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(TDR03B)

DATA EVALUATION RECORD

PAGE 1 OF

CASE GSO140

ALDICARB

PM

9/29/82

CHEM 098301

BRANCH EEB

DISC

TOPIC

Special Order

FORMULATION 00 Active Ingredient

FICHE/MASTER ID 00066341

CONTENT CAT 01

U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence As Related To Marine Environments: (Unpublished study) Environmental Research Laboratory, U.S. Environmental Protection Agency, Gulf Breeze, Florida EPA-600/4-81-041. (00066341).

SUBST. CLASS = S

OTHER SUBJECT DESCRIPTORS

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START DATE 10/17/83

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REVIEWED BY: Charles Bowen II
TITLE: Fisheries Biologist
ORG: EEB
LOC/TEL:

SIGNATURE:

DATE: 12/8/83

REVIEWED BY:
TITLE:
ORG:
LOC/TEL:

SIGNATURE:

DATE:

Chemical: Aldicarb

Formulation: Technical (99.8% A.I.)

Citation: U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence As Related To Marine Environments: (Unpublished study) Environmental Research Laboratory, U.S. Environmental Protection Agency, Gulf Breeze, Florida EPA-600/4-81-041. (00066341).

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test Type: 48-hour static marine bioassay

A. Species - Oyster embryos (Crassostrea virginica)

Report Results:

	<u>95% C.L.</u>
48-hour EC ₅₀ = 8,800 ppb	(1,400-56,000)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is toxic to marine invertebrates. This study will fulfill the requirements for a 48-hour oyster embryo-larvae bioassay.

METHODS AND MATERIALS

TEST ORGANISMS

All test organisms, except the oyster (Crassostrea virginica), post-larval penaeid shrimp (Penaeus stylirostris), and Atlantic silversides (Menidia menidia), used in toxicity tests described herein were either cultured at ERL, GB or BMRL, or collected from estuarine areas adjacent to these laboratories. Adult oysters were collected from Ocean Springs, Mississippi, and conditioned at BMRL in flowing, unfiltered seawater. P. stylirostris postlarvae were purchased from Ralston Purina's Marine Research Center, Crystal River, Florida; Atlantic silversides embryos were shipped from Wadmalaw Island, South Carolina.

All foods given to test animals during culture, holding, and testing at ERL, GB were analyzed chemically for chlorinated hydrocarbon content and contained less than 0.1 ug/g (micrograms per gram, wet weight). Mysid shrimp were fed living Artemia sp. nauplii. P. pugio were fed living Artemia sp. nauplii and a dry, flake food (nauplii as larvae and both foods as juveniles and adults). P. stylirostris were fed Artemia nauplii and a pelleted experimental food formulated and supplied by Ralston Purina. Pink shrimp (Penaeus duorarum) were fed grouper filets, and fish were fed either dry flake food, frozen adult Artemia, or live Artemia nauplii.

TEST PESTICIDES

Concentrations of pesticide are reported here as micrograms (ug) of pesticide per liter (l) of seawater (parts per billion) or ug of pesticide per gram (g) of tissue, wet weight (parts per million).

TEST WATER

ERL, GB

All seawater used for culture and testing at ERL, GB was pumped by #316 stainless steel pumps from Santa Rosa Sound, Florida, through a coarse sand filter and polypropylene filters (10 to 20 micrometers [μ m] pore size) into the laboratory. Seawater was then adjusted to the appropriate test temperature in reservoirs located near the test apparatus. From the reservoirs, seawater flowed by gravity to the various test systems.

BMRL

All water used for holding, acclimation, and testing was natural seawater pumped from Big Lagoon, Florida. The pump intake was located about 80 meters (m) from shore, at a depth of approximately 3 m.

Test water was pumped by a #316 stainless steel pump through hard polyvinylchloride (PVC) pipe, a fiberglass, sandfilled filter, and 10 μ m polypropylene-core filters into an elevated fiberglass reservoir. Water was aerated continuously and vigorously in the reservoir and flowed by gravity through PVC pipes into the laboratory and the test systems. The salinity of water in tests was that of the incoming water.

