



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

DEC 14 1990

OFFICE OF  
PESTICIDES AND TOXIC  
SUBSTANCES

**MEMORANDUM**

SUBJECT: DEET Product Chemistry Reregistration Standard Updates.

FROM: E. Zager, Acting Chief  
Chemistry Branch II: Reregistration Support  
Health Effects Division (H7509C) *E. Zager*

TO: Lois Rossi, Chief  
Reregistration Branch  
Special Review & Reregistration Division (H7508C)

and

Reto Engler, Ph.D., Chief  
Science Analysis and Coordination Branch  
Health Effects Division (H7509C)

Attached is the update to the Product Chemistry Chapter of the DEET Reregistration Standard prepared by Dynamac Corporation under supervision of CBRS, HED. It has undergone secondary review in the branch and has been revised to reflect Agency policies.

Revised data requirement tables are included.

If you need additional input please advise.

**Attachment 1:** DEET Product Chemistry Reregistration Standard Update

cc (With Attachment 1 ): RBP, DEET Reregistration Standard file, DEET Subject File, C. Furlow (PIB/FOD), J. Burrell (FOD), Dynamac, Circulation (7).

cc (Without Attachments): RF, P. Fenner-Crisp (HED).

Final Report

**DEET**  
**Task 4: Product Chemistry**  
**Registration Standard Update**

November 30, 1989

Revised Final Report dated December 14, 1990

Contract No. 68-D8-0080

**Submitted to:**  
Environmental Protection Agency  
Arlington, VA 22202

**Submitted by:**  
Dynamac Corporation  
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N,N-DIETHYL-M-TOLUAMIDE (DEET)

REGISTRATION STANDARD UPDATE

PRODUCT CHEMISTRY

TASK 4

INTRODUCTION

A Product Search Listing conducted on 3/16/90 identifies 23 registered manufacturing-use products (MPs) containing DEET as a single or multiple active ingredient. A list of the registrants, their respective products and registration numbers appears in Table 1.

An Amended Registration Standard for DEET was issued on 3/12/85 following the issuance of the original Registration Standard dated 12/22/80. The amended standard requires all generic and product-specific product chemistry data for all DEET MPs. In response to these requirements, the DEET Joint Venture, on behalf of Miles Laboratories, MGK, Morflex Chemicals, and Virginia Chemicals (whose product has since been transferred to Hoechst Celanese), has submitted generic product chemistry data (1987; MRID 40140501). In addition to this submission, the noted registrants have individually responded to the Amended Registration Standard by submitting data for certain products listed in Table 1. This document reviews and evaluates product chemistry data pertaining to all MPs containing DEET as an active ingredient, including those products containing multiple active ingredients. The Amended Registration Standard for DEET also requires product chemistry data for all end-use products (EPs) that are not eligible for the formulators exemption [FIFRA sec 3(c)(2)(D)]; data pertaining to end-use products are not considered in this update document.

Corresponding to each of the Topical Discussions listed below are the Guideline Reference Numbers from "Pesticide Assessment Guidelines - Subdivision D - Product Chemistry", referred to in Title 40 of the Code of Federal Regulations (40 CFR), Part 158, "Data Requirements for Registration", Subpart C, "Product Chemistry Data Requirements". These regulations and guidelines explain the minimum data that the Agency needs to adequately assess the product chemistry of DEET.

Guidelines Reference No.  
from 40 CFR §158.155-190

|                                                             |           |
|-------------------------------------------------------------|-----------|
| Product Composition and Manufacture . . . . .               | 61-(1-3)  |
| Analysis and Certification of Product Ingredients . . . . . | 62-(1-3)  |
| Physical and Chemical Characteristics . . . . .             | 63-(2-20) |

Table 1. Current registrants of DEET MPs and the data submitted in response to the Amended DEET Registration Standard dated 3/12/85.

| Registrant and Product(s)                             | EPA Reg. Nos.        | Data Submission <sup>a</sup>                       |
|-------------------------------------------------------|----------------------|----------------------------------------------------|
| Miles Laboratories, Inc.<br>99.9% T                   | 121-17               | 00149979, 40140501 <sup>c</sup> , CSF              |
| Hoechst Celanese Corp.<br>99.9% T                     | 8340-39 <sup>b</sup> | 00152588, 00155132,<br>40140501 <sup>c</sup> , CSF |
| Morflex Chemical Company, Inc.<br>99.9% T<br>75.0% FI | 51147-1<br>51147-2   | 40140501 <sup>c</sup><br>CSF                       |
| McLaughlin Gormley King Company (MGK)<br>99.9% T      | 1021-891             | 40140501 <sup>c</sup> , 40146001,<br>40158601      |
| 94.6% FI                                              | 1021-1354            | None                                               |
| 90.0% FI                                              | 1021-1355            | None                                               |
| 86.0% FI                                              | 1021-1276            | CSF                                                |
| 83.34% FI                                             | 1021-1201            | None                                               |
| 83.33% FI                                             | 1021-1214            | None                                               |
| 80.0% FI                                              | 1021-1312            | CSF                                                |
| 76.93% FI                                             | 1021-1111            | None                                               |
| 76.92% FI                                             | 1021-1290            | CSF                                                |
| 70.0% FI                                              | 1021-567             | 00163059, 40750101, CSF                            |
| 70.0% FI                                              | 1021-1144            | None                                               |
| 66.67% FI                                             | 1021-737             | CSF                                                |
| 60.0% FI                                              | 1021-971             | None                                               |
| 50.0% FI                                              | 1021-1070            | None                                               |
| 41.67% FI                                             | 1021-1200            | None                                               |
| 40.0% FI                                              | 1021-512             | None                                               |
| 40.0% FI                                              | 1021-886             | None                                               |
| 17.5% FI                                              | 1021-535             | CSF                                                |
| 5.0% FI                                               | 1021-511             | None                                               |

- <sup>a</sup> Eight digit numbers are MRID documents from the Pesticide Document Management System. "CSF" refers to a Confidential Statement of Formula obtained from the registration jacket.
- <sup>b</sup> Transferred on 4/18/89 from Virginia Chemicals, Inc. under EPA Reg. No. 1187-105.
- <sup>c</sup> Submitted by the DEET Joint Venture for the 99.9% technicals manufactured by Miles (EPA Reg. No. 121-17), Morflex (EPA Reg. No. 51147-1), MGK (EPA Reg. No. 1021-891), and Hoechst Celanese (EPA Reg. No. 8340-39).

## SUMMARY

The following Product Chemistry data are required:

- For the **Miles Laboratories, Inc.** 99.9% T (EPA Reg. No. 121-17): product composition, manufacturing process, discussion of the formation of impurities, preliminary analysis, certified limits, enforcement analytical methods, and physical chemical characteristics (boiling point, vapor pressure, solubility, octanol/water partition coefficient, stability, oxidizing/reducing action, flammability, explodability, viscosity, and corrosion characteristics).
- For the **Hoechst Celanese Corp.** 99.9% T (EPA Reg. No. 8340-39): product composition, discussion of the formation of impurities, certified limits, enforcement analytical methods, and physical chemical characteristics (boiling point, solubility, vapor pressure, octanol/water partition coefficient, stability, and corrosion characteristics).
- For the **Morflex Chemical Company, Inc.** 99.9% T (EPA Reg. No. 51147-1): product composition, manufacturing process, discussion of the formation of impurities, certified limits, enforcement analytical methods, and all physical chemical characteristics.
- For the **Morflex Chemical Company, Inc.** 75% FI (EPA Reg. No. 51147-2): discussion of the formation of impurities, certified limits, enforcement analytical methods, and storage stability.
- For the **McLaughlin Gormley King Company** 99.9% T (EPA Reg. No. 1021-891): product composition, manufacturing process, discussion of the formation of impurities, certified limits, enforcement analytical methods, and physical chemical characteristics (color, physical state, odor, boiling point, density, solubility, vapor pressure, pH, stability, oxidizing or reducing action, flammability, explosiveness, storage stability, viscosity, and corrosion characteristics).
- For the **McLaughlin Gormley King Company** 86% FI (EPA Reg. No. 1021-1276), 80% FI (EPA Reg. No. 1021-1312), 76.92% FI (EPA Reg. No. 1021-1290), 70% FI (EPA Reg. No. 1021-567), and 66.67% FI (EPA Reg. No. 1021-737): certified limits and storage stability data.
- For the **MGK** 17.5% FI (EPA Reg. No. 1021-535): storage stability data.

- For the **McLaughlin Gormley King Company** 94.6% FI (EPA Reg. No. 1021-1354), 90% FI (EPA Reg. No. 1021-1355), 83.34% FI (EPA Reg. No. 1021-1201), 83.33% FI (EPA Reg. No. 1021-1214), 76.93% FI (EPA Reg. No. 1021-1111), 70% FI (EPA Reg. No. 1021-1144), 60% FI (EPA Reg. No. 1021-971), 50% FI (EPA Reg. No. 1021-1070), 41.67% FI (EPA Reg. No. 1021-1200), 40% FI (EPA Reg. No. 1021-512), 40% FI (EPA Reg. No. 1021-886), and 5% FI (EPA Reg. No. 1021-511): a complete set of product chemistry data requirements for each product.

**Note to P.M.:** The nominal concentrations (as reported on the either the CSF or the preliminary analysis report) for all DEET technical products, as well as for the MGK 66.67% FI (EPA Reg. No. 1021-737), are not in agreement with the percent active ingredient listed on the label. We additionally note that the nominal concentration and/or certified limits for all MGK and Morflex FIs are based on the label claims for the respective technicals from which they were formulated; therefore, the labels for these FIs do not reflect the same concentration of DEET that would be obtained by analysis.

#### PRODUCT IDENTITY AND COMPOSITION

##### 61-1. Product Composition

The Amended DEET Registration Standard dated 3/12/85 requires additional generic and product-specific data concerning product composition. Miles Laboratories, Inc., Hoechst Celanese Corp., and Morflex Chemical Company have responded to these requirements for all of their products listed in Table 1; McLaughlin Gormley King Company has responded only for certain products. The submitted data are presented in Confidential Appendix A, and our conclusions are detailed below.

