
C. SUMMARY OF RESIDUE CHEMISTRY DATA REQUIREMENTS	7
D. RESIDUE CHARACTERIZATION	9
General Discussion on Residue Chemistry of Lactofen	9
1. Nature of the Residue in Plants	9
2. Nature of the Residue in Livestock	12
3. Residue Analytical Methods	12
4. Multiresidue Method Testing	14
5. Storage Stability Data	14
6. Magnitude of the Residue in Crop Plants	14
7. Magnitude of the Residue in Processed Food/Feed	15
8. Magnitude of the Residue in Meat, Milk, Poultry, and Eggs	16
9. Confined and Field Accumulation in Rotational Crops	18
E. TOLERANCE REASSESSMENT SUMMARY	18
1. Tolerance Reassessment Table	19
2. Codex/International Harmonization	19
F. BIBLIOGRAPHY	20
1. Study Citations	20
2. Agency Memoranda Citations	27

LACTOFEN

TOLERANCE REASSESSMENT ELIGIBILITY DOCUMENT

RESIDUE CHEMISTRY CONSIDERATIONS

PC Code 128888

A. INTRODUCTION

Lactofen [1-(carboethoxy)ethyl-5-[2-chloro-4-(trifluoromethyl) phenoxy]-2-nitrobenzoate] is a selective contact, diphenyl ether herbicide that is structurally related to acifluorfen and is classified as a B2 carcinogen. Lactofen, formulated as an emulsifiable concentrate (EC), is currently registered by Valent U.S.A. Corporation for preemergence and/or postemergence use on soybeans, snap beans, and cotton for the control of broadleaf weeds, such as nightshades, morning glories, pigweed, and ragweed. Two pesticide petitions for establishing permanent tolerances for lactofen residues in/on cotton (PP#9F3798) and peanut (PP#8F3591) commodities are currently under consideration by the Agency. A request for a Section 18 Emergency Exemption for use of lactofen on tomatoes has also been previously considered by the Agency (DP Barcodes D194843 and D195248, N. Dodd, 9/29/93); however, no pesticide petition for use on tomatoes has been submitted.

The nature of the residue in plants is adequately understood based on plant metabolism studies on cotton, peanut, soybean, and tomato. Currently the tolerance expression for plant commodities includes the parent compound and metabolites that contain the diphenyl ether moiety. The HED Metabolism Assessment Review Committee (MARC) met on April 4, 2000, considered all of the metabolism studies submitted to date (including the subject study) and concluded that only the parent compound needs to be regulated for plant commodities, provided that pre-harvest intervals exceed 45 days. Based on goat and hen metabolism studies, lactofen residues in animals have been tentatively determined to include PPG-2838 in addition to parent and the four diphenyl ether metabolites currently regulated in plants (DP Barcode D195308 and D208336, G. Otakie, 2/2/95; and C. Olinger, 4/26/00). At this time tolerances for livestock and processed commodities are not needed.

B. USE PATTERN SUMMARY

1. Product List

A search of the Agency's Reference Files System (REFS) on 2/11/00 indicates that there are two lactofen end-use products (EPs) registered to Valent U.S.A. Corporation that have uses on food and/or feed crops (Table 1). The 2.4 lb/gal EC formulation of lactofen (EPA Reg. No. 59639-92) is a

multiple active ingredient (MAI) product, which contains 0.7 lb/gal of flumiclorac pentyl ester in addition to lactofen.

There are eight SLN Labels associated with the 2 lb/gal EC: two for use on succulent beans (SLN Nos. NM980003 and TX980006); three that are for non-food/non-feed uses (SLN Nos. AR960005, FL890032 and MS960001); and three (SLN Nos. IA890002, TX930007, and TX960001) that are listed in REFS as non-food/non-feed uses, but which are for use on soybeans or cotton. The one SLN label (MO960009) associated with the 2.4 lb/gal EC is also listed as a non-food/feed use, but is for the use of this product in tank mixes.

Table 1. Lactofen EPs with Uses on Feed/Food Crops Registered to Valent U.S.A. Corporation

EPA Reg No.	Label Acceptance	Formulation	
	Date	Class	Product Name
59639-34 ^a	9/99	2 lb/gal EC	Cobra [®] Herbicide
59639-92 ^b	11/99	2.4 lb/gal EC	Stellar [®] Herbicide

^a Includes SLNs for food/feed uses on succulent beans (SLN Nos. NM980003 and TX980006) along with non-food/feed uses (SLN Nos. AR960005, FL890032, IA890002, MS960001, TX930007, and TX960001).

^b This EP is a multiple active ingredient (MAI) product that contains 0.7 lb/gal of flumiclorac pentyl ester in addition to 2.4 lb/gal of lactofen; Includes SLN No. MO960009 for a non-food/feed use.

2. Use Pattern Table

A comprehensive summary of the registered use patterns of lactofen, based on the product labels registered to Valent U.S.A., is presented in Table 2. A tabular summary of the residue chemistry science assessments for reregistration of lactofen is presented in Table 3. The conclusions listed in Table 3 regarding the tolerance reassessment eligibility are based on the use patterns registered by the basic producer, Valent U.S.A. Corporation. When end-use product DCIs are developed, 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 producers labels.

A review of the above EP labels and the supporting residue data indicate that the following label amendment is required:

The use directions for cotton on the label for the 2 lb/gal EC (EPA Reg. No. 59639-34) are unclear on the maximum number of applications allowed per season. One section of the label states that “Cobra Herbicide may also be applied as a layby application”, while Table 1C of the use directions implies that the product may be applied to cotton when plants are \$6 inches tall or at layby when plants are \$12 inches tall. The label must be amended to specify a maximum seasonal

application rate. The available cotton field trial data support a maximum of two applications per season, totaling 0.4 lb ai/A.

Table 2. Food/Feed Use Patterns Subject To Reregistration for Lactofen (PC Code 128888).

Site Application Type ^a Application Timing Application Equipment	Formulation [EPA Reg. No.]	Max. Single Application Rate (lb ai/A)	Max. # Apps./season	Minimum Retreatment Interval (Days)	Use Limitations ^{b, c}
Cotton					
Postemergence directed ground applications to plants at least 6 inches in height Ground equipment	2 lb/gal EC [59639-34]	0.2	2 ^d	Not specified (NS)	A 70-day PHI is specified. Applications may include crop oil concentrate at up to 2 pt/A or a non-ionic surfactant at 2 pt/100 gal of spray solution. A maximum seasonal application rate is not specified. Do not graze animals on forage or stubble or utilize hay or straw for animal feed or bedding.
Peanuts (Use pattern proposed under PP#8F3591)					
Broadcast applications at cracking (preemergence) and at 6-leaf stage (postemergence) Ground equipment	2 lb/gal EC [59639-34]	0.25 + 0.20	2	NS	A 90-day PHI is proposed, along with a restriction on the feeding of treated vine or hay to livestock.
Soybeans					
Broadcast and banded, pre- and postemergence applications Ground or aerial equipment	2 lb/gal EC [59639-34]	0.3 - preemergence 0.2 - postemergence	2	NS	Do not apply within 45 days of harvest or after growth stage R6 (full seed); 90-day PHI is specified in NY. Do not graze animals on forage or stubble or utilize hay or straw for animal feed or bedding. Do not apply more than 0.3 lb ai/A preemergence per season and more than a total of 0.4 lb ai/A/season. (0.2 lb ai/A/season in NY) Minimum application volumes of 5 and 10 gal/A are specified for aerial and ground applications, respectively. Applications may include 0.125-2% (v/v) of a crop oil concentrate or 0.25% of a non-ionic surfactant.

Table 2. (continued).

Site Application Type ^a Application Timing Application Equipment	Formulation [EPA Reg. No.]	Max. Single Application Rate (lb ai/A)	Max. # Apps./season	Minimum Retreatment Interval (Days)	Use Limitations ^{b, c}
Soybeans (continued)					
Postemergence broadcast or banded applications Ground equipment	2.4 lb/gal EC [59639-92]	0.13	2	NS	A 60-day PHI is specified. Do not graze animals on forage or stubble or utilize hay or straw for animal feed or bedding. Do not apply more than 0.13 lb ai/A/application and more than 0.19 lb ai/A/season. A minimum application volume of 15 gal/A is specified. Applications may include 1-2 pts./A of crop oil concentrate or methylated seed oil. Do not apply by air.
Snap beans (in OR and TN only)					
Preemergence broadcast application within 48 hours of planting. Ground equipment	2 lb/gal EC [59639-34]	0.22 - OR 0.25 - TN	1	NA	Restricted to use in OR and TN. A 55-day PHI is specified. Apply no later than 48 hours after planting. Apply only one application per season, and do not apply to soils with high sand contents (sandy loams, loamy sands, and gravelly sandy loams)

^a For banded applications, reduce the application volume and the broadcast rate in proportion to the area actually being treated.

