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**DYNAMAC**  
CORPORATION

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**NALED**

## **Task 2: Topical Discussions**

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**Submitted to:**

Environmental Protection Agency  
Arlington, Virginia 22202

**Submitted by:**

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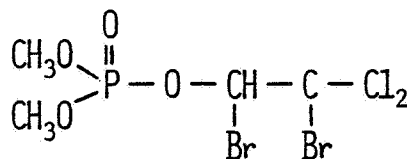
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Task 2

NALED, BROMEX, DIBROM, RE 4355



1,2-Dibromo-2,2-dichloroethyl dimethyl phosphate

Data requirements are cited from EPA's Guidelines for Registering Pesticides (1981).

(1) DEGRADATION 163.161

(A) Hydrolysis 163.161-1

Hydrolysis data are required to support the registration of each end-use product intended for outdoor use or aquatic impact use, and each manufacturing-use product that may legally be used to formulate such an end-use product.

One hydrolysis study was reviewed and found to be invalid.

Data Gaps

All data specified in Section 163.161-1 are needed to assess the hydrolysis of naled.

(B) Photodegradation in Water 163.161-2

A photodegradation study in water is required to support the registration of each end-use product intended for terrestrial (except greenhouse and domestic outdoor), aquatic, and forestry use and for any aquatic impact use which results in direct discharges into the aquatic environment. Such

a study is also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

No data on the photodegradation of naled in water are available.

#### Data Gaps

All data specified in Section 163.161-2 are needed to evaluate the photodegradation of naled in water.

#### (C) Photodegradation on Soil 163.161-3

Photodegradation studies on soil surfaces are required to support the registration of each end-use product intended for orchard crop use, field and vegetable crop use, or forestry use. Such studies are also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product. However, uses involving injection of the product into the soil or incorporation of the product into the soil upon application are not subject to the requirements of this section.

No data on the photodegradation of naled on soil are available.

#### Data Gaps

All data specified in Section 163.161-3 are needed to assess the photodegradation of naled on soil.

#### (D) Photodegradation in Air 163.161-4

Data from a laboratory photodegradation study in the vapor phase will be required on a case-by-case basis to support the registration of an end-use product that demonstrates a high potential for volatilization and is also intended for any greenhouse use, orchard crop use, or field and vegetable crop use involving potentially significant exposure to workers. Data from such a study or studies will also be required to support

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the registration of a manufacturing-use product which legally could be used to make such an end-use product.

No data on the photodegradation of naled in air are available.

Data Gaps

All data specified in Section 163.161-4 may be needed to assess the photodegradation of naled in air.

(2) METABOLISM 163.162

Data on metabolism are required to determine the nature and availability of pesticide residues to rotational crops and to help in the assessment of potential disposal and reentry hazards.

(A) Aerobic Soil 163.162-1

An aerobic laboratory soil metabolism study is required to support the registration of each end-use product intended for terrestrial or forestry use. Such a study is also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

One aerobic soil metabolism study was reviewed and found to be valid. Additionally, one microbiological study was reviewed and contained valid data that may be used to supplement soil metabolism data.

Naled (formulation unspecified), at 10 ppm, rapidly degraded in sand, loam, silt, sandy loam, and sterile sandy loam soils (soil characteristics in Table 1) incubated at 80% field capacity and room temperature, with half-lives of 2.6, 4.0, 3.1, 1.4, and ~4-5 hours, respectively (00074759). The degradate dichlorvos (DDVP) was detected in all soils, at a maximum concentration of ~10% of the applied naled within 24 hours after application. DDVP applied at 10 ppm degraded rapidly with half-life values of 2.3, 3.5, 5.6, and 8.0 hours in silt, sandy loam, loam, and sand soils, respectively, incubated at 80% field capacity and room temperature.

Naled, at 2 ppm, had little or no effect on the respiration of Azotobacter vinelandii (as determined by O<sub>2</sub> uptake); however at 100 ppm respiration was inhibited ~90% (05005579). DDVP (a degradate of naled), at 2 and 100 ppm, inhibited respiration by ~29 and 57%, respectively.

Data Gaps

All data specified in Section 163.162-1 are needed to assess the aerobic soil metabolism of naled.