Data (CSF dated 6/5/85) submitted by **Miles Laboratories, Inc.** for the 99.9% T (EPA Reg. No. 121-17) do not satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition because the identity and nominal concentration of the individual isomers were not provided. Preliminary analysis data indicate that additional components are present at 20.1%. The identity, purpose, and nominal concentration of each of these additional components must be included on the CSF. We note that neither the mean concentration (as determined by preliminary analysis) nor the lower certified limit of DEET is reflected on the label for this product.

Data (CSF dated 10/7/85; registration jacket) submitted by **Hoechst Celanese Corp.** for the 99.9% T (EPA Reg. No. 8340-39) do not satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition because

ingredients present at  $\geq 0.1\%$  were not listed along with their nominal concentrations; furthermore, the nominal concentration was not reported for the active ingredients. We note that preliminary analysis of five batch samples of the Hoechst Celanese T product (see Confidential Appendix D) indicate that additional components are present. In addition, we note that neither the mean concentration (as determined by preliminary analysis) nor the lower certified limit of DEET is reflected on the label for this product.

Data (CSF dated 3/30/87; registration jacket) submitted by **Morfle Chemical Company, Inc.** for the 99.9% T (EPA Reg. No. 51147-1) do not satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition because nominal concentrations were not provided for any ingredient and impurities were not identified as such. We note that neither the mean concentration (as determined by preliminary analysis) nor the lower certified limit of DEET is reflected on the label for this product.

Data (CSF dated 6/12/85; registration jacket) for the Morflex 75% FI (EPA Reg. No. 51147-2) satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition. We note that the nominal concentration reported for this product correctly reflects the label claim of 99.9% DEET in the technical product, which is used to formulate this FI. However, if the label of the technical product is amended to more accurately reflect the mean concentration of DEET in the technical product, a new CSF for this FI will be required to reflect this change.

Data (1987; MRID 40158601) submitted by **McLaughlin Gormley King Company** for the 99.9% T (EPA Reg. No. 1021-891) do not satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition because the nominal concentrations and purposes of the listed ingredients were not reported. We note that neither the mean concentration (as determined by preliminary analysis) nor the lower certified limit of DEET is reflected on the label for this product.

Data submitted for the MGK 86% FI (EPA Reg. No. 1021-1276; CSF dated 3/15/90), 80% FI (EPA Reg. No. 1021-1312; CSF dated 3/15/90), 76.92% FI (EPA Reg. No. 1021-1290; CSF dated 3/15/90), 70% FI (EPA Reg. No. 1021-567; CSF dated 3/15/90), 66.67% FI (EPA Reg. No. 1021-737; CSF dated 3/30/90), and 17.5% FI (EPA Reg. No. 1021-535; CSF dated 3/15/90) satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition. We note that the nominal concentration reported for all FIs correctly reflects the label claim of 99.9% DEET in the technical product, which is used to formulate these FIs. However, if the label of the technical product is amended to more accurately reflect the mean concentration of DEET in the

technical product, new CSFs will be required for all MGK FIs as well.

No information on product identity has been submitted by **McLaughlin Gormley King Company** for the following formulation intermediate products: 94.6% FI (EPA Reg. No. 1021-1354), 90% FI (EPA Reg. No. 1021-1355), 83.34% FI (EPA Reg. No. 1021-1201), 83.33% FI (EPA Reg. No. 1021-1214), 76.93% FI (EPA Reg. No. 1021-1111), 70% FI (EPA Reg. No. 1021-1144), 60% FI (EPA Reg. No. 1021-971), 50% FI (EPA Reg. No. 1021-1070), 41.67% FI (EPA Reg. No. 1021-1200), 40% FI (EPA Reg. No. 1021-512), 40% FI (EPA Reg. No. 1021-886), and 5% FI (EPA Reg. No. 1021-511). Data requirements regarding this topic remain outstanding for these products.

We note that the nominal concentration of DEET reported on the CSF of the MGK 66.67% FI (EPA Reg. No. 1021-737) is not in agreement with the percent active ingredient listed on the label.

#### 61-2. Starting Materials and Manufacturing Process

The Amended DEET Registration Standard dated 3/12/85 specifies generic and product-specific data requirements regarding starting materials and manufacturing and formulation processes. In response, Hoechst Celanese, Morflex, and McLaughlin Gormley King have submitted descriptions of production and formulation processes for certain registered MPs; these data appear in Confidential Appendix B. Our conclusions are presented below.

Data (1985; MRID 00155132) submitted by **Virginia Chemicals, Inc.** for the **Hoechst Celanese** 99.9% T (EPA Reg. No. 8340-39) satisfy the requirements of 40 CFR §158.160-162 (Guideline Reference No. 61-2) regarding starting materials and the manufacturing process. However, Hoechst Celanese must verify that both the manufacturing process and location has not changed since the transfer of ownership on 4/89 from Virginia Chemicals. All information will be required if either has changed.

Data (Registration jacket; no MRID assigned) submitted by **Morflex Chemical Company, Inc.** for the 75% FI (EPA Reg. No. 51147-2) satisfy the requirements of 40 CFR §158.160-162 (Guideline Reference No. 61-2) regarding starting materials and the formulation process. No additional data concerning this topic are required for this product.

Data (product registration jackets; no MRIDs assigned) submitted by **McLaughlin Gormley King Company** for 86% FI (EPA Reg. No. 1021-1276), 80% FI (EPA Reg. No. 1021-1312), 76.92% FI (EPA Reg. No. 1021-1290), 70% FI (EPA Reg. No. 1021-567), 66.67% FI (EPA Reg. No. 1021-737), and 17.5% FI (EPA Reg. No. 1021-535) satisfy the requirements of 40 CFR §158.160-162 (Guideline Reference No. 61-2) regarding starting materials and the formulation process.



No additional data concerning this topic are required for these MGK products.

No information on beginning materials and manufacturing process has been submitted for Miles Laboratories 99.9% T (EPA Reg. No. 121-17), Morflex Chemical 99.9% T (EPA Reg. No. 51147-1), and the following MGK products: 99.9% T (EPA Reg. No. 1021-891), 94.6% FI (EPA Reg. No. 1021-1354), 90% FI (EPA Reg. No. 1021-1355), 83.34% FI (EPA Reg. No. 1021-1201), 83.33% FI (EPA Reg. No. 1021-1214), 76.93% FI (EPA Reg. No. 1021-1111), 70% FI (EPA Reg. No. 1021-1144), 60% FI (EPA Reg. No. 1021-971), 50% FI (EPA Reg. No. 1021-1070), 41.67% FI (EPA Reg. No. 1021-1200), 40% FI (EPA Reg. No. 1021-512), 40% FI (EPA Reg. No. 1021-886), and 5% FI (EPA Reg. No. 1021-511). Data requirements regarding this topic remain outstanding for these products.

#### 61-3. Discussion of the Formation of Impurities

The Amended DEET Registration Standard dated 3/12/85 specifies generic and product-specific data requirements regarding discussion of formation of impurities. In response, the DEET Joint Venture (1987; MRID 40140501) submitted a discussion of the formation of impurities in the "DEET Blend." The blend is a 1:1:1:1 composite of the 99.9% technical products registered to Miles Laboratories, Hoechst Celanese, Morflex Chemical, and MGK. This discussion which is presented in Confidential Appendix C does not satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding formation of impurities in the 99.9% technical products registered to Miles Laboratories (EPA Reg. No. 121-17), Hoechst Celanese (EPA Reg. No. 8340-39), Morflex Chemical (EPA Reg. No. 51147-1), and MGK (EPA Reg. No. 1021-891) because the discussions did not cover post-production reactions between ingredients, migration of components of packaging materials, carry-over of contaminants from production equipment, and process quality control measures. Additional discussion is required for these technical products.

McLaughlin Gormley King Company (product registration jacket; no MRIDs assigned) submitted additional product-specific information regarding the formation of impurities in MGK FI products. This discussion is summarized in Confidential Appendix C. This discussion satisfies the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding formation of impurities in the following MGK products: 86% FI (EPA Reg. No. 1021-1276), 76.92% FI (EPA Reg. No. 1021-1290), 70% FI (EPA Reg. No. 1021-567), 66.67% FI (EPA Reg. No. 1021-737), and 17.5% FI (EPA Reg. No. 1021-535).

No discussion of the formation of impurities has been submitted for the Morflex 75% FI (EPA Reg. No. 51147-2) and the following MGK formulation intermediate products: 94.6% FI (EPA Reg. No. 1021-1354), 90% FI (EPA Reg. No. 1021-1355), 83.34% FI (EPA Reg.

No. 1021-1201), 83.33% FI (EPA Reg. No. 1021-1214), 76.93% FI (EPA Reg. No. 1021-1111), 70% FI (EPA Reg. No. 1021-1144), 60% FI (EPA Reg. No. 1021-971), 50% FI (EPA Reg. No. 1021-1070), 41.67% FI (EPA Reg. No. 1021-1200), 40% FI (EPA Reg. No. 1021-512), 40% FI (EPA Reg. No. 1021-886), and 5% FI (EPA Reg. No. 1021-511). Data requirements regarding this topic remain outstanding for these products.

## ANALYSIS AND CERTIFICATION OF PRODUCT INGREDIENTS

### 62-1. Preliminary Analysis

The Amended DEET Registration Standard dated 3/12/85 requires all data regarding preliminary analysis. In response, the registrants listed in Table 1 have submitted preliminary analysis data for their registered technical products as well as an analysis data of a "DEET Blend" (a 1:1:1:1 blend of the four registered technical products). These data appear in Confidential Appendix D; our conclusions are presented below.

Data (1985; MRID 00155132) submitted by **Virginia Chemicals, Inc.** for the **Hoechst Celanese** 99.9% T (EPA Reg. No. 8340-39) do not satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) regarding preliminary analysis because a more recent analysis submitted by the DEET Joint Venture (see p. 4 of this section) indicates that additional impurities are present in this product. Additional data concerning this topic are required for this product.