^b Labels for both the 2 and 2.4 lb/gal ECs include the following general restrictions: (1) a restricted entry interval of 12 hours; and (2) do not apply through any type of irrigation system.

^c The label for Stellar[®] has the following rotational crop restrictions: do not rotate to crops other than soybeans or field corn within 30 days of the last application, and do not rotate to small grains for a least 120 days after the last application.

^d A maximum of 2 applications/season is implied for the use on cotton; however, the label directions are unclear.

C. SUMMARY OF RESIDUE CHEMISTRY DATA REQUIREMENTS

Table 3. Summary of Residue Chemistry Data Requirements for Lactofen (PC Code 128888).

Guideline No.	Guideline Description / Commodity	§180.432 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.	Comments
860.1200	Directions for Use	NA	Yes		Use directions for cotton must be amended.
860.1300	Nature of the Residue - Plants	NA	No	40436601 40436606 41297601 42508101 44166701 44411701	Adequate studies are available on soybean, peanuts, and tomatoes.
860.1300	Nature of the Residue - Animals	NA	No	41709501 41709502 42183001 43095001 43095002	Ruminant and poultry studies are adequate.
860.1340	Residue Analytical Method				
	Plant commodities	NA	No	40059402 40436603 41297604 42925301 44176601 44514701	An adequate GC/ECD method (RM-28D) is available for determining residues in plant commodities.
	Animal commodities	NA	No	42183003 42925301	An adequate GC/ECD method (RM-28C) is available for determining residues in animal commodities.
860.1360	Multi-Residue Method	NA	No	40026603 41297604 42183004	
860.1380	Storage Stability Data	NA	No	41297603 42925301 43379201 44194301 44411901	Crop field trials and processing studies are supported by adequate storage stability data.
860.1400	Magnitude of the Residue - Water, Fish, and Irrigated Crops	NA	NA		
860.1460	Magnitude of the Residue - Food Handling	NA	NA		
860.1480	Magnitude of the Residue - Meat, Milk, Poultry, Eggs	None	No	42263801 42925301	Tolerances are not required for residues in livestock commodities.

Table 3. *Continued.*

Guideline No.	Guideline Description / Commodity	§180.432 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.	Comments
860.1500	Crop Field Trials				
	<u>Legume Vegetables Crop Group</u> Soybean	0.05	No	42934501 43638601	Residues of each analyte are <0.01 ppm in soybeans from 1x and 5x treatments.
	Bean, snap	0.05	No	43379201	Residues of each analyte are <0.01 ppm in snap beans from a 2x treatment.
860.1500	<u>Miscellaneous Commodities</u> Cottonseed	0.05 (expired)	No	41069801 42494901	Residues of each analyte are <0.01 ppm in cottonseed from 1x and 2x treatments.
	Cotton gin byproducts	None	No	41709503 44411901	In gin trash from a 1x treatment, residues of lactofen <i>per se</i> are <0.01-0.03 ppm, and residues of each metabolite are <0.01ppm .
	Peanuts	None	No	40436604 41297602 42508102	Residues of each analyte are <0.01 ppm in peanut nutmeats from 1x and 3x treatments.
860.1520	Processed Food/Feed				
	Cottonseed		No	41209101 41709503	Residues do not concentrate in cottonseed processed commodities.
	Peanut		No	40436605 42508103	Residues do not concentrate in soybean processed commodities.
	Soybean		No	42934501 43638602	Residues do not concentrate appreciably in soybean processed commodities.
860.1850	Confined Accumulation in Rotational Crops	None	Yes	00117578 00117580	
860.1900	Field Accumulation in Rotational Crops	None	Reserved	00117579	

D. RESIDUE CHARACTERIZATION

General Discussion on Residue Chemistry of Lactofen

1. Nature of the Residue in Plants

Adequate studies are available depicting the metabolism of [¹⁴C]lactofen in soybeans, peanuts, and tomatoes. Although the quantities of individual metabolites vary between crops, the data indicate that the metabolic pathway is similar between crops. The metabolism of lactofen initially involves reduction of the nitro group to an amino group, with or without loss of the ethyl ester side chains to form the preliminary diphenyl ether metabolites: amino lactofen (PPG-1576), N-formyl lactofen (PPG-2597), desethyl lactofen (PPG-947), acifluorfen (PPG-847), and amino acifluorfen (PPG-2053). Subsequent conjugation of these primary metabolites through their carboxyl and amino groups results in the formation of complex soluble and insoluble polar components. Data from the recent peanut metabolism study indicates that following formation of acifluorfen, the diphenyl ether bond may be cleaved in a glutathione-mediated reaction to form a glutathione conjugate with the 2-nitrobenzoic acid moiety. Subsequent degradation of the glutathione moiety to cysteine forms S-(carboxy-4-nitrophenyl)cysteine (CNPC), which was the most abundant metabolite detected in peanut hay. Free and conjugated 5-hydroxy-2-nitrobenzoic acid (HNBA) detected in nutmeats and hay may result from either loss of the cysteine moiety or from direct cleavage of the acifluorfen metabolite. The chemical names and structure of the lactofen residues of concern in plants and animals are presented in Figure 1.

In tomatoes, total radioactive residues (TRRs) were low (0.002 ppm) in/on ripe tomatoes harvested 25 days following the last of four soil-directed applications of [¹⁴C]lactofen totaling 1.5 lb ai/A (2.5x). ¹⁴C-Residues were higher in/on ripe tomatoes (0.082 ppm) and foliage (1.389 ppm) from the same plants that were directly exposed to the spray treatment; however, these fruits and leaves also showed signs of severe phytotoxicity. Analysis of damaged fruit directly exposed to the spray treatment detected lactofen (5.5% TRR, 0.005 ppm) and N-formyl lactofen (2.9% TRR, 0.002 ppm), along with trace amounts (#1.4% TRR, #0.001 ppm) of amino CTBL, desethyl lactofen, and amino NCTBA; but the majority of ¹⁴C-residues were characterized as being comprised of unknown polar compounds (42.6% TRR, 0.035 ppm). The metabolite profile in/on sprayed foliage was similar. As in fruit, the majority of solvent extractable ¹⁴C-residues were comprised of unknown polar compounds (48.8% TRR, 0.679 ppm). The principal ¹⁴C-residues identified in foliage were lactofen (7.6% TRR, 0.106 ppm) and N-formyl lactofen (4.3% TRR, 0.059 ppm), along with trace amounts (#2.0% TRR, #0.028 ppm) of amino CTBL, desethyl lactofen, and amino NCTBA.

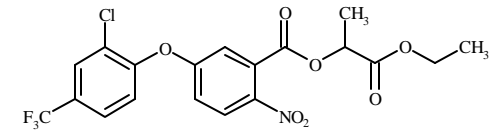
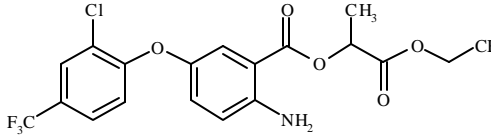
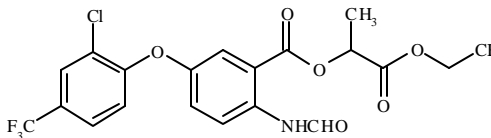
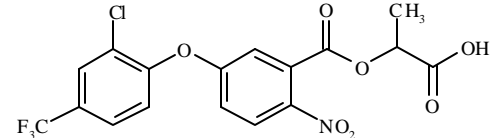
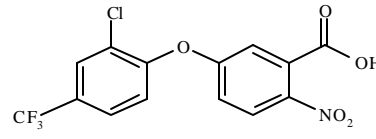
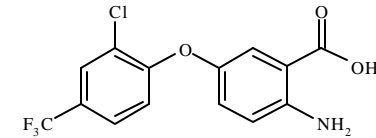
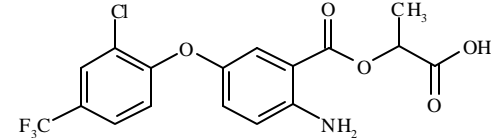
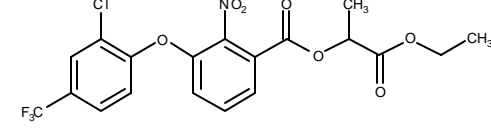
In the most recent peanut metabolism study, TRRs were 0.046 and 0.216 ppm in/on peanut nutmeats and hay, respectively, harvested at maturity (127 days post-treatment) following two early-season broadcast applications of [¹⁴C]lactofen at -2x the proposed seasonal rate. The majority of ¹⁴C-residues in nutmeats (70% TRR, 0.034 ppm) were characterized as unknown polar components,