## References

Leary, J.B. 1970. Decomposition of naled and DDVP in soils. File No. 721.2. Unpublished study received Nov. 27, 1970 under unknown Admin. No.; submitted by Chevron Chemical Co., Richmond, CA; CDL:120336-A. (00074759)

MacRae, I.C., and J.S. Celo. 1974. The effects of organophosphorus pesticides on the respiration of Azotobacter vinelandii. Soil Biol. Biochem. 6(2): 109-111. (05005579)

### (B) Anaerobic Soil 163.162-2

An anaerobic soil metabolism study is required to support the registration of each end-use product intended for field or vegetable crop use. Such a study is also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product. However, an anaerobic soil metabolism study shall not be required if an anaerobic aquatic metabolism study has been conducted in accordance with the requirements of Section 163.162-3.

No data on the anaerobic soil metabolism of naled are available.

## Data Gaps

All data specified in Section 163.162-2 are needed to assess the anaerobic soil metabolism of naled.

### (C) Anaerobic Aquatic 163.162-3

An anaerobic aquatic metabolism study is required to support the registration of each end-use product intended for aquatic use, forestry use, or for any aquatic impact use which results in direct discharges into the aquatic environment. Such a study is also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product. The anaerobic soil metabolism study in Section 163.162-2 may not be substituted for this study.

No data on the anaerobic aquatic metabolism of naled are available.

Table 1. Characteristics of soils used in naled soil metabolism studies.

Soil type	Moisture (%)	Clay (%)	Silt (%)	Sand (%)	Field capacity (%)	pH
Sand	0.17	0.9	1.8	97.3	21.5	6.8
Loam	1.1	1.9	43.2	54.9	31.5	5.0
Silt	8.0	6.8	88.0	5.2	42.5	5.2
Sandy loam	3.2	3.0	24.0	73.0	27.5	8.1

From 00074759.



#### Data Gaps

All data specified in Section 163.162-3 are needed to assess the anaerobic aquatic metabolism of naled.

#### (D) Aerobic Aquatic 163.162-4

An aerobic aquatic metabolism study is required to support the registration of each end-use product intended for aquatic use or for any aquatic impact use which results in direct discharges into the aquatic environment. Such a study is also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

Three studies were reviewed and considered valid. Two of these studies were combined into a single review because one study (00074885) described the analytical method used in the other (00074691).

Naled (formulation unspecified) at 100 µg/ml degraded rapidly in aqueous solutions buffered at pH 5.0, 7.0, and 9.0 with half-lives at 21 C of ~25, 16, and 0.25 hours, respectively (00074691 and 00074885). The corresponding values at 37 C were ~6, 4, and 0.05 hours. Leary (00074644) reported that naled (formulation unspecified) at 100 µg/ml degraded rapidly in sewage water samples (pH 7.0) incubated at room temperature, with a half-life of 23 hours. The degradate dichlorvos was found at a maximum concentration of 3 µg/ml, but no information was provided regarding its dissipation.

#### Data Gaps

All data specified in Section 163.162-4 are needed to assess the aerobic aquatic metabolism of naled.

#### References

Chevron Chemical Company. 1969. Analysis of naled and DDVP residues. File No. 740.01. Method RM-3G dated Oct. 31, 1969. Unpublished study received Nov. 30, 1970 under OF0975; submitted by Chevron Chemical Co., Richmond, CA; CDL:095468-A. (00074885)

Leary, J.B. .1971. Rate of hydrolysis of naled in aqueous solution. File No. 721.2. Unpublished study received July 30, 1971 under 1F1111; submitted by Chevron Chemical Co., Richmond, CA; CDL:090881-A. (00074691)

Leary, J.B. 1974. Rate of decay of naled in sewage water. File No. 721.2. Unpublished study received Dec. 30, 1974 under 1769-203; prepared by Chevron Chemical Co., submitted by National Chemsearch, Division of NCH Corp., Irving, TX; CDL:224603-B. (00074644)

(3) MICROBIOLOGICAL

The requirement for the submission of microbiological data is currently being reserved.