Data (jacket for 51147-1; no MRID assigned) submitted by **Morflex Chemical Company, Inc.** for the 99.9% T (EPA Reg. No. 51147-1) do not satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) regarding preliminary analysis because the data do not reflect the concentrations of impurities of the Morflex product alone. A new analysis must be submitted reflecting the impurity profile of this product.

Data (1987; MRID 40158601) submitted by **McLaughlin Gormley King Company** for the 99.9% T (EPA Reg. No. 1021-891) satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) regarding preliminary analysis. No additional data concerning this topic are required for this product.

Data (1987; MRID 40140501) submitted by the DEET Joint Venture for the **Miles Laboratories, Inc.** 99.9% T (EPA Reg. No. 121-17) do not satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) regarding preliminary analysis because only one batch was analyzed (five batches are required). Additional data are required for this product.

## 62-2. Certified Limits

The Amended DEET Registration Standard dated 3/12/85 requires all generic and product-specific data regarding certification of ingredient limits. In response, the registrants listed in Table 1 have submitted certification of ingredient limits for certain of the registered MPs. The data are presented in Confidential Appendix A; our conclusions are presented below.

Data (CSF dated 6/5/85) submitted by **Miles Laboratories, Inc.** for the 99.9% T (EPA Reg. No. 121-17) do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certification of limits because a lower and upper certified limit was not submitted for each of the isomers present.

Data (CSF dated 10/7/85; registration jacket) submitted by **Hoechst Celanese Corp.** for the 99.9% T (EPA Reg. No. 8340-39) do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certification of limits because upper certified limits were not submitted for the active ingredients, including for each individual isomer and lower certified limits were not submitted for each individual related isomer. We note that the ortho- and para-isomers of DEET are considered to be active ingredients since they are grouped under the same Pesticide Chemical Code as the meta-isomer; therefore, upper and lower certified limits are required for each of these ingredients.

Data (CSF dated 3/30/87; registration jacket) submitted by **Morflex Chemical Company, Inc.** for the 99.9% T (EPA Reg. No. 51147-1) do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certification of limits for the following reasons: (i) an upper certified limit was not reported for the meta-isomer (active ingredient); (ii) an upper certified limit was not provided for an impurity; (iii) the data were not submitted on EPA Form 8570-4 (Rev 2/85); and (iv) an explanation on how the upper limits were established was not provided. We note that the ortho- and para-isomers of DEET are considered to be active ingredients since they are grouped under the same Pesticide Chemical Code as the meta-isomer; therefore, upper and lower certified limits are required for each of these ingredients.

Data (CSF dated 6/12/85; registration jacket) submitted for the **Morflex 75% FI** (EPA Reg. No. 51147-2) do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certification of limits because lower and upper certified limits were not reported for the active and inert ingredients and certified limits were not reported on EPA Form 8570-4 (Rev. 2/85).

Data submitted by **McLaughlin Gormley King Company** (1987; MRID 40158601) for the 99.9% T (EPA Reg. No. 1021-891) do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certification of limits because an upper certified limit must be provided for the active ingredient and the certifications must be submitted on EPA Form 8570-4 (Rev. 2/85). We note that the ortho- and para-isomers of DEET are considered to be active ingredients since they are grouped under the same Pesticide Chemical Code as the meta-isomer; therefore, lower certified limits are required for each of these ingredients.

Data submitted for the MGK 86% FI (EPA Reg. No. 1021-1276; CSF dated 3/15/90), 80% FI (EPA Reg. No. 1021-1312; CSF dated 3/15/90), 76.92% FI (EPA Reg. No. 1021-1290; CSF dated 3/15/90), 70% FI (EPA Reg. No. 1021-567; CSF dated 3/15/90), and 66.67% FI (EPA Reg. No. 1021-737; CSF dated 3/30/90), do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certification of limits because the range of certified limits for the ingredient DEET exceed the range of standard certified limits without explanation by the registrant. Data submitted for the MGK 17.5% FI (EPA Reg. No. 1021-535; CSF dated 3/15/90) satisfy requirements pertaining to certified limits. However, if the label of the technical product is amended to more accurately reflect the mean concentration of DEET in the technical product, a new CSF for these FIs will be required to reflect this change in the certified limits.

No information on certified limits has been submitted by **McLaughlin Gormley King Company** for the following formulation intermediate products: 94.6% FI (EPA Reg. No. 1021-1354), 90% FI (EPA Reg. No. 1021-1355), 83.34% FI (EPA Reg. No. 1021-1201), 83.33% FI (EPA Reg. No. 1021-1214), 76.93% FI (EPA Reg. No. 1021-1111), 70% FI (EPA Reg. No. 1021-1144), 60% FI (EPA Reg. No. 1021-971), 50% FI (EPA Reg. No. 1021-1070), 41.67% FI (EPA Reg. No. 1021-1200), 40% FI (EPA Reg. No. 1021-512), 40% FI (EPA Reg. No. 1021-886), and 5% FI (EPA Reg. No. 1021-511). Data requirements regarding this topic remain outstanding for these products.

#### 62-3. Enforcement Analytical Methods

The Amended DEET Registration Standard dated 3/12/85 specifies data requirements regarding analytical methods to verify certified limits. In response, The DEET Joint Venture (1987; MRID 40140501) on behalf of the members (Miles, MGK, Morflex, and Virginia Chemicals thus Hoechst), **McLaughlin Gormley King Company** (1987; MRID 40158601), and **Morflex Chemical Company, Inc.** (1987; jacket for 51147-1; no MRID assigned) have submitted analytical methods for determination of the active ingredient (discussed below) and impurities (discussed in Confidential Appendix E). The submitted information does not satisfy the

requirements of 40 CFR §158.180 (Guideline Reference No. 62-3) regarding enforcement analytical methods because appropriate validation data for the methods was not submitted. Additional information is required.

A capillary GLC method is used for determination of the active ingredient (meta-isomer). Samples are diluted with petroleum ether and an aliquot of this solution is assayed by GLC on a 25 meter cross-linked methylsilicone column using a flame ionization detector. No validation data for the method were provided.

#### PHYSICAL AND CHEMICAL CHARACTERISTICS

The Amended DEET Registration Standard dated 3/12/85 requires all generic and product-specific data requirements pertaining to physical and chemical characteristics. In response, several registrants have submitted physical and chemical characteristics of the DEET purified active ingredient (PAI), technical grade of the active ingredient (TGAI), and manufacturing-use products (MP). These data are summarized below in Table 1.

Data (1985; MRID 00149979) submitted by **Miles Laboratories, Inc.** for the 99.9% T (EPA Reg. No. 121-17) do not satisfy many of the requirements of 40 CFR 158.190 (Guidelines Reference Nos. 63-2 through 63-20) because the registrant did not submit raw data, methods, and conditions under which solubility, octanol/water partition coefficient, storage stability, and corrosion characteristics data were collected. Furthermore, no data were submitted pertaining to boiling point, vapor pressure, stability, oxidizing/reducing action, flammability, explosability, and viscosity.

Data (1985; MRIDs 00152588 and 00155132) submitted by **Virginia Chemicals, Inc.** for the **Hoechst Celanese** 99.9% T (EPA Reg. No. 8340-39) do not fully satisfy the requirements of 40 CFR 158.190 (Guidelines Reference Nos. 63-2 through 63-20) because no data were submitted pertaining to boiling point, solubility, vapor pressure, octanol/water partition coefficient, stability, and corrosion characteristics. In addition, the registrant did not submit the raw data and conditions under which storage stability data were obtained.

Data (located in the registration jacket; no MRID assigned) submitted by **Morflex Chemical Company, Inc.** for the 75% FI (EPA Reg. No. 55147-2) satisfy all product-specific requirements of 40 CFR 158.190 (Guidelines Reference Nos. 63-2 through 63-20) with the exception of storage stability, for which raw data and information regarding the storage container are required.

Data (1986; 00163059 and 1987; MRID 40146001) submitted by **McLaughlin Gormley King Company** for the 99.9% T (EPA Reg. No.

1021-891) do not fully satisfy the requirements of 40 CFR 158.190 (Guidelines Reference Nos. 63-2 through 63-20) because no data were submitted pertaining to color, physical state, odor, boiling point, density, vapor pressure, stability, oxidizing or reducing action, flammability, explosiveness, storage stability, viscosity, and corrosion characteristics. In addition, data for solubility did not include representative polar and non-polar solvents.

Data (located in the registration jacket of respective products; no MRIDs assigned) submitted by **McLaughlin Gormley King Company** for the 86% FI (EPA Reg. No. 1021-1276), 80% FI (EPA Reg. No. 1021-1312), 76.92% FI (EPA Reg. No. 1021-1290), 70% FI (EPA Reg. No. 1021-567), 66.67% FI (EPA Reg. No. 1021-737), and 17.5% FI (EPA Reg. No. 1021-535) satisfy all of the product-specific requirements of 40 CFR 158.190 (Guidelines Reference Nos. 63-2 through 63-20) with the exception of storage stability data, which were not submitted for any of the noted MGK FI products. The submitted storage stability data (MRID 40750101) for the 70% FI (EPA Reg. No. 1021-567) were deemed unacceptable by the Agency (letter by P. Hutton, PM 17 to S. Rogosheke of McLaughlin Gormley King and Company; dated 3/2/90; registration jacket) because tests were conducted at a temperature of 100 C rather than at room temperature. The registrant was requested to submit an additional storage stability study in which the formulated product is stored in a container similar to those that will be used in the trade for a period of one year under warehouse conditions of temperature and humidity. The analysis should include data from time zero.

No physical and chemical characteristics have been submitted by **Morflex Chemical Company, Inc.** for the 99.9% T (EPA Reg. No. 51147-1) and by **McLaughlin Gormley King Company** for the following products: 94.6% FI (EPA Reg. No. 1021-1354), 90% FI (EPA Reg. No. 1021-1355), 83.34% FI (EPA Reg. No. 1021-1201), 83.33% FI (EPA Reg. No. 1021-1214), 76.93% FI (EPA Reg. No. 1021-1111), 70% FI (EPA Reg. No. 1021-1144), 60% FI (EPA Reg. No. 1021-971), 50% FI (EPA Reg. No. 1021-1070), 41.67% FI (EPA Reg. No. 1021-1200), 40% FI (EPA Reg. No. 1021-512), 40% FI (EPA Reg. No. 1021-886), and 5% FI (EPA Reg. No. 1021-511). Data requirements regarding physical and chemical characteristics remain outstanding for these products.