with the largest single fraction accounting for 27.6% of the TRR (0.012 ppm). Minor amounts of conjugated HNBA (7.3% TRR) and CNPC (8.4% TRR) were detected in nutmeats, but lactofen and its diphenyl ether metabolites were not detected (<0.001 ppm). However in peanut hay, trace amounts of lactofen (0.8% TRR) were detected along with minor amounts of the following diphenyl ether metabolites: N-formyl lactofen (0.4% TRR), desethyl lactofen (0.7% TRR), acifluorfen (3.6% TRR) and amino acifluorfen (0.5% TRR). The principal ¹⁴C-residue identified in hay was CNPC which accounted for 25.1% of the TRR (0.056 ppm). Minor levels of HNBA (4.4% TRR) and S-(carboxy-4-nitrophenyl) glutathione (CNPG; 1.2% TRR) were also identified in peanut hay. As in nutmeats, unknown polar components accounted for a largest portion of the ¹⁴C-residues in hay (40.7% TRR, 0.090 ppm), although individual polar components or fractions each accounted for #8.9% of the TRR (0.020 ppm).

In a soybean metabolism study conducted at rates ranging from 0.5x to 1.25x, residues of lactofen, acifluorfen, amino lactofen, N-formyl lactofen, and desethyl lactofen were less than 0.01 ppm at pre-harvest intervals reflecting the registered use. Residues were generally non-detectable at a limit of quantitation of 0.005 ppm, with the exception of amino lactofen. One study showed residues of approximately 0.008 ppm at a preharvest interval of 89 days. Percent of total radioactive residue could not be determined from the information presented in the review or the study.

The current tolerance expression includes lactofen and metabolites containing the diphenyl ether linkage. Specifically, the enforcement method is capable of analyzing lactofen, acifluorfen, des-ethyl lactofen, amino lactofen, and N-formyl lactofen. The HED Metabolism Assessment Review Committee (MARC) met on April 4, 2000 to discuss the metabolism of lactofen in plants and livestock. The MARC concluded that only the parent compound need be included in the tolerance expression and risk assessment for plant commodities, assuming the pre-harvest interval is 45 days or greater (C. Olinger, 4/26/00, D265469).

Figure 1. Chemical name and structure of lactofen residues of concern in plants and animals.

Common names/(Codes) Chemical name	Chemical Structure
Lactofen ^a (PPG-844, PG-1) 1-(Carboethoxy)ethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoate	
Amino lactofen; amino CTBL ^a (PPG-1576, PG-74) 1-(Carboethoxy)ethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-aminobenzoate	
N-formyl lactofen ^a (PPG-2597, PG-73) 1-(Carboethoxy)ethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-formamidobenzoate	
Desethyl lactofen ^a (PPG-947, PG-11) 1-(Carboxy)ethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoate	
Acifluorfen (PPG-847, PG-5) ^a 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoic acid	
Amino acifluorfen ^b ; amino NCTBA (PPG-2053, PG-75) 2-amino-5-[2-chloro-4-(trifluoromethyl)phenoxy]-benzoic acid	
PPG-2828 ^b (PPG-A947) 1-(carboxy)ethyl-5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-aminobenzoate	
PPG-1530 (Internal Standard) 1-(Carboethoxy)ethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-6-nitrobenzoate	

^a The residues of lactofen in plants formerly regulated for lactofen include: lactofen, desethyl lactofen, amino lactofen, N-formyl lactofen, and acifluorfen. ^bPPG-2053 and PPG-2828 are residues of concern in animal commodities, along with lactofen and the four plant metabolites.

2. Nature of the Residue in Livestock

Adequate studies are available depicting the metabolism of [¹⁴C]lactofen in ruminants and poultry. In a ruminant metabolism study, a dairy goat was dosed orally with [¹⁴C]lactofen for four days at a level equivalent to 25 ppm in the diet (5,000x the maximum level of residues estimated in the diet, 0.005 ppm). TRR levels in tissues were 6.96 ppm in kidney, 4.39 ppm in liver, 0.110-0.143 ppm in fat, and 0.087-0.101 ppm in muscle. TRR levels in milk were 0.014-0.109 ppm and plateaued by Day 4. The principal ¹⁴C-residue detected in tissues was PPG-2828, which accounted for 34% of the TRR in kidney (1.49 ppm) and 38% of the TRR in liver (2.65 ppm). PPG-2828 was also detected in muscle (#20% TRR, #0.02 ppm) and fat (#14% TRR, #0.02 ppm). Minor amounts (#2% TRR, #0.05 ppm) of PPG-1576, PPG-2597, and PPG-2053 were detected in liver and/or kidney. ¹⁴C-Residues identified in milk from Days 4 and 5 included PPG-2828 (0.01-0.05 ppm), PPG-1576 (0.01 ppm), and PPG-847 (0.01 ppm). Lactofen was not detected in any tissues or milk.

In a poultry metabolism study, hens were dosed orally with [¹⁴C]lactofen for eight days at a level equivalent to 14.3 ppm in the diet (3,575x the maximum level of residues estimated in the diet, 0.004 ppm). TRR levels in tissues were 1.47 ppm in liver, 0.057 ppm in fat, 0.060-0.090 ppm in muscle, and 0.151 ppm in skin. TRR levels in eggs were 0.018-0.166 ppm in yolks and 0.008-0.047 ppm in whites. ¹⁴C-Residues in yolks increased throughout the dosing period attaining a maximum of 0.166 ppm on Day 7; whereas, ¹⁴C-residues in egg whites plateaued by Day 4 at 0.044 ppm. The principal residues in poultry liver were PPG-847 (15.7% TRR, 0.230 ppm), PPG-947 (20.6% TRR, 0.303 ppm), and PPG-2828 (36.3% TRR, 0.534 ppm). In muscle, the major ¹⁴C-residue was PPG-947 (59.7-77.0% TRR, 0.046-0.054 ppm); minor levels of lactofen (#14.2% TRR, #0.013 ppm), PPG-847 (3.6-7.3% TRR, 0.002-0.006 ppm), and PPG-2828 (#1.4% TRR, #0.001 ppm) were also detected. In fat and skin, the major ¹⁴C-residue was PPG-947 (58.6-60.6% TRR, 0.033-0.091 ppm), along with PPG-847 (8.7-15.1% TRR, 0.005-0.023 ppm). In eggs (Day 7), PPG-947 was the principal ¹⁴C-residue in both yolk (29.7% TRR, 0.049 ppm) and whites (46.8% TRR, 0.015 ppm), followed by PPG-847 (yolk - 5.7% TRR, 0.010 ppm; whites - 23.3% TRR, 0.008 ppm)

The residues of concern in animals include lactofen and its diphenyl ether metabolites, which would include PPG-847, PPG-947, PPG-1576, PPG-2053, PPG-2597, and PPG-2828 in animals (G. Okatie, 6/19/91, C. Olinger, 4/26/2000).

3. Residue Analytical Methods

The Pesticide Analytical Manual (PAM) Vol. II, Pesticide Regulation Section 180.432 lists three GC/electron capture detection (ECD) methods (Methods I, A, and B) for determining residues of lactofen in plant commodities. For Method I, residues of lactofen are extracted with acetonitrile:triethylamine (ACN:TEA, 99:1, v/v), followed by partitioning with hexane for oily matrices. Lactofen residues are then purified by silica gel column chromatography and analyzed by GC/ECD using a DB-5 column. The Agency validated this method down to a limit of 0.01 ppm using soybeans.