(4) MOBILITY 163.163

The movement of pesticide residues by means of leaching through the soil may cause contamination of food, result in a loss of usable land and water resources to man due to contamination of groundwater supplies, or cause habitat loss to wildlife. Therefore, studies are required to ascertain the extent of pesticide leaching through soil, which, in turn, provides a basis for assessing the mobility potential of a pesticide.

(A) Leaching 163.163-1

Data are required to support the registration of each end-use product intended for domestic outdoor use, greenhouse use, terrestrial non-crop use, orchard crop use, field or vegetable crop use, forestry use, aquatic use, and aquatic impact use involving direct discharge only. Such data are also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

For terrestrial non-crop uses, orchard crop uses, field or vegetable crop uses, and forestry uses, the mobility of the test substance and its degradates in soil shall be assessed either by soil thin-layer chromatography, soil column, or batch equilibrium (adsorption/desorption). For domestic outdoor uses, greenhouse uses, aquatic uses, and aquatic impact uses, the mobility of the test substance and its degradates in soil shall be assessed only by batch equilibrium (adsorption/desorption).

One study was reviewed and considered valid.

Naled has an intermediate mobility ( $R_f$  0.41-0.48) in sandy loam, loamy sand, and clay soils, based on soil thin-layer chromatography tests (00064796). However, naled mobility in a clay loam soil is low ( $R_f$  0.28). Dichlorvos (a degradate of naled) is mobile ( $R_f$  0.80) in sandy loam, loamy sand, and clay soils, but has an intermediate mobility ( $R_f$  0.56) in a clay loam soil. Mobility of both compounds appears to decrease as soil organic matter content increases (Table 2).

Table 2. Characteristics of soils used in naled mobility studies.

Soil type	pH	Organic matter (%)	Sand (%)	Silt (%)	Clay (%)	Water holding capacity (%)	CEC (meq/100 g)
Sandy loam	5.6	1.4	68	16	16	13	7.5
Clay loam	7.2	6.7	23	40	37	38	21
Loamy sand	7.3	1.4	85	6	9	2.4	7.5
Clay	4.5	2.4	28	26	46	34	25

From 00064796.

This study partially fulfills the data requirements in Section 163.163-1 by providing information on the mobility of unaged naled and its degradate dichlorvos in soils ranging in texture from loamy sand to clay.

#### Data Gaps

Aged leaching (to study degradates other than dichlorvos) and batch equilibrium (adsorption/desorption) studies, as specified in Section 163.163-1, are needed to fully assess the mobility of naled in soil.

#### Reference

Pack, D.E. 1980. Mobility of naled and dichlorvos in soil as determined by soil thin-layer chromatography. File No: 722.2. Unpublished study received Oct. 20, 1980 under 239-1633; submitted by Chevron Chemical Co., Richmond, CA; CDL:243547-A. (00064796)

#### (B) Laboratory Volatility 163.163-2

A laboratory volatility study is required to support the registration of each end-use product intended for greenhouse use. Laboratory volatility studies may also be required on a case-by-case basis to support the registration of each end-use product intended for use in open agricultural sites such as fields and groves. Such studies are also required to support the registration of each manufacturing-use product which legally could be used to make any end-use product for which laboratory volatility data are required.

No data are available on the volatility of naled under laboratory conditions.

#### Data Gaps

All data specified in Section 163.163-2 may be needed to assess the volatility of naled under laboratory conditions.

(C) Field Volatility 163.163-3

A volatility study conducted in a greenhouse and/or in the field will be required on a case-by-case basis for those pesticides that demonstrate a high potential for volatilization in the laboratory volatility study.

No data are available on the volatility of naled under field conditions.

Data Gaps

All data specified in Section 163.163-3 may be needed to assess the volatility of naled under greenhouse and/or field conditions.

(5) DISSIPATION 163.164

(A) Field Dissipation - Terrestrial 163.164-1

A terrestrial field dissipation study is required to support the registration of each end-use product intended for any terrestrial use (except greenhouse use). Such data are also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

No data are available on the terrestrial field dissipation of naled.

Data Gaps

All data specified in Section 163.164-1 are needed to assess the terrestrial field dissipation of naled.

(B) Field Dissipation - Aquatic and Aquatic Impact 163.164-2

An aquatic field dissipation study is required to support the registration of each end-use product intended for aquatic food crop uses, aquatic non-crop uses, and for any aquatic impact use which results in direct discharges into the aquatic environment. Such a study is also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

One study was reviewed and considered valid.