Table 1. Physical and chemical properties of the DEET purified active ingredient (PAI), technical grade of the active ingredient (TGAI), and manufacturing-use products.

| Guidelines Reference<br>No., 40 CFR §158.190;<br>Name of Property | Description [Method] (Product;<br>EPA Reg. No.; MRID or Jacket) <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 63-2. Color                                                       | <p><b>light amber to colorless</b><br/>(99.9% T; 121-17; 00149979)</p> <p><b>clear to lightly colored</b><br/>[ASTM D 1535-68]<br/>(99.9% T; 8340-39; 00152588)</p> <p><b>water white</b><br/>(86% FI; 1021-1276; jacket)<br/>(66.67% FI; 1021-737; jacket)</p> <p><b>clear</b><br/>(75% FI; 51147-2; jacket)</p> <p><b>very pale yellow</b><br/>(80% FI; 1021-1312; jacket)<br/>(76.92% FI; 1021-1290; jacket)<br/>(70% FI; 1021-567; jacket)<br/>(17.5% FI; 1021-535; jacket)</p> |
| 63-3. Physical state                                              | <p><b>liquid</b><br/>(99.9% T; 121-17; 00149979)<br/>(99.9% T; 8340-39; 00152588)<br/>(86% FI; 1021-1276; jacket)<br/>(80% FI; 1021-1312; jacket)<br/>(76.92% FI; 1021-1290; jacket)<br/>(70% FI; 1021-567; jacket)<br/>(66.67% FI; 1021-737; jacket)<br/>(17.5% FI; 1021-535; jacket)</p> <p><b>oily liquid</b><br/>(75% FI; 51147-2; jacket)</p>                                                                                                                                  |
| 63-4. Odor                                                        | <p><b>near odorless to slightly musty</b><br/>(99.9% T; 121-17; 00149979)</p> <p><b>little odor; bland</b><br/>(99.9% T; 8340-39; 00152588)<br/>(76.92% FI; 1021-1290; jacket)</p> <p><b>characteristic ethanol odor</b><br/>(75% FI; 51147-2; jacket)</p>                                                                                                                                                                                                                          |

(Continued.)

Table 1. (Continued.)

| Guidelines Reference<br>No., 40 CFR §158.190;<br>Name of Property | Description [Method] (Product;<br>EPA Reg. No.; MRID or Jacket) <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 63-2. Odor (cont.)                                                | <b>DEET-odor</b><br>(86% FI; 1021-1276; jacket)<br>(80% FI; 1021-1312; jacket)<br>(70% FI; 1021-567; jacket)<br>(66.67% FI; 1021-737; jacket)<br><br><b>characteristic isopropanol odor</b><br>(17.5% FI; 1021-535; jacket)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 63-5. Melting point                                               | <b>N/A since all registered technical DEET products are liquid</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 63-6. Boiling point                                               | <b>no data reported</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 63-7. Density, bulk<br>density, or<br>specific gravity            | <b>specific gravity 0.996</b><br>(99.9% T; 121-17; 00149979)<br><br><b>0.9946 specific gravity at 25 C</b><br>[VCI method 0112-09-2.3.7, hydrometer]<br>(99.9% T; 8340-39; 00152588)<br><br><b>1.007 ± 0.012 specific gravity</b><br>(86% FI; 1021-1276; jacket)<br><br><b>1.011 ± 0.012 specific gravity at 20 C</b><br>(80% FI; 1021-1312; jacket)<br><br><b>1.013 ± 0.01 specific gravity at 20 C</b><br>(76.92% FI; 1021-1290; jacket)<br><br><b>0.940-0.946 specific gravity at 25C</b><br>(75% FI; 51147-2; jacket)<br><br><b>1.02 ± 0.01 specific gravity at 25C</b><br>(70% FI; 1021-567; jacket)<br><br><b>0.990 ± 0.012 specific gravity</b><br>(66.67% FI; 1021-737; jacket)<br><br><b>0.833 ± 0.012 specific gravity at 20 C</b><br>(17.5% FI; 1021-535; jacket) |
| 63-8. Solubility                                                  | <b>Completely miscible at all ratios in:<br/>ethanol, isopropanol, acetone,<br/>chloroform, dichloroethane, methanol,</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

(Continued.)



Table 1. (Continued.)

| Guidelines Reference<br>No., 40 CFR §158.190;<br>Name of Property | Description [Method] (Product;<br>EPA Reg. No.; MRID or Jacket) <sup>a</sup>                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 63-8. Solubility<br>(cont.)                                       | toluene, octanol, petroleum ether, and<br>most other organic solvents. Slightly<br>soluble in water and glycerin.<br>(99.9% T; 121-17; 00149979)<br><br>solubility in water at 0.2-0.3 wt %<br>(99.9% T; 1021-891; 40146001)                                                                                                                                                  |
| 63-9. Vapor pressure                                              | no data reported                                                                                                                                                                                                                                                                                                                                                              |
| 63-10. Dissociation<br>constant                                   | not required according to Amended DEET<br>Registration Standard                                                                                                                                                                                                                                                                                                               |
| 63-11. Octanol/water<br>partition<br>coefficient                  | 100% in the octanol phase<br>[CFR, 45, 77350, 11/1/80]<br>(99.9% T; 121-17; 00149979)<br><br>$\log K_{ow}=2.00$ [CFR, Vol 50, No. 188,<br>9/27/85] (99.9% T; 1021-891; 40146001)                                                                                                                                                                                              |
| 63-12. pH                                                         | 9.5 $\pm$ 1<br>(99.9% T; 121-17; 00149979)<br><br>N/A since product is not dispersible<br>in water<br>(99.9% T; 8340-39; 00152588)<br>(86% FI; 1021-1276; jacket)<br>(80% FI; 1021-1312; jacket)<br>(76.92% FI; 1021-1290; jacket)<br>(70% FI; 1021-567; jacket)<br>(66.67% FI; 1021-737; jacket)<br>(17.5% FI; 1021-535; jacket)<br><br>8.5-9.5<br>(75% FI; 51147-2; jacket) |
| 63-13. Stability                                                  | stable at ambient temperatures<br>(86% FI; 1021-1276; jacket)<br>(80% FI; 1021-1312; jacket)<br>(76.92% FI; 1021-1290; jacket)<br>(70% FI; 1021-567; jacket)<br>(66.67% FI; 1021-737; jacket)<br>(17.5% FI; 1021-535; jacket)                                                                                                                                                 |

(Continued.)

Table 1. (Continued.)

| Guidelines Reference<br>No., 40 CFR §158.190;<br>Name of Property | Description [Method] (Product;<br>EPA Reg. No.; MRID or Jacket) <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 63-14. Oxidizing or<br>reducing action                            | <p><b>does not have reducing or oxidizing properties</b> [44 Fed. Reg. 16267 (3/16/79)]<br/>           (99.9% T; 8340-39; 00155132)<br/>           (86% FI; 1021-1276; jacket)<br/>           (80% FI; 1021-1312; jacket)<br/>           (70% FI; 1021-567; jacket)<br/>           (66.67% FI; 1021-737; jacket)<br/>           (17.5% FI; 1021-535; jacket)</p>                                                                                                                                                                                                                                                                              |
| 63-15. Flammability                                               | <p><b>flash point &gt;200 F</b><br/>           [Tag closed cup, ASTM D 56-70]<br/>           (99.9% T; 8340-39; 00152588)<br/>           (70% FI; 1021-567; jacket)</p> <p><b>flash point = 200 F [TCC]</b><br/>           (86% FI; 1021-1276; jacket)<br/>           (80% FI; 1021-1312; jacket)<br/>           (76.92% FI; 1021-1290; jacket)<br/>           (70% FI; 1021-567; jacket)<br/>           (66.67% FI; 1021-737; jacket)</p> <p><b>flash point = 80 F</b><br/>           [Tag closed cup, ASTM D-56]<br/>           (75% FI; 51147-2 ; jacket)</p> <p><b>flash point = 60 F</b><br/>           (17.5% FI; 1021-535; jacket)</p> |
| 63-16. Explodability                                              | <p><b>no thermal explodability</b><br/>           [ASTM E698-79 and ARC]<br/>           (99.9% T; 8340-39; 00155132)</p> <p><b>N/A since product is not considered to be potentially explosive</b><br/>           (86% FI; 1021-1276; jacket)<br/>           (80% FI; 1021-1312; jacket)<br/>           (76.92% FI; 1021-1290; jacket)<br/>           (75% FI; 51147-2; jacket)<br/>           (70% FI; EPA Reg. No. 1021-567; jacket)<br/>           (66.67% FI; 1021-737; jacket)<br/>           (17.5% FI; 1021-535; jacket)</p>                                                                                                           |
| 63-17. Storage stability                                          | <p><b>stable two years at 72 F and for one year at 100 F</b><br/>           (99.9% T; 121-17; 00149979)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

(Continued.)