Method A is similar to Method I, except that the extracted residues are base (NaOH) hydrolyzed converting lactofen to acifluorfen, which is then methylated with diazomethane. The derivatized residues are then purified by silica gel column chromatography and analyzed by GC/ECD using a DB-1701 column. Method B (Chevron Method RM-28, 3/12/90) is essentially identical to Method I, except that it allows for the use of an alternative column (DB-1701) with GC/ECD analysis for confirmation of residues.

In conjunction with the petitions for use of lactofen on cotton and peanuts, Method RM-28 was revised changing the extraction solvent from ACN:TEA to ethanol:water:TEA (94:5:1, v/v/v) and adding a water:dichloromethane (DCM) partitioning step after solvent extraction. The modified method (RM-28B) was rewritten to clarify the procedures and renamed Method RM-28D.

The proposed GC/ECD enforcement method (Method RM-28D) has been successfully radiovalidated in conjunction with a recent tomato metabolism study and has undergone a successful independent laboratory validation trial. In an initial petition method validation (PMV) trial, the Agency was able to validate the method only down to a limit of quantitation (LOQ) of 0.05 ppm for each analyte (DP Barcode D213094, G. Okatie, 5/9/95). However, after clarification of the procedures, the method was successfully validated (DP Barcode D229065, G. Otakie, 9/19/97) by the Agency using peanut nutmeats and cottonseed down to a LOQ of 0.01 ppm. Method RM-28D (revised 1/13/98) was subsequently revised to incorporate changes suggested by the Analytical Chemistry Branch and has been resubmitted to the Agency (DP Barcodes D244081, D244082 and D244635, C. Olinger, 4/27/00).

An adequate GC/ECD method (Valent Method RM-28C) is available for determining residues of lactofen and its six diphenyl ether metabolites (PPG-847, PPG-947, PPG-1576, PPG-2053, PPG-2597, and PPG-2828) in animal commodities. This method is essentially the same as Method B (RM-28B) in PAM Vol. II. Residues are extracted from animal matrices with ACN:TEA (99:1, v/v) and are partitioned with hexane. Residues are then methylated using diazomethane, purified by silica gel column chromatography, and analyzed GC/ECD using an internal standard (PPG-1530). The method LOQ and LOD is 0.01 and 0.005 ppm, respectively, for each analyte. The method was radiovalidated in conjunction with the goat and poultry metabolism studies using samples of milk, kidney, liver (goat and poultry), and egg yolks.

4. Multiresidue Method Testing

Adequate data are available on the recovery of lactofen and its plant metabolites through Multiresidue Method Testing Protocols. The FDA PESTDATA database indicates that residues of lactofen *per se* are completely recovered through Method 304, PAM Vol. I (3rd ed., revised 10/97); however, no data are available on the recovery of lactofen through Methods 302 and 303.

5. Storage Stability Data

Adequate storage stability data are available to support the existing crop field trials and processing studies. The data indicate that lactofen is stable in cottonseed stored at 0 C for least 1 year and in cotton gin byproducts stored at -20 C for at least 5.4 months. Recoveries from cottonseed, corrected for recoveries from freshly fortified samples, were 80-105% for lactofen, and corrected recoveries from cotton gin byproducts were 71-110% at 5.4 months. Data for snap beans also indicate that residues are stable at -15 C for up to 9.6 months. In peanut nutmeats, residues of lactofen are stable in frozen nutmeats for at least 25 months. In soybeans, lactofen is stable for up to 154 days (recoveries of 67-97%), but residues declined moderately by 820 days (47-81% recoveries).

For animal commodities, lactofen and its metabolites were stable in milk at -20 C for at least 131 days (69-119% recoveries). In tissue samples, PPG-847 and PPG-947 were stable at -20 C for up to 154 days (74-164% recoveries). Lactofen and PPG-2597 were stable at -20 C in muscle, fat, and kidney for up to 152 days (73-114% recoveries), but declined in liver after 62 days (recoveries: lactofen, 8%; PPG-2597, 27%). The metabolites PPG-1576 and PPG-2828 stable in frozen tissues for up to 62 days (83-140% recoveries), but showed moderate declines from 90-154 days (48-85% recoveries). The metabolite PPG-2053 was the least stable analyte in frozen tissues with recoveries declining to 71-82% by 33 days and 12-65% by 62 days.

6. Magnitude of the Residue in Crop Plants

Adequate lactofen residue data are available for cotton, peanuts, snap beans, and soybeans. An adequate number of field trials have been conducted on these crops depicting lactofen residues resulting from the application of lactofen at the maximum labeled or proposed use rate.

For cotton, residues of lactofen and its four regulated metabolites were each <0.01 ppm in/on cottonseed (n=14) harvested 59-127 days following a single postemergence soil-directed application of lactofen (2 lb/gal EC) at 0.4 lb ai/A (2x the single application rate) and in/on cottonseed (n=10) harvested 23-108 days following the last of two postemergence directed applications at 0.4 lb ai/A/application (0.8 lb ai/A/season; 2x the maximum seasonal rate). With one exception, residues of lactofen and its metabolites were also each <0.01 ppm in/on cotton gin byproducts (n=11) derived from cotton harvested 69-108 days following two applications at 0.2 lb ai/A (1x). One gin trash sample bore residues of lactofen *per se* at 0.03 ppm, but confirmatory analyses of this sample detected lactofen at <0.01-0.02 ppm and residues of lactofen were <0.01 ppm in the duplicate treated sample from the same trial.

In soybeans treated at 0.4 lb ai/A (1x the maximum seasonal rate) and harvested 44-50 days post-treatment, residues of lactofen *per se* in/on seeds were <0.005 ppm for 7 samples and 0.007 ppm for one sample (LOQ=0.01 ppm); residues of all four metabolites were nondetectable (<0.005 ppm) in/on all eight samples. In addition, residues of lactofen *per se* were #0.007 ppm in/on soybeans (n=4) from 4 trials conducted at 5x the maximum application rate, and residues of the four metabolites were <0.005 ppm.

In five trials, residues of lactofen and its metabolites were each <0.01 ppm in/on snap beans harvested 53-59 days following a single application of lactofen at 0.5 lb ai/A (2x the maximum label rate).

In the 8 field trials conducted in conjunction with the petition for use on peanuts (PP#8F3591), residues of lactofen and its metabolites were each <0.01 ppm in/on 16 samples each of peanut nutmeats and hulls harvested 65-71 days following the last of two broadcast applications of lactofen (2 lb/gal EC) totaling 0.45 lb ai/A (1x the maximum proposed rate). Residues of each analyte were also <0.01 ppm in/on peanut nutmeats and hulls from two trials conducted at 2x and 5x the maximum seasonal rate.

7. Magnitude of the Residue in Processed Food/Feed

Adequate processing studies are available for cottonseed, peanuts, and soybeans. These studies indicate that separate tolerances for processed commodities are not required for these crops. Residue data on aspirated grain fractions are not needed as the use is not likely to result in higher residues in/on these fractions.

In a single trial, residues of lactofen and its four metabolites were each <0.01 ppm in/on cottonseed harvested 76 days following the last of two directed applications of lactofen at 0.6 lb ai/A/application, (1.2 lb ai/A/season; 3x rate). Residues of each analyte were also <0.01 ppm in samples of meal, hulls, oil (crude and refined) and soapstock processed from 3x-treated cottonseed. The maximum theoretical concentration factor for processed cotton commodities is 6.3x (oil).

In four tests conducted at 5x the maximum use rate for soybeans, residues of lactofen *per se* were #0.007 ppm and in/on soybeans, and residues of each of the four metabolites were <0.005 ppm. In one trial, residues of lactofen *per se* in seeds averaged 0.006 ppm and concentrated by 3x in hulls (0.018 ppm); no concentration of metabolites was noted. Based on the level of residues of lactofen (#0.007 ppm) and its metabolites (each <0.005 ppm) in seeds and the observed 3x concentration factor for hulls, a separate tolerance for residues in hulls is not required.

Residues of lactofen and its metabolites were each <0.01 ppm in/on peanut nutmeats harvested 70 days following the last of two applications totaling 1.35 and 2.25 lb ai/A (3x and 5x the maximum seasonal use rate). Residue of each analyte were <0.01 ppm in meal, oil (crude and refined), and soapstock processed from nutmeats treated at 3x and 5x.

8. Magnitude of the Residue in Meat, Milk, Poultry, and Eggs

Reregistration requirements for magnitude of the residue in meat, milk, poultry, and eggs are fulfilled. A ruminant feeding study is available depicting residues of lactofen and its residues of concern in animals (PPG-847, PPG-947, PPG-1576, PPG-2053, PPG-2597, and G-2828) in meat and milk.