Naled (Skychoda, 34.9% ai, formulation unspecified) dissipated rapidly in sewage water following addition of ~5 ppm to a trickling filter in a sewage treatment plant (00074645). A maximum of 0.04 ppm was detected in samples taken at the filter exit 20 minutes after treatment. No naled (<0.015 ppm) was detected after 24 hours. The breakdown products dichlorvos and dichloroacetaldehyde were detected at the filter exit at maximum concentrations of 0.4 and 0.04 ppm, respectively, 20 minutes after treatment, but neither compound was found in samples taken 24 hours after treatment (dichloroacetaldehyde detection limit 0.009 ppm).



### Data Gaps

All data specified in Section 163.164-2 are needed to assess the aquatic field dissipation of naled.

### Reference

Leary, J.B., and M.D. Miesch, Jr. 1974. National Chemsearch Skychoda fate of naled in a sewage treatment plant. File No. 721.2. Unpublished study received Dec. 30, 1974; May 12, 1976 under 1769-203; prepared by Chevron Chemical Co., submitted by National Chemsearch, Division of NCH Corp., Irving, TX; CDL:224603-C. (00074645)

#### (C) Dissipation - Forestry 163.164-3

Field dissipation studies for forestry uses are required to support the registration of each end-use product intended for forestry use and of each manufacturing-use product which legally could be used to make such an end-use product.

No data are available on the dissipation of naled in forests.

### Data Gaps

All data specified in Section 163.164-3 are needed to assess the dissipation of naled in forests.

#### (D) Dissipation - Combinations and Tank Mixes 163.164-4

A laboratory or field soil dissipation study may be required on a case-by-case basis to support the registration of an end-use product containing more than one active ingredient, intended for use as a component in tank mixtures, or customarily applied serially with another pesticide product.

No data on the dissipation of multiple active ingredient formulations of naled are available.

Data requirements for combinations and tank mixes containing naled are not cited here because this standard deals only with the single active ingredient.

(E) Dissipation - Long Term 163.164-5

A long-term soil dissipation study will be required to support the registration of the end-use products of any pesticide that has been shown not to readily dissipation in a soil environment. Such a study may also be required to support the registration of any manufacturing-use product that legally could be used to make such an end-use product.

No data on the long-term soil dissipation of naled are available.

Data Gaps

All data specified in Section 163.164-5 may be needed to assess the long-term soil dissipation of naled.

(6) ACCUMULATION 163.165

(A) Confined Accumulation - Rotational Crops 163.165-1

Confined accumulation studies on rotational crops are required to support the registration of each end-use product intended for field or vegetable crop use, aquatic crop use, or use on any other site on which it is reasonably foreseeable that any food or feed crop may be produced after application of a pesticide. Such studies are also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

No data are available on the accumulation of naled in rotational crops under confined conditions.

Data Gaps

All data specified in Section 163.165-1 are needed to assess the accumulation of naled in rotational crops under confined conditions.

(B) Field Accumulation - Rotational Crops 163.165-2

A field accumulation study to determine the uptake of soil residues by rotational crops is required when the confined accumulation study, Section 163.165-1, identifies the  $^{14}\text{C}$  residues in the crop as either parent compound, closely-related degradates, metabolites, and/or their conjugates.

No data on the accumulation of naled in rotational crops under field conditions are available.

Data Gaps

All data specified in Section 163.165-2 may be needed to assess the accumulation of naled in rotational crops under field conditions.

(C) Accumulation - Irrigated Crops 163.165-3

A study of residue accumulation in irrigated crops under actual field use conditions is required to support the registration of each end-use product intended for aquatic food crop or aquatic non-crop uses, for uses in and around holding ponds used for irrigation purposes, or for uses that involve effluents and other discharges which in turn are used to irrigate crops. Such a study is also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

No data on the accumulation of naled in irrigated crops are available.

Data Gaps

All data specified in Section 163.165-3 are needed to assess the accumulation of naled in irrigated crops.