Table 1. (Continued.)

| Guidelines Reference<br>No., 40 CFR §158.190;<br>Name of Property | Description [Method] (Product;<br>EPA Reg. No.; MRID or Jacket) <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 63-17. Storage stability<br>(cont.)                               | <p>stable for one year in glass containers<br/>(99.9% T; 8340-39; 00152588)</p> <p>no raw data are available; however,<br/>registrant claims, product will pass<br/>product specifications after one year<br/>(75% FI; 51147-2; jacket)</p> <p>stable for one year at 100 F in glass,<br/>Conolene, PET, Barex, HDPE containers,<br/>and welded-seam lined cans with epon-<br/>coated valve cups<br/>(70% FI; 1021-567; 40750101, 00163059)</p>                                                                                                                    |
| 63-18. Viscosity                                                  | <p>16.92 centistokes at 25 C<br/>[ASTM D445-71 and D446-74 at 25 C]<br/>(99.9% T; 8340-39; 00155132)</p> <p>32.5 centipoises at 22 C<br/>(86% FI; 1021-1276; jacket)<br/>(76.92% FI; 1021-1290; jacket)</p> <p>31.5 centipoises at 23 C<br/>(80% FI; 1021-1312; jacket)</p> <p>5 centipoises at 25 C<br/>[spindle #1 at 30 rpm]<br/>(75% FI; 51147-2; jacket)</p> <p>37.5 centipoises at 22 C<br/>(70% FI; 1021-567; jacket)</p> <p>32.0 centipoises at 22 C<br/>(66.67% FI; 1021-737; jacket)</p> <p>9.5 centipoises at 22 C<br/>(17.5% FI; 1021-535; jacket)</p> |
| 63-19. Miscibility                                                | N/A; not required by Amended DEET<br>Registration Standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 63-20. Corrosiveness                                              | will not corrode or dissolve nylon,<br>teflon, polyethylene, polypropylene,<br>polyester; dissolves or softens many                                                                                                                                                                                                                                                                                                                                                                                                                                                |

(Continued.)

Table 1. (Continued.)

| Guidelines Reference<br>No., 40 CFR §158.190;<br>Name of Property | Description [Method] (Product;<br>EPA Reg. No.; MRID or Jacket) <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 63-20. Corrosiveness<br>(cont.)                                   | <p><b>other plastics including polyvinyl chloride and tygon</b><br/>(99.9% T; 121-17; 00149979)</p> <p><b>N/A since products are not considered to be corrosive</b><br/>(86% FI; 1021-1276; jacket)<br/>(80% FI; 1021-1312; jacket)<br/>(76.92% FI; 1021-1290; jacket)<br/>(70% FI; 1021-567; jacket)<br/>(66.67% FI; 1021-737; jacket)<br/>(17.5% FI; 1021-535; jacket)</p> <p><b>no corrosion was observed in welded seam lined cans with epon coated valve cups for one year at 100 F</b><br/>(70% FI; 1021-567; 40750101, 00163059)</p> <p><b>no evidence of corrosion has occurred in metal drums, pails, or tank trucks that are used for shipping and storage</b><br/>(75% FI; 51147-2; jacket)</p> |

<sup>a</sup> PAI = purified active ingredient. TGAI = technical grade of the active ingredient. MP = manufacturing-use product. FI = formulation intermediate. Hyphenated numbers represent EPA Registration Numbers. Eight-digit numbers are MRID documents from the Pesticide Document Management System (PDMS). "Jacket" refers to the pesticide registration jacket maintained for the specified product by Registration Division, OPP, EPA.

Product Chemistry Citations (used):

00149979 Miles Laboratories, Inc. (1985) Product Specific Data Report of Diethyltoluamide:. Unpublished compilation. 23 p.

00152588 Virginia Chemicals (1985) Product Chemistry: N,N-Diethyl-meta-toluamide:. Unpublished compilation. 36 p.

00155132 Virginia Chem Inc. (1985) Product Chemistry: Product Specific: N,N-Diethyl-meta-toluamide. Unpublished compilation. 101 p.

00163059 McLaughlin Gormley King Co. (1986) Laboratory Report: :Storage Stability of Pyroicide Intermediate 5734:. Unpublished compilation. 7 p.

40140501 Hefley, A.; Jakob, P.; Meinen, V.; et al. (1987) N,N,-Diethyl-meta-toluamide (DEET): :Product Chemistry: in Response to Registration Standard--Amended: Dated March 1985. Unpublished compilation prepared by Chemical Specialties Manufacturers Assn. 80 p.

40146001 Meinen, V.; McKay, T. (1987) Product Chemistry--Physical and Chemical Characteristics of Diethyltoluamide Including: Water Solubility, Octanol/Water Partition Coefficient and Miscibility. Unpublished study prepared by McLaughlin Gormley King Co. & Ethyl Corp. 16 p.

40158601 Meinen, V.; Trahanovsky, W. (1987) N-N-diethyl-meta-toluamide (DEET): Product Chemistry. Unpublished compilation prepared by McLaughlin Gormley King Co., and Iowa State Univ. 28 p.

40750101 Carlson, D. (1988) Pyroicide Intermediate 5734 Storage Stability Study on End Use Dilution. Unpublished study prepared by McLaughlin Gormley King Co. 7 p.

Product Chemistry Citations (not used):

[The following MRIDs either do not contain data/information useful to the registration of DEET or pertain to end-use products.]

00148719 McLaughlin Gormley King Co. (1985) Laboratory Report: :Storage Stability of End-use Product:: TL-1669. Unpublished compilation. 6 p.

00149980 Miles Laboratories, Inc. (1985) Product Specific Data Report: Cutter Insect Repellent Stick. Unpublished compilation. 19 p.

00149981 Miles Laboratories, Inc. (1985) Product Specific Data Report: Cutter Evergreen Scent Insect. Unpublished compilation. 19 p.

00150283 Boyle-Midway, Inc. (1985) Product Chemistry Data: Black Flag Maximum Strength Insect Repellent. Unpublished compilation. 15 p.

00150284 Boyle-Midway, Inc. (1985) Manufacturer's Data Sheets: Active and Inert Ingredients: Black Flag Maximum Strength Insect Repellent. Unpublished compilation. 11 p.

00150311 Plough, Inc. (1985) :Product Chemistry Data of Muskol Ultra Insect Repellent Spray:. Unpublished study. 47 p.

00150583 S. C. Johnson & Son, Inc. (1985) Product Chemistry: Maximum Strength Deep Woods Off] II. Unpublished compilation. 20 p.

00150586 S. C. Johnson & Son, Inc. (1985) Product Chemistry: Off] Insect Repellent Formula V. Unpublished compilation. 29 p.

00150588 S. C. Johnson & Son, Inc. (1985) Product Chemistry: Formula 6099 #12 Insect Repellent. Unpublished compilation. 25 p.

00150590 S. C. Johnson & Son, Inc. (1985) Product Chemistry: Off] Formula 111 Liquid Spray Insect Repellent. Unpublished compilation. 24 p.

00150591 S. C. Johnson & Son, Inc. (1985) Product Chemistry: 6017 Formula 3 Insect Repellent. Unpublished compilation. 26 p.

00150593 S. C. Johnson & Son, Inc. (1985) Product Chemistry: Maximum Strength Deep Woods Off. Unpublished compilation. 17 p.

00150596 S. C. Johnson & Son, Inc. (1985) Product Chemistry: 6017 Formula 7 Insect Repellent. Unpublished compilation. 26 p.

00150598 S. C. Johnson & Son, Inc. (1985) Product Chemistry: Formula 6099 #2 Insect Repellent. Unpublished compilation. 24 p.

00152214 Plough, Inc. (1985) :Muskol Insect Repellent Spray - Product Chemistry Data:. Unpublished compilation. 50 p.

00152576 Amway Corp. (1985) Preliminary Analysis :and Certification of Product Ingredients of Amway d-15 Insect Repellent:. Unpublished compilation. 19 p.

00152577 Amway Corp. (1985) :Physical and Chemical Characteristics of Amway d-15 Insect Repellent:. Unpublished compilation. 24 p.

00152887 Plough, Inc. (1985) :Product Chemistry Data - Muskol Insect Repellent Lotion:. Unpublished compilation. 20 p.

00153799 Miles Laboratories, Inc. (1985) Product Chemistry: Cutter Formula 100 Maximum Strength Insect Repellent. Unpublished study. 14 p.

00155691 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using OFF] Pressurized Insect Repellent:. Unpublished study. 26 p.

00155693 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using OFF] Insect Repellent:. Unpublished study. 19 p.

00155697 Fuller Brush Co. (1985) :Product Chemistry Using MGK Diethyltoluamide:. Unpublished compilation. 51 p.

00155699 Fuller Brush Co. (1985) Product Chemistry :Using Insect Repellent Gel:. Unpublished compilation. 74 p.

00155701 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using Maximum Strength Pump Spray Deep Woods OFF]:. Unpublished study. 17 p.

00155702 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using Formula 6099 #11 Insect Repellent:. Unpublished study. 22 p.

00155705 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using Formula 6099 #10 Insect Repellent:. Unpublished study. 25 p.

00155708 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using 9017 Formula 15 Insect Repellent:. Unpublished study. 28 p.

00155711 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using Pump Spray Formula 6099 #9 Insect Repellent:. Unpublished study. 25 p.

00155713 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using Formula 14 Insect Repellent:. Unpublished study. 28 p.

00155715 S.C. Johnson & Son, Inc. (185) Product Chemistry :Using OFF] Insect Repellent Formula IV:. Unpublished study. 38 p.

00155716 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using 6017 Formula 13 Insect Repellent:. Unpublished study. 28 p.

00155717 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using OFF] Insect Repellent Foam:. Unpublished study. 37 p.

00155719 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using Maximum Strength Deep Woods OFF] III:.. Unpublished study. 31 p.

00155721 S.C. Johnson & Son, Inc. (1985) Product Chemistry :Using Formula 6099 #8 Insect Repellent:.. Unpublished study. 31 p.

00156170 Carter-Wallace, Inc. (1986) Data Requirements: Product Chemistry: No Bite-No Burn. Unpublished compilation. 15 p.

00156384 United Guardian, Inc. (1985) Chemistry: Product Identity and Composition :of DEET Mosquito Repellent; G3Z:.. Unpublished study. 15 p.

00161646 Meinen, V. (1986) :Storage Analysis for DEET by GLC:.. Unpublished compilation prepared by McLaughlin Gormley King Co. 2 p.

00162531 Sanex Chemicals, Inc. (1986) Product Chemistry Data: Sanex Jungle Power II Insect Repellent. Unpublished compilation. 23 p.

00164655 Carter-Wallace Inc. (19??) Ingredient Information Summary: No Bite-No Burn. Unpublished study. 5 p.

00164660 Carter-Wallace, Inc. (1986) :Ingredient Information Summary and Other Product Chemistry:: No Bite-No Burn. Unpublished compilation. 37 p.

40132600 Miles Laboratories, Inc. (1987) Submission of Product Chemistry Data in Support of Application for Amended Registration of Cutter Original Insect Repellent Cream. Transmittal of 1 study.