Because residues of lactofen and its metabolites have been below the LOQ (<0.01 ppm) in essentially all samples of animal feed items from crops treated with lactofen, even at exaggerated rates, the dietary burden for livestock has been calculated using estimated residue levels rather than the tolerances. In the available animal feed items, only lactofen *per se* has ever been detected at quantifiable levels and only at 0.03 ppm in 1 out of 12 samples of cotton gin trash. Using an estimated maximum residue level of 0.01 ppm for livestock feed items (DP Barcode D228848, G. Otakie, 11/6/96) and a realistic animal diet, the calculated maximum dietary burdens for lactofen residues in livestock diets are 0.005 ppm for dairy and beef cattle, 0.004 ppm for poultry, and 0.0025 ppm for swine (see table below).

Calculation of maximum dietary burdens of livestock animals for lactofen

Feed Commodity	% Dry Matter ^a	% Diet ^a	Estimated Residues Levels (ppm) ^b	Dietary Contribution (ppm) ^c
Beef and Dairy Cattle				
Cottonseed	88	25	0.01	0.0028
Cotton gin-byproducts	90	20	0.01	0.0022
TOTAL BURDEN				0.005
Poultry				
Soybean, meal	NA	40	0.01	0.004
TOTAL BURDEN				0.004
Swine				
Soybean, meal	NA	25	0.01	0.0025
TOTAL BURDEN				0.0025

^a Table 1 (OPPTS Guideline 860.1000, August 1996).

^b Estimated residues based on data from field trials.

^c Contribution = [tolerance / % DM (if cattle)] X % diet.

In the available ruminant feeding study, four groups of dairy cows (3 animals/dose group) were dosed with lactofen at levels equivalent to 0.025, 0.075, 0.25 and 2.5 ppm in the diet for 28 consecutive days. These dose levels are equivalent to 5x, 15x, 50x, and 500x the maximum estimated dietary burden for cattle (0.005 ppm). Milk was collected twice daily on days -1, 1, 4, 7, 10, 14, 21, 28, and 29 (day of slaughter). Cows were sacrificed within 24 hours for the final dose and samples of liver, kidney, fat, and muscle were collected. Duplicate samples of each matrix were collected and analyzed for each treated cow.

With the exceptions of the samples indicated in the table below, residues of lactofen and its six metabolites were nondetectable (<0.005 ppm) in ruminant tissues and milk.

Dose level	Summary of detectable (\$0.005 ppm) residues from cow feeding study
0.025 ppm (5x)	In liver, PPG-1576 was detected in three out of six samples at 0.005-0.006 ppm. No residues were detected in kidney; and samples of fat, muscle and milk were not analyzed.
0.075 ppm (15x)	In liver, PPG-1576 was detected in one sample at 0.005 ppm. In kidney, PPG-2828 was detected five samples at 0.005-0.008 ppm. No residues were detected in fat; and muscle and milk were not analyzed.
0.25 ppm (50x)	In liver, PPG-2828 was detected in all six samples at 0.008-0.014 ppm. In kidney, PPG-2828 also was detected in all six samples at 0.011-0.029 ppm, and PPG-1576 was detected at 0.007 ppm in one sample. No residues were detected in muscle and fat. In milk, PPG-2053 was detected at 0.008 ppm in one sample on Day 1, and PPG-1576 was detected at 0.005-0.007 ppm in a total of five samples over Days 1 through 21.
2.50 ppm (500x)	In liver, PPG-2053 and PPG-2828 were detected in all six samples at 0.005- 0.011 ppm and 0.093 to 0.214 ppm, respectively, and PPG-1576 was detected at 0.006 ppm in one sample. In kidneys, PPG-2828 was detected in all six samples at 0.131-0.233 ppm; PPG-2053 was detected in three samples at 0.006-0.008 ppm; and lactofen was detected at 0.005 ppm in one sample. In fat, PPG-1576 was detected in all six samples at 0.019-0.023 ppm. No residues were detected in muscle. In milk from days 1 through 28, PPG-2053 was detected in three samples, PPG-1576 in five samples, and PPG-2828 in 21 samples. The highest residue level for any moiety was PPG-2828 at 0.012 ppm in Day 10 milk.

As residues of lactofen and its six metabolites were each <LOQ (0.01 ppm) in liver, kidney and fat from the 0.075 ppm (15x) dose group and in milk and muscle from the 0.25 ppm (50x) dose group, there is no reasonable expectation of finding quantifiable lactofen residues in livestock tissues or milk [40 CFR 180.6(a)(3)]. Accordingly, tolerances for lactofen residues in livestock (cattle, goats, horses, and sheep) commodities not required at the present time. These data also indicate that tolerances are not required for hog commodities, given that the maximum dietary burden is lower for swine than ruminants. If additional feed items are registered, this decision will be revisited.

Based on the results of the poultry metabolism study, in which hens were dosed for 7 days at 14.3 ppm (3,575x dose level), a poultry feeding study and tolerances for lactofen residues in poultry and eggs are not required, as quantifiable levels of lactofen residues are unlikely to occur in poultry.

9. Confined and Field Accumulation in Rotational Crops

There are currently no plant-back restrictions on the COBRA® label. A confined rotational crop study in root crops indicated that there was minimal uptake of radioactivity in carrots and radishes planted between 42 and 119 days after treatment of soil with ¹⁴C-lactofen. A confirmatory confined rotational crop study with a leafy vegetable and small grain is required.

E. TOLERANCE REASSESSMENT SUMMARY

Tolerances for residues of lactofen in or on raw agricultural commodities for plants are currently expressed in terms of lactofen and its metabolites (PPG-847, PPG-947, PPG-1576, and PPG-2597) containing the diphenyl ether linkage, expressed as lactofen. Permanent tolerances for lactofen residues have been established on snap beans and soybeans at 0.05 ppm [40 CFR §180.432(a)]. A time-limited tolerance was previously established for residues in/on cottonseed at 0.05 ppm [40 CFR §180.432(b)]; however, this tolerance expired on 12/31/96. There are currently no tolerances for lactofen in processed commodities or animal commodities, and the available processing studies and ruminant feeding study indicate that tolerances for processed and animal commodities are not required at the present time.

A summary of the lactofen tolerance reassessment and recommended modifications in commodity definitions are presented in Table 5. It is noted that the HED MARC has recommended that the tolerance expression for plant commodities should only include the parent compound.

1. Tolerance Reassessment Table

Table 5. Tolerance Reassessment Summary for Lactofen.

Commodity	Current Tolerance (ppm) ^a	Range of residues (ppm) ^b	Tolerance Reassessment (ppm)	Comment/Correct Commodity Definition
Tolerances listed under 40 CFR §180.432(a):				
Beans, snap	0.05	<0.01	0.01	<i>Beans, snap, succulent (excluding Limas)</i>
Cottonseed	0.05 ^c	<0.01	0.01	<i>Cotton, undelinted seed</i>
Soybean	0.05	<0.005-0.007 ^c	0.01	<i>Soybean, seed</i>
Tolerances needed under 40 CFR §180.432(a):				
Cotton, gin byproducts	None	<0.01-0.03	0.02	
Peanut	None	<0.01	0.01	

^a Expressed in terms of lactofen.

^b Refer to section on Magnitude of Residues in Crop Plant for detailed discussion of residues in crops.

^c Time limited tolerance for cottonseed expired on 12/31/96.

2. Codex/International Harmonization

No maximum residue limits (MRLs) for lactofen have been established or proposed by Codex for any agricultural commodity. Therefore, no compatibility questions exist with respect to U.S. tolerances.