(D) Laboratory Studies - Fish 163.165-4

A fish accumulation study is required to support the registration of each end-use product intended for outdoor use (except domestic outdoor and greenhouse uses), or aquatic impact use resulting in direct discharge into aquatic environments, and for each manufacturing-use product that legally could be used to produce such a product, except when the criteria below are satisfied.

Fish accumulation data will not normally be required in situations where the registrant can offer acceptable evidence showing that the active ingredient and/or its principal degradation product(s):

- Will not reach water, or
- Will not persist in water (i.e., a half-life of approximately 4 days or less) and has properties suggesting:
  - A relatively low potential for accumulation in fish (i.e., an octanol/water partition coefficient less than ~1,000) or
  - A lack of accumulation in the organs and tissues of mammals or birds.

One study was reviewed and found to be valid.

Naled did not accumulate in whole body tissues of killifish (Fundulus heteroclitus) following exposure to naled (Dibrom 14 EC, 85% ai) at 0.031, 0.063, and 0.127 ppm in static bioassay tests (sea water: pH 7.3-7.5; dissolved oxygen content 6.6-7.8 mg/l; daily temperature range 10-17 C) (00074643). Naled was not detected (<0.02 ppm) in any fish tissue sample taken over the 7 day test period, however, the degradate dichlorvos (DDVP) was found at a maximum concentration of 0.04 ppm (approximately twice the concentration in corresponding water samples) 1 hour after treatment. DDVP was not found (<0.01 ppm) in tissue samples taken 24 hours after treatment. The half-life of naled in water samples was <24 hours. DDVP was found in all water samples, at a maximum concentration of ~0.02 ppm 24 hours after treatment. DDVP was not detected (<0.01 ppm) in water samples taken 7 days postapplication.

No data on the accumulation of naled in fish are required because naled has a half-life of <4 days in water and an octanol/water partition coefficient of <1,000.

#### Reference

Pack, D.E. 1976. Residues of naled and DDVP in aquatic organisms living in Dibrom 14 treated water. File No. 721.11/Dibrom S-249. Includes method RM-3G-3 dated Feb. 23, 1973. Unpublished study, including letter dated March 24, 1976 from J.B. Leary to Michael L. Paulson, received April 8, 1976 under 1769-203; prepared by Chevron Chemical Co., submitted by National Chemsearch, Division of NCH Corp., Irving, TX; CDL:224602-A. (00074643)

#### (E) Field Accumulation - Aquatic Non-Target 163.165-5

Field accumulation studies in aquatic non-target organisms are required to support the registration of each end-use product:

- Which is intended for forestry use, aquatic non-crop use, or aquatic impact use that results in direct discharges;

- For which data from a laboratory fish accumulation study are required by Section 163.164-4; and
- For which no tolerance or action level for fish has been granted.

Such studies are also required to support the registration of each manufacturing-use product which legally could be used to make such an end-use product.

No data on the accumulation of naled in aquatic non-target organisms are available.

No data on the accumulation of naled in aquatic non-target organisms are required because laboratory fish accumulation studies are not required.

(7) REENTRY (SUBPART K)

Reentry data may be required to support the registration of manufacturing-use and end-use naled. Requirements will be decided on a case-by-case basis.

California has established a safe reentry interval for naled of 24 hours for citrus, peaches, nectarines, and grapes. Naled has been reported to cause skin irritation (Mick et al. No MRID).

Data Requirements

General

For each crop the registrant must propose an acceptable reentry interval; this proposed interval may be based on any of the following: (a) the longest (most restrictive) existing reentry intervals (b) data on dissipation of foliar residues (decline curve), on human exposure to those residues, and on the inherent toxicity of the chemical; (c) determination of that time beyond which there are no detectable foliar residues (under appropriate climatic conditions) in the area where the chemical will be applied.

Specific

Either the longest (most restrictive) reentry interval is acceptable, or the exposure data and a dislodgeable residue curve, together with the inherent toxicity of the chemical, may be used to establish an appropriate interval for activities that result in foliar contact.

[The longest (most restrictive) reentry intervals will be listed by crop.]

Data Gaps

For each crop, "See general data requirements in the topical discussions."

Reference

Mick et al. 1970. A case report. Occupational exposure to the insecticide naled. J. Iowa Med. Soc. June, 395-396. (No MRID)