40132601 Hefley, A. (1987) Manufacturing Procedure for Cutter Original Insect Repellent Cream...in Support of Amended Registration. Unpublished study prepared by Miles Laboratories, Inc. 3 p.

40140500 DEET Joint Venture (1987) Submission of Product Chemistry Data of DEET in Response to Data Standard--Amended. Transmittal of 1 study.

00146000 McLaughlin Gormley King Co. (1987) Submission of Product Chemistry Data for MGK Diethyltoluamide. Transmittal of 1 study.

40152600 Hartz Mountain Corp. (1987) Submission of Chemistry Data To Support the Conditional Registration of Hartz Blockade for Cats. Transmittal of 1 study.

40152601 Perlberg, W. (1987) Storage Stability: Hartz Blockade for Cats. Unpublished study prepared by Hartz Mountain Corp. 4 p.



40152800 Hartz Mountain Corp. (1987) Submission of Storage Stability Data To Satisfy the Stipulation Placed on the Conditional Registration of Hartz Blockade for Dogs. Transmittal of 1 study.

40152801 Perlberg, W. (1987) Storage Stability :Data:: Hartz Blockade for Dogs. Unpublished study prepared by Hartz Mountain Corp. 4 p.

40139400 Miles Laboratories, Inc. (1987) Product Chemistry and Toxicology Data submitted To Support the Registration Standard of Cutter Original Insect Repellent Pump Spray. Transmittal of 3 studies.

40139401 Hefley, A. (1987) Manufacturing Procedure for Cutter Original Insect Repellent Pump Spray: :Product Chemistry Data:. Unpublished study prepared by Miles Laboratories, Inc. 6 p.

40139402 Hefley, A. (1987) Product Chemistry: Storage Stability for Cutter Original Insect Repellent Pump Spray. Unpublished study prepared by Miles Laboratories, Inc. 3 p.

40158600 McLaughlin Gormley King Co. (1987) Submission of Data in Compliance with the Registration of MGK: Product Chemistry Study. Transmittal of 1 study.

40170000 Draft Enterprises Ltd. (1987) Submission of Product Chemistry Data in Support of Application for Registration of Great Canadian Bug Repellent. Transmittal of 1 study.

40170001 Kennedy, S. (1987) Product Chemistry of Morflex Deet. Unpublished compilation prepared by Morflex Chemical Co., Inc. 6 p.

40188200 Miles Laboratories, Inc. (1987) Submission of Product Chemistry Data to Support the Registration of New Product Cutter Backyard Insect Repellent Spray. Transmittal of 1 study.

40188201 Hefley, A. (1987) Product Chemistry for Cutter Backyard Insect Repellent Spray. Unpublished study prepared by Miles Laboratories, Inc. 16 p.

40197600 Miles Laboratories, Inc. (1987) Submission of Product Chemistry Data in Support of Application for Registration of Cutter for Kids Insect Repellent Spray. Transmittal of 1 study.

40204800 Maurry Biological Co. (1987) Submission of Product Chemistry and Toxicology Data in Support of Registration of DMT-50. Transmittal of 2 studies.

40204801 Maurry Biological Co. (1987) Storage Stability: :of DMT-50:. Unpublished study. 3 p.

40214900 3M Co. (1987) Submission of Product Chemistry and Toxicology Data in Support of Application for Registration of 3M's Insect/Arthropod Repellent Lotion (35% DEET). Transmittal of 6 studies.

40214901 Randen, N. (1987) Product Chemistry Data Requirements for 3M's Insect/Arthropod Repellent Lotion: Lab Project ID: 2100414504. Unpublished compilation prepared by 3M Co. 92 p.

40197601 Hefley, A. (1987) Product Chemistry for Cutter for Kids Insect Repellent Spray. Unpublished compilation prepared by Miles Laboratories, Inc. 16 p.

40273400 Hartz Mountain Corp. (1987) Submission of Product Chemistry Data for Hartz Blockade for Dogs II. Transmittal of 1 study.

40273401 Perlberg, W. (1987) Storage Stability: Hartz Blockade for Dogs II. Unpublished study prepared by Hartz Mountain Corp. 4 p.

40273500 Hartz Mountain Corp. (1987) Submission of Product Chemistry Data for Hartz Blockade for Cats II. Transmittal of 1 study.

40273501 Perlberg, W. (1987) Storage Stability: Hartz Blockade for Cats II. Unpublished study prepared by Hartz Mountain Corp. 4 p.

40487600 The d-Con Company Inc. (1988) Submission of Chemistry and Toxicity Data on 6-12 Plus Insect Repellent Spray (EPA Reg.No. 3282-48) in Response to Data Call-In for 2-Ethyl-1,3-Hexanediol. Transmittal of 2 studies.

40487601 Wark, B. (1988) Product Chemistry: 6/12 Plus Insect Repellent Spray. Unpublished study prepared by The d-Con Company, Inc. 4 p.

40487800 The d-Con Co., Inc. (1988) Submission of Chemistry and Toxicity Data in Support of 6/12 Plus Insect Repellent Liquid. Transmittal of 2 studies.

40487900 The d-Con Company, Inc. (1988) Submission of Chemistry Data on Sportmate II Premium Insect Repellent Liquid (EPA Reg. No. 3282-57) in Response to 2-Ethyl-1,3-Hexanediol Data Call-In Dated 10/09/87. Transmittal of 1 study.

40487901 Wark, B. (1988) Product Chemistry: Sportsmate II Premium Insect Repellent Liquid. Unpublished study prepared by The d-Con Company, Inc. 4 p.

40488000 The d-Con Company, Inc. (1988) Submission of Chemistry and Toxicity Data on Sportsmate II Premium Insect Repellent Spray (EPA Reg. No. 3283-57) in Response to 2-Ethyl-1,3-Hexanediol Data Call-In dated 10/09/87. 36 p.

40488001 Wark, B. (1988) Product Chemistry: Sportsmate II Premium Insect Repellent Spray. Unpublished study prepared by The d-Con Company, Inc. 4 p.

40487801 Wark, B. (1988) Product Chemistry: 6/12 Plus Insect Repellent Liquid. Unpublished study prepared by The d-Con Co., Inc. 4 p.

40750100 McLaughlin Gormley King Co. (1988) Submission of Storage Stability Data to Fulfill Data Requirements for the End Use Dilution of the Pyroicide Intermediate 5734 Manufacturing Intermediate. Transmittal of 1 study.

40898000 Camm, Inc. (1988) Submission of Toxicological and Product Chemistry Data to Support the Petition to Register "Skin Defender" as an Insect Repellent and Sun Screen. Transmittal of 3 studies.

41160700 Miles, Inc. (1989) Submission of Product Chemistry Data in Support of Cutter Original Insect Repellent Pump Spray Formula MMI Amended Registration. Transmittal of 1 study.

41160701 Spagnoli, J. (1989) Product Chemistry for Cutter Original Insect Repellent Pump Spray Formula MMI. Unpublished study prepared by Miles Inc. 25 p.

41214100 3M Co. (1989) Submission of Data To Support the Application for a New "Me Too" Pesticide Registration: Product Chemistry Studies. Transmittal of 1 study.

41214101 Randen, N. 1989) Volume 2 Product Chemistry Data Requirements 3M Brand "Safetygard" Insect Repellent: Project ID: 3M/PCP 2100661104. Unpublished study prepared by 3M Co. 41 p.

41217200 **Pet** Chemicals (1989) Submission of Product Chemistry to Support **the Amendment** to Registration for Holiday Outdoorsman Double Strength Insect Repellent. Transmittal of 1 study.

41217201 Pet Chemicals (1989) Product Chemistry: Holiday Outdoorsman Double Strength Insect Repellent N,N-Diethyl Toluamide (DEET). Unpublished study prepared by Speer Products, Inc. 17 p.

41246500 3M Company (1989) Submission of Product Chemistry and Toxicological Data to Support the Registration for a New "Me-Too" Pesticide Product. Transmittal of 4 studies.

41246501 Randen, N. (1989) Volume 2 Product Chemistry Data Requirements 3M Brand "Safetygard" Insect Repellent: Laboratory Project ID 3M/PCP 2100661104. Unpublished study prepared by 3M Company. 60 p.

41293001 Randen, N. (1989) Product Chemistry and Manufacturing 3M Brand Ultrathon Insect Repellent: Lab Project Number 3M/PCP 2100661104; Method 163.61-7a. Unpublished study prepared by 3M/Consumer Specialties Div. 36 p.

41347500 Boyle-Midway Household Products, Inc. (1989) Submission of data in support of registration for Black Flag Insect Repellent Spray: Product chemistry. Transmittal of 1 study.

41347501 Boyle-Midway Household Products, Inc. (1989) Product Chemistry: Black Flag Insect Repellent Spray. Unpublished study. 7 p.

41293000 3M Consumer Specialties Div. (1989) Submission in support of registration of 3M Ultrathon Insect Repellent: Product chemistry and toxicology.

41558700 Miles Inc. (1990) Submission of Data To the Application for Amendment Registration of Cutter Insect Repellent Spray--Formula MMI: Product Chemistry Study. Transmittal of 1 study.

41558701 Spagnoli, J. (1990) Product Chemistry for Cutter Insect Repellent Spray Formula MMI. Unpublished study prepared by Miles Inc. 19 p.

41558900 Miles Inc. (1990) Submission of Data To Support the Application for Amended Registration of Cutter Insect Repellent Cream--Formula MM: Product Chemistry Study. Transmittal of 1 study.

41558901 Spagnoli, J. (1990) Product Chemistry for Cutter Insect Repellent Cream Formula MM. Unpublished study prepared by Miles Inc. 19 p.

41559000 Miles Inc. (1990) Submission of Data To Support the Application for Amended Registration of Cutter Evergreen Insect Repellent Pump Spray--Formula MMI: Product Chemistry Data. Transmittal of 1 study.

41559001 Spagnoli, J. (1990) Product Chemistry for Cutter Evergreen Insect Repellent Pump Spray Formula MMI. Unpublished study prepared by Miles Inc. 19 p.