F. BIBLIOGRAPHY

1. Study Citations

00117567 PPG Industries, Inc. (1982) Tests on Amounts of Residue Remaining, Including a Description of the Analytical Method: [Soybean Tolerance for PPG-844]. (Metabolism of PPG-844 by Peanuts, Rao, et erance for PPG-844]. (Compilation; unpublished study received Nov 2, 1982 under 748-EX-18; CDL:071227-A)

00117568 PPG Industries, Inc. (1982) (PPG-844: Environmental Chemistry Summaries). (Compilation; unpublished study received Nov 2, 1982 under 748-EX-18; CDL:071228-A)

00117578 Wiedmann, J.; Coffman, D.; Marsden, P. (1982) Determination of Residues in Rotational Crops Planted at Different Intervals after¹⁴C-PPG-844 Soil Application: PPG-844 Rotational Crop Studies I: BRC 22807. (Unpublished study received Nov 2, 1982 under 748-EX-18; submitted by PPG Industries, Inc., Barberton, OH; CDL:071228-L)

00117579 Wiedmann, J.; Marsden, P.; Coffman, D. (1982) Determination of PPG-844 Residues in Rotational Crops Planted after the Preemergence Treatment of PPG-844 Applied to Corn or Soybeans: 1981-1982 Crop Years: ... Rotational Crop Studies II: BR 22818. (Unpublished study received Nov 2, 1982 under 748-EX-18; submitted by PPG Industries, Inc., Barberton, OH; CDL:071228-M)

00117580 Wiedmann, J. (1982) Determination of PPG-844 Residues in Wheat, Carrots, and Radishes Grown in Soil Treated with 14-C PPG-844, 1982: BRC 22805. (Unpublished study received Nov 2, 1982 under 748-EX-18; submitted by PPG Industries, Inc., Barberton, OH; CDL:071228-N)

00133304 PPG Industries, Inc. (1983) Tests on Amounts of Residue Remaining Including a Description of the Analytical Method: [Cobra Herbicide in Soybeans and Rats]. (Compilation; unpublished study received Dec 6, 1983 under 748-EX-18; CDL:072197-A)

00133305 PPG Industries, Inc. (1983) Toxicology: [Summary of Animal Studies with PPG-844 Herbicide]. (Unpublished study received Dec 6, 1983 under 748-EX-18; CDL:072198-A)

00138560 Interregional Research Project No. 4 (1983) Tests on Amounts of Residue Remaining, Including a Description of the Analytical Method: [Lactofen]. (Compilation; unpublished study received Dec 29, 1983 under 748-EX-19; CDL:072241-A)

00150365 PPG Industries, Inc. (1985) PPG-844: Nature and Amount of Residue Remaining in Soybeans and Other Agricultural Crops: 1. Nature of the Residue; 2. Magnitude of the Residue . Unpublished compilation. 371 p.

00153274 Pensyl, J.; Wiedmann, J. (1985) Analytical Residue Methods for the Determination of PPG-844 and Five Metabolites in Soil, Crops and Animal Tissues: BR 23728. Unpublished study prepared by PPG Industries, Inc. 127 p.

00155670 Wiedmann, J.; Hope, J.; Coffman, D. (1985) Determination of PPG-844 and Metabolites in Cotton Treated Postdirected with 0.2 Lb/A Carbon-14 Labeled PPG-844: Experiment 83-14. Unpublished study prepared by PPG Industries, Inc. 15 p.

00155671 Wiedmann, J.; Coffman, D.; Kassay, K. (1985) Translocation of PPG-844 in Cotton: Project No. BR-23854. Unpublished study prepared by PPG Industries, Inc. 29 p.

00155672 Wiedmann, J.; Pensyl, J.; Kassay, K.; et al. (1985) Determination of Residues of PPG-844 and Its Potential Metabolites PPG-1576, PPG-947 and PPG-847 in Cotton Treated Post Directed with Cobra, 1980-1985 Crop Years: Project No. BR-23870. Unpublished study prepared by PPG Industries, Inc. 15 p.

00155673 Wiedmann, J.; Pensyl, J.; Mattle, D. (1985) Dissipation of PPG-844 and Its Metabolites from Peanut Plants, 1983 and 1985 Crop Years: BR-23865. Unpublished study prepared by PPG Industries, Inc. 20 p.

00155674 Wiedmann, J.; Pensyl, J.; Kassay, K. et al. (1985) Determination of Residues of PPG-844 and Its Potential Metabolites PPG-1576, PPG- 947 and PPG-847 in Peanuts Treated Postemergent with Cobra, 1981-1985 Crop Years: BR-23864. Unpublished study prepared by PPG Industries, Inc. 147 p.

00160487 Wiedmann, J.; Pensyl, J. (1986) Tolerance Enforcement Method for PPG-844 (Cobra) and Its Metabolite PPG-1576 in Soybean Seed: BR-23973. Unpublished study prepared by PPG Industries, Inc. 14 p.

00160513 Wiedmann, J.; Kassay, K. (1986) Reformatted Data Tables Providing Harvest to Analysis Storage Intervals for the Determination of Residues of PPG-844 and Its Potential Metabolites PPG-1576, PPG-947, PPG-847 and PPG-2053 in Soybeans Treated Postemergent with Cobra, 1980-1984 Crop Years: BR-23746A. Unpublished study prepared by PPG Industries, Inc. 24 p.

40026601 Wiedmann, J. (1986) Freezer Storage Stability of PPG-844 (Lactofen) and Its Metabolites on Soybean Seeds and Peanuts: Laboratory Study No. BR-23749-B. Unpublished study prepared by PPG Industries, Barbetron Technical Center. 9 p.

40026602 Weidmann, J. (1986) Cobra--Magnitude of Residue in Soybean Seed-- 1986 Crop Year: Laboratory Study No. BR-24068: Supplement to MRID 150365. Unpublished study prepared by PPG Industries, Barberton Technical Center. 16 p.

40026603 Pensyl, J. (1986) Evaluation of FDA Multiresidue Methodology for the Analysis of PPG-844 and Its Principal Metabolite PPG-1576, in Soybean Grain: Laboratory Study No. BR-24073. Unpublished study prepared by PPG Industries, Barbetron Technical Center. 9 p.

40059401 Wiedmann, J.; Pensyl, J. (1987) Analytical Procedure for the Determination of Cobra and Metabolite Residues in Soybean Seed III. Hydrolysis/GC Method: Laboratory Study No. BR-24080. Unpublished study prepared by PPG Industries. 27 p.

40059402 Wiedmann, J.; Pensyl, J. (1987) Confirmatory Procedure for the Determination of PPG-844 and Metabolites in Soybeans: Project ID; BR-24085. Unpublished study prepared by PPG Industries, Inc. 25 p.

40059403 Wiedmann, J. (1986) Cobra - Magnitude of Residue in Soybean Seed - 1986 Crop Year: Hydrolysis Procedure: Laboratory Study No. BR- 24083. Unpublished study prepared by PPG Industries. 19 p.

40109601 Wiedmann, J.; Pensyl, J. (1987) Analytical Procedure for the Determination of Cobra and Metabolite Residues in Soybean Seed III: Hydrolysis/GC Method--Additional Chromatograms: Laboratory Study No. BR-24080. Unpublished study prepared by PPG Industries. 6 p.

40109701 Weidmann, J.; Pensyl, J. (1987) Revised Confirmatory Procedure for the Determination of Cobra and Metabolite Residues in Soybean Seed: Laboratory Study No. BR-24107. Unpublished study prepared by PPG Industries. 26 p.

40154201 Wiedmann, J. (1987) Recovery Data for PPG-844 and Plant Metabolites in Cotton: Laboratory Study No. BR-24122. Unpublished study prepared by PPG Industries prepared by PPG Industries. 19 p.

40436603 Wiedmann, J.; Pensyl, J. (1987) Individual Component Residue Analytical Procedure for Determination of Cobra and Metabolites in Peanuts: Study No. BR-24266. Unpublished study prepared by PPG Industries. 23 p.

40436604 Wiedmann, J.; Pensyl, J. (1987) Cobra - Magnitude of Residue in Peanuts and Peanut Hulls - 1987 Crop Year: Analysis by Individual Component Procedure: Study No. BR-24264. Unpublished study prepared by PPG Industries. 45 p.

40436605 Wiedmann, J.; Pensyl, J. (1987) Magnitude of Residue Studies for Cobra Residues in Processed Peanuts: Study No. BR-24240. Unpublished study prepared by PPG Industries. 21 p.

40436606 Wiedmann, J. (1987) Determination of PPG-844 and Metabolites in Peanuts Treated Postemergent with 0.2 LB/A of ¹⁴C-Labeled PPG-844, Supplements Metabolism of PPG-844 by

Peanuts, Rao, et al., BRC-23234 ...: BR-23856. Unpublished study prepared by PPG Industries, Inc. 24 p.

41069801 Wiedmann, J.; Pensyl, J. (1988) Cobra--Magnitude of Residue in Cotton Seed, 1987 Crop Year: Analysis by the Individual Component Procedure: Laboratory Project ID BR-24289. Unpublished study prepared by PPG Industries, Inc. 38 p.