41559200 Miles Inc. (1990) Submission of Data To Support the Application for Amended Registration of Cutter Insect Repellent Pump Spray: Product Chemistry Study. Transmittal of 1 study.

41559201 Spagnoli, J. (1990) Product Chemistry for Cutter Insect Repellent Pump Spray Formula MMI. Unpublished study prepared by Miles Inc. 19 p.

TABLE A. GENERIC DATA REQUIREMENTS FOR THE DEET TECHNICAL GRADE OF THE ACTIVE INGREDIENT.<sup>1</sup>

| Data Requirement                                         | Test Substance <sup>2</sup> | Does EPA have data to satisfy this requirement? | Bibliographic Citation <sup>3</sup> | Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)? |
|----------------------------------------------------------|-----------------------------|-------------------------------------------------|-------------------------------------|----------------------------------------------------------------|
| <u>40 CFR §158.155-190 Product Chemistry</u>             |                             |                                                 |                                     |                                                                |
| <u>Product Composition</u>                               |                             |                                                 |                                     |                                                                |
| 61-2. Beginning Materials and Production Process         | TGAI                        | Partially                                       | 00155132                            | Yes <sup>4</sup>                                               |
| 61-3. Formation of Impurities                            | TGAI                        | Partially                                       | 40140501                            | Yes <sup>5</sup>                                               |
| <u>Analysis and Certification of Product Ingredients</u> |                             |                                                 |                                     |                                                                |
| 62-1. Preliminary Analysis                               | TGAI                        | Partially                                       | 00155132 40140501<br>40158601       | Yes <sup>6</sup>                                               |
| <u>Physical and Chemical Characteristics<sup>7</sup></u> |                             |                                                 |                                     |                                                                |
| 63-2. Color                                              | TGAI                        | Partially                                       | 00149979 00152588                   | Yes <sup>8</sup>                                               |
| 63-3. Physical State                                     | TGAI                        | Partially                                       | 00149979 00152588                   | Yes <sup>8</sup>                                               |
| 63-4. Odor                                               | TGAI                        | Partially                                       | 00149979 00152588                   | Yes <sup>8</sup>                                               |
| 63-5. Melting Point                                      | TGAI                        | N/A                                             | N/A                                 | No <sup>9</sup>                                                |
| 63-6. Boiling Point                                      | TGAI                        | No                                              | N/A                                 | Yes <sup>10</sup>                                              |
| 63-7. Density, Bulk Density, or Specific Gravity         | TGAI                        | Partially                                       | 00149979 00152588                   | Yes <sup>8</sup>                                               |
| 63-8. Solubility                                         | TGAI or PAI                 | Partially                                       | 00149979 40146001                   | Yes <sup>11</sup>                                              |
| 63-9. Vapor Pressure                                     | TGAI or PAI                 | No                                              | N/A                                 | Yes <sup>12</sup>                                              |
| 63-10. Dissociation Constant                             | TGAI or PAI                 | N/A                                             | N/A                                 | No                                                             |
| 63-11. Octanol/Water Partitioning Coefficient            | PAI                         | Partially                                       | 00149979 40146001                   | Yes <sup>13</sup>                                              |
| 63-12. pH                                                | TGAI                        | N/A                                             | N/A                                 | No <sup>14</sup>                                               |
| 63-13. Stability                                         | TGAI                        | Partially                                       | N/A                                 | Yes <sup>12</sup>                                              |
| <u>Other Requirements:</u>                               |                             |                                                 |                                     |                                                                |
| 64-1. Submittal of Samples                               | N/A                         | N/A                                             | N/A                                 | No                                                             |

1. Data pertain to the 99.9% technical products registered to the following companies: Miles Laboratories, Inc. (EPA Reg. No. 121-17), Hoechst Celanese Corp. (EPA Reg. No. 8340-39), Morflex Chemical Company, Inc.

TABLE A. (Continued).

(EPA Reg. No. 51147-1), and McLaughlin Gormley King Company (MGK) (EPA Reg. No. 1021-891). Additional data requirements are listed in the following Table B, "Product Specific Data Requirements for DEET Manufacturing-Use Products".

2. Test substance: **PAI** = purified active ingredient; **TGAI** = technical grade of the active ingredient; **MP** = manufacturing-use product.
3. Underlining indicates documents that have been reviewed in this Update document.
4. Miles, Morflex, and MGK have not responded to data requirements for their technical products listed in Footnote 1; all data are required for these products. Hoechst Celanese has responded for its 99.9% T; however, the registrant must verify that the manufacturing process and location has not changed since the transfer of ownership effective 4/18/89; otherwise all data would be required.
5. The Deet Joint Venture has responded to data requirements for the technical products listed in Footnote 1; however all of the registrants must address post-production reactions between ingredients, migration of components of packaging materials, carry-over of contaminants from production equipment, and process quality control measures for their product.
6. Miles, Hoechst, and Morflex have responded to data requirements for their technical products listed in Footnote 1; however five or more recent representative samples must be analyzed for the amount of active ingredient and each impurity present at 0.1% or greater for each of these products individually. MGK has adequately responded for its 99.9% T.
7. As required by 40 CFR §158.190 and more fully described in the Pesticide Assessment Guidelines, Subdivision D, Guidelines Reference Nos. 63-2 through 63-13, data must be submitted on physicochemical characteristics (color, physical state, odor, melting point, boiling point, specific gravity, solubility, vapor pressure, dissociation constant, octanol/water partition coefficient, pH, and stability). There are additional data requirements listed in Table B pertaining to physicochemical characteristics of those technical products which are also manufacturing use products.
8. MGK and Morflex have not responded to data requirements for their technical products listed in Footnote 1; all data are required. Miles and Hoechst have adequately responded for their 99.9% Ts.
9. Data on melting point are not required since the technicals are a liquid at room temperature.

TABLE A. (Continued).

10. Miles, Hoechst, Morflex and MGK have not responded to data requirements for their technical products listed in Footnote 1; data on boiling point are required for these products.
11. Hoechst and Morflex have not responded to data requirements for their technical products listed in Footnote 1; all data are required. Miles has responded for its 99.9% T, but must submit the raw data to support the reported solubility information. MGK has also responded for its 99.9% T, but in addition must submit data using representative polar and nonpolar solvents.
12. Miles, Hoechst, Morflex, and MGK have not responded to data requirements for their technical products listed in Footnote 1; data are required from all registrants.
13. Morflex and Hoechst have not responded to data requirements for their technical products listed in Footnote 1; all data are required. Miles has responded for its 99.9% T; however the raw data and methods used must be submitted. MGK has adequately responded for its 99.9% T.
14. Data on pH are not required since the technical chemical is not dispersible in water.



TABLE B. PRODUCT SPECIFIC DATA REQUIREMENTS FOR DEET MANUFACTURING-USE PRODUCTS.<sup>1</sup>

| Data Requirement                                           | Test Substance <sup>2</sup> | Does EPA have data to satisfy this requirement? | Bibliographic Citation <sup>3</sup>                                | Must additional data be submitted under FIFRA Sec. 3(c) (2) (B)? |
|------------------------------------------------------------|-----------------------------|-------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------|
| <u>40 CFR §158.155-190 Product Chemistry</u>               |                             |                                                 |                                                                    |                                                                  |
| <u>Product Composition</u>                                 |                             |                                                 |                                                                    |                                                                  |
| 61-1. Product Composition                                  | MP                          | Partially                                       | <u>40158601</u>                                                    | Yes <sup>4</sup>                                                 |
| 61-2. Beginning Materials & Production/Formulation Process | MP                          | Partially                                       | <u>00155132</u>                                                    | Yes <sup>5</sup>                                                 |
| 61-3. Formation of Impurities                              | MP                          | Partially                                       | <u>40140501</u>                                                    | Yes <sup>6</sup>                                                 |
| <u>Analysis and Certification of Product Ingredients</u>   |                             |                                                 |                                                                    |                                                                  |
| 62-1. Preliminary Analysis                                 | MP                          | Partially                                       | <u>00155132</u> <u>40140501</u><br><u>40158601</u>                 | Yes <sup>7</sup>                                                 |
| 62-2. Certified Limits                                     | MP                          | Partially                                       | <u>40158601</u>                                                    | Yes <sup>8</sup>                                                 |
| 62-3. Enforcement Analytical Methods                       | MP                          | Partially                                       | <u>40140501</u> <u>40158601</u>                                    | Yes <sup>9</sup>                                                 |
| <u>Physical and Chemical Characteristics<sup>10</sup></u>  |                             |                                                 |                                                                    |                                                                  |
| 63-2. Color                                                | MP                          | Partially                                       | <u>00149979</u> <u>00152588</u>                                    | Yes <sup>11</sup>                                                |
| 63-3. Physical State                                       | MP                          | Partially                                       | <u>00149979</u> <u>00152588</u>                                    | Yes <sup>11</sup>                                                |
| 63-4. Odor                                                 | MP                          | Partially                                       | <u>00149979</u> <u>00152588</u>                                    | Yes <sup>11</sup>                                                |
| 63-7. Density, Bulk Density, or Specific Gravity           | MP                          | Partially                                       | <u>00149979</u> <u>00152588</u>                                    | Yes <sup>11</sup>                                                |
| 63-12. pH                                                  | MP                          | Yes                                             | <u>00149979</u>                                                    | No <sup>12</sup>                                                 |
| 62-14. Oxidizing or Reducing Action                        | MP                          | Partially                                       | <u>00155132</u>                                                    | Yes <sup>13</sup>                                                |
| 62-15. Flammability                                        | MP                          | Partially                                       | <u>00152588</u>                                                    | Yes <sup>14, 15</sup>                                            |
| 63-16. Explosibility                                       | MP                          | Partially                                       | N/A                                                                | Yes <sup>14, 16</sup>                                            |
| 63-17. Storage Stability                                   | MP                          | Partially                                       | <u>00149979</u> <u>00152588</u><br><u>00163059</u> <u>40750101</u> | Yes <sup>17</sup>                                                |
| 63-18. Viscosity                                           | MP                          | Partially                                       | <u>00155132</u>                                                    | Yes <sup>14, 18</sup>                                            |
| 63-19. Miscibility                                         | MP                          | N/A                                             | N/A                                                                | No <sup>19</sup>                                                 |