41209101 Pensyl, J. (1989) Effect of Processing on Lactofen Residues in Cotton Seed: Project ID: T-7242. Unpublished study prepared by Chevron Chemical Co. 180 p.

41209102 ???

41297601 Lee, S. (1989) An Interim Report on the Metabolism of Lactofen (Cobra) in Peanut Plants: Lab Project Number: MEF/0118. Unpublished study prepared by Chevron Chemical Co. 57 p.

41297602 Pensyl, J. (1989) Magnitude of Lactofen Residues in Peanuts: Lab Project Number: T/7239. Unpublished study prepared by Chevron Chemical Co. 100 p.

41297603 Pensyl, J. (1989) Storage Stability Study - PPG 2597 on Peanuts: Lab Project Number: V/092289. Unpublished study prepared by Chevron Chemical Co. 7 p.

41297604

41709501 Lee, S. (1990) The Metabolism of Lactofen (Cobra) in Lactating Goats: Lab Project Number: MEF-0117/9009406. Unpublished study prepared by Chevron Chemical Co. 123 p.

41709502 Chen, Y. (1990) Metabolism of [¹⁴C]-Lactofen in Laying Hens: Lab Project Number: MEF-0146/9011404. Unpublished study prepared by Chevron Chemical Co. 102 p.

41709503 Pensyl, J. (1990) Effect of Processing on Lactofen Residues in Cotton Seed: Supplement to: Lab Project Number: T-7242. Unpublished study prepared by Chevron Chemical Co. 44 p.

42183003 Pensyl, J. (1990) Determination of Lactofen and Its Metabolites in Eggs, Milk and Animal Tissues: Method RM-28C: Lab Project Number: RM-28C. Unpublished study prepared by Chevron Chemical Co. 21 p.

42183004 Fomenko, J. (1991) Testing of PPG-847, PPG-947 and PPG-2597 through FDA Multi-Residue Protocols, A through E: Lab Project Number: VA002. Unpublished study prepared by Spectralytix, Inc. 232 p.

42263801 Peterson, B.; Eichoff, J. (1992) Report on Feed Ingredients Potentially Containing Lactofen (Cobra): Lab Project Number: VCOB-1692. Unpublished study prepared by Technical Assessment Systems. 30 p.

42494901 Pensyl, J. (1992) Magnitude of Residue of Lactofen and Its Metabolites in Cottonseed: Lab Project Number: 1714/89/COTTONSEED. Unpublished study prepared by Chevron Chemical Co. 539 p.

42508101 Lee, S. (1992) The Metabolism of Lactofen (COBRA) in Peanut Plants: Lab Project Number: MEF-0118/9011795. Unpublished study prepared by Chevron Chemical Co. 96 p.

42508102 Pensyl, J. (1992) Magnitude of Residue of Lactofen and its Metabolism in Peanut Plants: Lab Project Number: 1714/89/PEANUT. Unpublished study prepared by Chevron Chemical Co. 1234 p.

42508103 Pensyl, J. (1992) Magnitude of the Residue [Lactofen]: Plants: Lab Project Number: 1714/89/T7419. Unpublished study prepared by Chevron Chemical Co. 212 p

42925301 LeBlanc, M. (1993) Independent Validation of the Method for the Determination of Lactofen and Its Plant Metabolites in Cotton Seed and Peanut Nutmeat: Lab Project Number: 1332:10606:1332-1. Unpublished study prepared by Analytical Development Corp. 91 p.

42925302 Pensyl, J. (1993) Lactofen Bovine Feeding Study: Lab Project Number: VP-10031: 1714-92-1051:1293-1. Unpublished study prepared by Valent U.S.A. Corp.; Analytical Development Corp. and Colorado State University Metabolic Lab. 530 p.

42934501 Pensyl, J. (1993) Magnitude of the Residue of Lactofen in Soybeans and Soybean Processed Commodities: Lab Project Number: VP-10615: T-7530: RM-28. Unpublished study prepared by Valent U.S.A. Corp. 730 p.

43095001 Rose, A. (1993) Metabolism of (¹⁴C)-Lactofen in Laying Hens: Second Supplemental Report: Lab Project Number: MEF-0146/9011404. Unpublished study prepared by Chevron Chemical Co., Agricultural Chemicals Div. 14 p.

43095002 Rose, A. (1994) Metabolism of Lactofen (COBRA) in Lactating Goats: Second Supplemental Report: Lab Project Number: MEF-0117/9009406. Unpublished study prepared by Chevron Chemical Co., Agricultural Chemicals Div. 16 p.

43379201 Kunkel, D. (1994) Lactofen: Magnitude of Residue on Beans (Snap): Lab Project Number: 3603: 90:OR:006: 90:WI:010. Unpublished study prepared by Rutgers University, Interregional Research Project No. 4. 399 p.

43638601 Pensyl, J. (1993) Magnitude of the Residues of Lactofen in Soybeans: Lab Project Number: VP-10048: V-1052-A: V-1052-C. Unpublished study prepared by Valent USA Corp. 201 p.

43638602 Pensyl, J. (1995) Response to EPA Review of the Report "Magnitude of the Residue of Lactofen in Soybeans and Soybean Processed Commodities": MRID 429345-01: Lab Project Number: VP-11263. Unpublished study prepared by Valent USA Corp. 38 p.

43871501 Rose, A. (1995) Third Supplemental Report to the Metabolism of Lactofen (Cobra) in Lactating Goats: Lab Project Number: MEF-0117/9009406. Unpublished study prepared by Chevron Chemical Co. 14 p.

43871502 Pensyl, J. (1995) Response to EPA Review of the Report "Lactofen Bovine Feeding Study", Dated 9/8/93: Valent Study #VP-10031, MRID #429345-01: Lab Project Number: VP-11294-1: VP-10031. Unpublished study prepared by Valent USA Corp. 14p.

43871503 Pensyl, P. (1995) Response to EPA Method Validation of Residue Method RM-28D, "Determination of Lactofen and its Metabolites in Oilseed Crops": Lab Project Number: VP-11294-2. Unpublished study prepared by Valent USA Corp. 73 p.

44156102 Hathcock, T.; Sved, D.; Ruzo, L. (1996) The Distribution and Metabolism of (¹⁴C) Lactofen in the Lactating Goat: Lab Project Number: 580W: 9600431. Unpublished study prepared by PTRL West, Inc. and WIL Labs., Inc. 219 p.

44156103 Pensyl, J. (1996) Determination of the Extraction Efficiency of the Residue Analytical Method for Determining Residues of Lactofen and Its Degradates in Animal Tissues: Lab Project Number: VP-11530: VL-005-04: VR-013-02. Unpublished study prepared by Valent U.S.A. Corp.; WIL Labs., Inc.; and PTRL West, Inc. 89 p.

44156104 Pensyl, J. (1993) Revised Report on the Effect of Processing on Lactofen Residues in Cotton Seed: Lab Project Number: T-7318. 9300767: SL-89012. Unpublished study prepared by Valent U.S.A. Corp. 226 p.

44166701 Jalal, M.; Alam, F.; Dedmore, M. (1996) Nature of the Residues: Metabolism of (CF₃-Phenyl-¹⁴C) Lactofen in Tomato Plants: Lab Project Number: 92209: VP-10030: 9600335. Unpublished study prepared by ABC Laboratories California. 193 p.

44176601 Pensyl, J. (1996) Determination of the Extraction Efficiency of the Residue Analytical Method for Determining Residues of Lactofen and Its Degradates in Tomatoes: Lab Project Number: VP-11042: 9600437: RM-28D. Unpublished study prepared by Valent U.S.A. Corp. 176 p.

44176602 Pensyl, J. (1996) Response to EPA Review Entitled "Lactofen (Cobra) Herbicide on Peanuts-Evaluation of Analytical Method and Residue Data. MRID Nos. 42508101, 42508102, and 42508103. CBTS Nos. 10764": Lab Project Number: VP-11577: 10764: RM-28B. Unpublished study prepared by Valent U.S.A. Corp. 44 p.

44194301 Pensyl, J. (1993) Freezer Storage Stability of Lactofen and Its Metabolites in Peanut Nutmeats and Hulls: Supplemental to "Magnitude of Residue of Lactofen and Its Metabolites in Peanuts": Lab Project Number: 1714/93/7411SS: 1714/89/PEANUT: 1714/93/7411. Unpublished study prepared by Valent U.S.A. Corp. 52 p.