(Continued, footnotes follow)

TABLE B. (Continued).

| Data Requirement                 | Test Substance | Does EPA have data to satisfy this requirement? | Bibliographic Citation                      | Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)? |
|----------------------------------|----------------|-------------------------------------------------|---------------------------------------------|----------------------------------------------------------------|
| 63-20. Corrosion Characteristics | MP             | Partially                                       | <u>00149979 00163059</u><br><u>40750101</u> | Yes <sup>14</sup>                                              |
| <u>Other Requirements:</u>       |                |                                                 |                                             |                                                                |
| 64-1. Submittal of Samples       | N/A            | N/A                                             | N/A                                         | No                                                             |

1. Data requirements pertain to the 99.9% technical products registered to the following companies: Miles Laboratories, Inc. (EPA Reg. No. 121-17), Hoechst Celanese Corp. (EPA Reg. No. 8340-39), Morflex Chemical Company, Inc. (EPA Reg. No. 51147-1), and McLaughlin Gormley King Company (MGK) (EPA Reg. No. 1021-891). Requirements also pertain to the following FIS (EPA Reg. Nos. follow): the Morflex 75% FI (51147-2) and the MGK 94.6% FI (1021-1354), 90.0% FI (1021-1355), 86.0% FI (1021-1276), 83.34% FI (1021-1201), 83.33% FI (1021-1214), 80.0% FI (1021-1312), 76.93% FI (1021-1111), 76.92% FI (1021-1290), 70.0% FI (1021-567), 70.0% FI (1021-1144), 66.67% FI (1021-737), 60.0% FI (1021-971), 50.0% FI (1021-1070), 41.67% FI (1021-1200), 40.0% FI (1021-512), 40.0% FI (1021-886), 17.5% FI (1021-535), and 5.0% FI (1021-511). Additional data requirements are listed in the preceding Table A, "Generic Data Requirements for the DEET Technical Grade of the Active Ingredient".

2. Test substance: PAI = purified active ingredient; TGAI = technical grade of the active ingredient; MP = manufacturing-use product.

3. Underlining indicates documents that have been reviewed in this Update document.

4. MGK has not responded to data requirements for the following FIS: 94.6%, 90%, 83.34%, 83.33%, 76.93%, 70% (EPA Reg. No. 1021-1144), 60%, 50%, 41.67%, both 40%, and 5%; all data are required for these products. Miles, Hoechst, Morflex, and MGK have responded to data requirements for their 99.9% technical products listed in Footnote 1; however, all of the registrants must submit a nominal concentration for DEET, as well as the identity, purpose, and nominal concentrations of all other ingredients present at ≥0.1% by weight in their products. Morflex and MGK have adequately responded for the Morflex 75% FI and the following MGK FIS: 86%, 80%, 76.92%, 70% (EPA Reg. No. 1021-567), 66.67%, and 17.5%. However, if the label of the technical

TABLE B. (Continued).

products are amended to more accurately reflect the mean concentration of DEET in the technical product, new CSFs will be required for the related FIs.

5. MGK has not responded to data requirements for the following FIs: 94.6%, 90%, 83.34%, 83.33%, 76.93%, 70% (EPA Reg. No. 1021-1144), 60%, 50%, 41.67%, both 40%<sub>s</sub>, and 5%; all data are required for these products. Miles, Morflex, and MGK have not responded to data requirements for their 99.9% technical products listed in Footnote 1; all data are required. Hoechst has responded for its 99.9% T; however, they must verify that neither the manufacturing process nor the location of manufacture has changed since the transfer of ownership on 4/89 from Virginia Chemicals; otherwise all data would be required. Morflex and MGK have adequately responded for the Morflex 75% FI and the following MGK FIs: 86%, 80%, 76.92%, 70% (EPA Reg. No. 1021-567), 66.67%, and 17.5%.
6. MGK has not responded to data requirements for the following FIs: 94.6%, 90%, 83.34%, 83.33%, 76.93%, 70% (EPA Reg. No. 1021-1144), 60%, 50%, 41.67%, both 40%<sub>s</sub>, and 5%; all data are required for these products. Morflex has not responded for its 75% FI; all data are required. The Deet Joint Venture has responded for the Miles, Hoechst, Morflex, and MGK 99.9% technical products; however the registrants must submit a discussion regarding post-production reactions between ingredients, migration of components of packaging materials, carry-over of contaminants from production equipment, and process quality control measures. MGK has adequately responded for the following MGK FIs: 86%, 80%, 76.92%, 70% (EPA Reg. No. 1021-567), 66.67%, and 17.5%.
7. Miles, Hoechst, and Morflex have responded to data requirements for their 99.9% technical products listed in Footnote 1; however five or more recent representative samples must be analyzed for the amount of active ingredient and each impurity present at 0.1% or greater for each of these products individually. MGK has adequately responded for its 99.9% T.
8. MGK has not responded to data requirements for the following FIs: 94.6%, 90%, 83.34%, 83.33%, 76.93%, 70% (EPA Reg. No. 1021-1144), 60%, 50%, 41.67%, both 40%<sub>s</sub>, and 5%; all data are required for these products. MGK has responded for the following FIs: 86% FI (CSF dated 3/15/90), 80% FI (CSF dated 3/15/90), 76.92% FI (CSF dated 3/15/90), 70% FI (EPA Reg. No. 1021-567; CSF dated 3/15/90), and 66.67% FI (CSF dated 3/30/90); however an explanation as to why the certified limits for DEET exceed the range of standard certified limits is required. Morflex has responded for its 75% FI; however upper and lower certified limits for the active and inert ingredients are required. Miles has responded for its 99.9% T; however a lower and upper certified limit for each isomer of the active ingredient must be submitted. Hoechst has responded for its 99.9% T; however the registrant must submit upper certified limits for the active ingredients, including for

TABLE B. (Continued).

each individual isomer and lower certified limits for each individual related isomer of the active ingredient. Morflex has responded for its 99.9% T; however the following information are required: (i) an upper certified limit for the meta-isomer (active ingredient); (ii) an upper certified limit for an impurity; (iii) an explanation on how the upper limits were established, and (iv) lower certified limits for the ortho- and para-isomers of the active ingredient. MGK has responded for its 99.9% T; however the registrant must submit lower and upper certified limits for all of the active ingredients, including the related isomers. We note that the ortho- and para-isomers of DEET are considered to be active ingredients since they are grouped under the same Pesticide Chemical Code as the meta-isomer; therefore, upper and lower certified limits are required for each of these ingredients. If the label of the technical product is amended to more accurately reflect the mean concentration of DEET in the technical product, a new CSF for the related FIs will be required to reflect this change in the certified limits. Certifications must be submitted on EPA Form 8570-4 (Rev. 2/85).

9. The DEET Joint Venture on behalf of the members (Miles, MGK, Morflex, and Virginia Chemical thus Hoechst) has responded to the data requirements for the products listed in Footnote 1; however information regarding accuracy and precision of the submitted methods is required.
10. As required in 40 CFR §158.190 and more fully described in the Pesticide Assessment Guidelines, Subdivision D, Guidelines Reference Nos. 63-2 through 63-20, data must be submitted on physicochemical characteristics of each manufacturing-use product (color, physical state, odor, specific gravity, pH, oxidizing or reducing action, flammability, explosibility, storage stability, viscosity, miscibility, and corrosion characteristics). Additional data requirements regarding physicochemical properties of manufacturing-use products which contain only the technical grade of the active ingredient are listed in Table A, "Generic Data Requirements for the DEET Technical Grade of the Active Ingredient."
11. Adequate data have been submitted in response to the data requirements for the Hoechst and Miles 99.9% Ts, the Morflex 75% FI, and the following MGK products: 86% FI; 80% FI; 70% FI (EPA Reg. No. 1021-567); 66.67% FI; and the 17.5% FI. The registrants of all other products listed in Footnote 1 have not responded to data requirements; all data are required for these products.
12. Data on pH are not required since the test substances are not dispersible in water.
13. Adequate data have been submitted in response to the data requirements for the Hoechst 99.9% T and the following MGK products: 86% FI; 80% FI; 70% FI (EPA Reg. No. 1021-567); 66.67% FI; and the 17.5% FI. The

TABLE B. (Continued).

registrants of all other products listed in Footnote 1 have not responded to data requirements; data are required on oxidizing/reducing potential if the product contains an oxidizing or reducing agent.

14. Adequate data have been submitted in response to data requirements for the Hoechst 99.9% T, the Morflex 75% FI, and the following MGK FIs: the 86% FI; 80% FI; 76.92% FI; 70% FI (EPA Reg. No. 1021-567); 66.67% FI; and the 17.5% FI. The registrants of all other products listed in Footnote 1 have not responded to data requirements; all data are required for these products.

15. Data are required on flammability if the product contains combustible liquids.

16. Data are required if the product is potentially explosive.

17. Miles and Hoechst have responded to data requirements for their 99.9% Ts; however the raw data and conditions used are required. MGK has responded for its 70% FI (EPA Reg. No. 1021-567); however the registrant must submit a storage stability study in which the formulated product is stored in a container similar to those that will be used in the trade for a period of one year at warehouse temperatures and humidity. The registrants of all other products listed in Footnote 1 have not responded to data requirements; all data are required for these products.

18. Data on viscosity are required if the product is a liquid.

19. Data on miscibility are required if the product is an emulsifiable liquid and is to be diluted with petroleum solvents. These data were not required by the Amended DEET Registration Standard.

N,N-DIETHYL-M-TOLUAMIDE (DEET)

REGISTRATION STANDARD UPDATE

PRODUCT CHEMISTRY

TASK 4

(Final Report)

CONFIDENTIAL APPENDICES

Appendix A: 11 Page(s)  
Appendix B: 2 Page(s)  
Appendix C: 3 Page(s)  
Appendix D: 5 Page(s)  
Appendix E: 1 Page(s)

Confidential Appendices to the Scientific Review of the Registration Standard Update Report for the pesticide DEET by the Dietary Exposure Branch [Confidential FIFRA Trade Secret/CBI].