44411701 Jalal, M.; Maurer, J. (1997) Nature of the Residues: Metabolism of (Nitrophenyl-(carbon 14)) Lactofen in Peanuts (*Arachis hypogoea*): Lab Project Number: VP-11581: 9700386: V-96-11581. Unpublished study prepared by Valent Technical Center. 200 p. {OPPTS 860.1300}

44411702 Pensyl, J. (1997) Radiovalidation of the Residue Analytical Method for Determining Residues of Lactofen and its Metabolites in Peanuts: Lab Project Number: VP-11581A: 9700387: VL-005-05. Unpublished study prepared by Valent Technical Center. 122 p. {OPPTS 860.1340}

44411901 Pensyl, J. (1997) Magnitude of the Residues of Lactofen and Its Metabolites in Cotton Gin Trash: Amended Report #1: Lab Project Number: VP-11322: 9700371: V-11322-A. Unpublished study prepared by Valent U.S.A. Corp. 613 p.

44514701 Pensyl, J. (1993) Determination of Lactofen and its Metabolites in Oilseed Crops--Residue Method RM-28D: Lab Project Number: RM-28D: METHOD RM-28D: 9800039. Unpublished study prepared by Valent Technical Center. 27 p. {OPPTS 860.1340}

2. Agency Memoranda Citations

Table 7. Agency Memoranda Citations.

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
12/27/85	None	1492	M. Firestone	R. Mountfort and Toxicology Branch	Acc. Nos. 073855, 073853, 073843, and 073858	PP#5F3299 - Lactofen (Cobra) Herbicide on Soybeans. Evaluation of Analytical Methods and Residue Data.
9/29/86	None	1111	M. Firestone	R. Mountfort and Toxicology Branch	Acc. Nos. 263517-263519	PP#5F3299 - Lactofen (Cobra) Herbicide on Soybeans. Evaluation of Amendment Dated June 23, 1986
9/30/86	None	None	S. Simko	Unknown	Acc. Nos. 073854, 071228	Environmental Fate and Exposure Assessment for Lactofen
2/24/87	None	1779 and 1897	C. Deyrup	R. Mountfort and Toxicology Branch	40026601-40026603, 40059401-40059403	PP#5F3299 - Lactofen on Soybeans. Amendments of 12/12/86 and 1/23/87
3/10/87	None	None	M. Law	C. Trichilo	None	PP#5F3299 - Lactofen Method Trial on Soybeans
3/25/87	None	None	C. Deyrup	R. Mountfort and Toxicology Branch	None	PP#5F3299 - Lactofen on Soybeans. Evaluation of Method Trial Report dated 3/10/87
3/1/88	None	3098, 3099	G. Otakie	R. Mountfort	40436601-40436606	PP#8F3591 - Lactofen (Cobra) Herbicide on Peanuts - Evaluation of Analytical Methods and Residue Data.
2/22/90	None	5741	G. Otakie	J. Miller	41209101 and 41209102	PP#9F3798 - Lactofen (Cobra [®]) Herbicide on Cotton - Evaluation of Analytical Methods, Residue and Processing Data Dated July 24, 1989.
3/14/90	None	5952, 6054	G. Otakie	J. Miller	41297601-41297604	PP#8F3591 - Lactofen (Cobra) Herbicide on Peanuts - Evaluation of Amendments Dated May 8, 1989 and November 8, 1989.

Table 7. *Continued.*

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
4/5/90	None	None	G. Otakie	J. Miller	41297604	PP#8F3591 - Lactofen (Cobra [®]) Herbicide on Peanuts - Multiresidue Protocol Testing.
8/14/90	None	6699	G. Otakie	J. Miller	None	PP#8F3591 - Lactofen (Cobra) Herbicide on Peanuts - Supplemental Submission and Request for Clarification Dated May 8, 1989.
6/19/91	None	None	G. Otakie	J. Stewart and M. Copley	None	Toxicological Significance of Lactofen Animal Metabolites.
6/20/91	None	7488	G. Otakie	J. Miller	41709501-41709503	PP#8F3798 - Lactofen (Cobra) Herbicide on Cotton - Evaluation of Amendments Dated November 19, 1990.
5/14/92	D177126	9735	G. Otakie	J. Miller and E. Wilson	42263801	PP#8F3798 - Lactofen (Cobra) Herbicide on Cotton - Evaluation of Feeding Study Protocol and Proposed Worst Case Dairy Cattle Diet - Amendment Dated April 1, 1992.
7/13/92	None	None	G. Otakie	H. Hundley	42183004	Multi-Residue Method Testing of Lactofen Metabolites.
9/30/92	D175379	9514	G. Otakie	J. Miller	42183001-42183003	PP#9F3798 - Lactofen (Cobra) Herbicide on Cotton - Evaluation of Amendments Dated January 17, 1992.
3/23/93	D183428	10730	G. Okatie	J. Miller	42494901	PP#8F3798 - Lactofen (Cobra) Herbicide on Cotton - Evaluation of Analytical Method and Residue Data.
4/7/93	D183793	10764	G. Otakie	J. Miller and J. Mayes	42508101, 42508102, 42508103	PP#8F3591 - Lactofen (Cobra) Herbicide on Peanuts - Evaluation of Analytical Method and Residue Data.
5/10/94	D195440	12627	G. Otakie	F. Sanders, J. Miller, F. Liem, and D. Bradway	42934501	PP#3299 - Response to Agency 6/18/93 Lactofen Data Call-In (i.e. Additional Residue Data to Support the Existing Registration of Lactofen on Soybeans) Dated 9/23/93 - Evaluation of Field Trial and Processing Residue Data.

Table 7. *Continued.*

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
2/2/95	D195308, D208336	12579, 14544	G. Otakie	J. Miller	42925301, 42925302	PP#9F3798 - Lactofen (Cobra) Herbicide on Cotton - Evaluation of Amendments Dated September 13, 1993 and September 28, 1994.
5/9/95	D213094	15249	G. Otakie	C. Parker and J. Smith	None	PP#9F3798 and 8F3591 - Lactofen on Cottonseed, Peanut Nutmeat and Peanut Hulls. Results of EPA Method Validation.
5/22/95	D199043	13259	G. Otakie	J. Miller	43095001, 43095002	PP#3798 - Lactofen (Cobra) Herbicide on Cotton - Evaluation of Amendments Dated January 21, 1994.
9/18/95	D207879	11450	N. Dodd	H. Jamerson and W. Hazel	43379201	PP#4E04418. Lactofen on Snap Beans. Review of Analytical Methods and Residue Data.
2/20/96	D217263	15862	G. Otakie	J. Miller and D. Kenny	43638601, 43638602	PP#3299 - Lactofen on Soybeans. Evaluation of Residue Data and Amended Use Request.
11/6/96	D228848	17494	G. Otakie	D. McCall	None	PP#3798 - Lactofen (Cobra) Herbicide on Cotton - Evaluation of Lactofen Position Document Dated July 26, 1996.
9/19/97	D229065	17493	G. Otakie	J. Miller	None	PP#9F3798 and 8F3591 - Lactofen on Cottonseed and Peanut Nutmeats - Results of Petition Method Validation Request for Revised Methods.
3/23/00	D264367	None	C. Olinger	G. Kramer	None	Lactofen: Issues to be presented to the Metabolism Assessment Review Committee
4/26/00	D265469	None	C. Olinger	G. Kramer	None	Lactofen: HED Metabolism Assessment Review Committee Decision Memorandum
5/3/00	D231841, D232696	None	C. Olinger	S. Stanton and C. Scheltema	44166701, 44176601	Lactofen - Evaluation of Tomato Metabolism Study and Radiovalidation Data.

Table 7. *Continued.*

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
5/3/00	D241039	None	C. Olinger	S. Stanton and C. Scheltema	44411901	PP#3798 - Lactofen (Cobra) Herbicide on Cotton - Evaluation of Residue Data for Cotton Gin Byproducts.
5/3/00	D244081, D244082, D244635	None	C. Olinger	S. Stanton and C. Scheltema	44176602, 44194301, 44411701, 44411702	PP#8F3591 - Lactofen (Cobra) Herbicide on Peanuts - Evaluation of Peanut Metabolism Study, Analytical Methodology, Storage Stability Data, and Response to Agency Review of April 7, 1993.