ACUTE TOXICITY TESTS

Static Oyster Larval Tests

Methods for the 48-h oyster larvae toxicity tests were based on those of Woelke (1972) and American Society for Testing and Materials Committee E-35 on Pesticides (1978).

For the larval eastern oyster (Crassostrea virginica) studies, individual sexually mature females, held in glass chambers that contained 1 l of filtered (5 μ m) seawater, were induced to spawn by increasing the water temperature from 29 to 35°C. Viable sperm excised from the gonad of a sexually mature male oyster were added to each chamber. Fertilization occurred upon release of the eggs into the spawning chambers and was confirmed microscopically. Fertilization success was 91%. Population density of the embryos was determined by a Sedgwick-Rafter count of 1:10 dilution (1 me embryo suspension to 10 me seawater) of water from the spawning chamber.

Concentrations for definitive tests were based on the results of 48-h range-finding tests. All concentrations and the control were in triplicate. Test containers were 1 l glass jars, each of which contained 900 me of filtered (5 μ m) natural seawater. Test concentrations were prepared by adding appropriate weighed amounts of the pesticide to each test container. If a solvent/carrier was required, the pesticide was dissolved in reagent grade triethylene glycol (TEG) and the appropriate amounts added to the test containers. A solvent control was also maintained to which was added the maximum volume of TEG.

Each test container was inoculated with an estimated 30,000 embryos within 1 h after fertilization, then maintained at $25 \pm 1^\circ\text{C}$ in a light- and temperature-controlled environmental chamber.

After 48-h exposure, the larvae from each container were collected and preserved separately in a constant volume of filtered seawater with neutralized formalin. The number of normally developed 48-h larvae was determined by a Sedgwick-Rafter count from each triplicate test concentration container and each control container.

Percentage reduction of normal embryos was determined as:

Percentage reduction. = $\frac{\text{Number of normal 48-h control embryos} - \text{number of normal 48-h embryos in each test concentration}}{\text{Number of normal 48-h control embryos}} \times 100$

Static Invertebrate and Fish Tests

Test methods used for static 96-h toxicity tests with mysid shrimp, penaeid shrimp, and fish were generally those of The Committee on Methods for Toxicity Tests with Aquatic Organisms (1975). Stock solutions of each pesticide, were prepared by dissolving appropriate quantities of each in TEG. By using Hamilton^R microliter syringes, stocks were added directly to filtered seawater in jars or culture dishes. Solutions were stirred with ten vigorous swirls with a glass rod and allowed to equilibrate in an incubator or water bath for 30 minutes before addition of test animals. Twenty animals were exposed in each concentration of insecticide and in each of two control groups. One control contained seawater and TEG carrier at the same concentration as those used in the test solution chambers; the second control, seawater only. Juvenile M. bahia less than 24-h-old and P. stylirostris postlarvae were fed 48-h-old Artemia larvae during the tests to limit cannibalism or starvation. Mortality was recorded daily, and dead animals were removed when discovered. Test temperature for all studies was 25 + 1°C; test salinity, 20 ‰. Dissolved oxygen values and pH, where monitored, are in Appendix I.

Flow-through Macrocrustacean and Fish Tests

Methods for all 96-h flow-through tests were those described by the Committee on Methods for Toxicity Tests with Aquatic Organisms (1975). Five concentrations and a seawater control were used for aldicarb. Selection of concentrations for each test were generally based on the results of 96-h static tests. Dissolved oxygen values and pH, where monitored, are in Appendix II.

Aldicarb tests were conducted in a closed diluter designed to deliver at a dilution rate of 60%. The test species and test aquaria volumes were: M. bahia, 8.5 e; P. duorarum, 8.5 e; C. variegatus, 53 e; and L. rhomboides, 52 e. At least eight volume additions per day were provided for the crustacean tests; at least two for the fish test. Triethylene glycol was used as a solvent.

Flow-through toxicity tests with mysid shrimp, because of the shrimp's small size, required several modifications in the above procedures (Nimmo et al., 1977). Juvenile mysids were placed in test containers that consisted of glass Petri dishes to which a 150- μ m-high nylon screen collar (210 to 315 μ m mesh opening) was attached with silicone sealant. Test containers were placed in each aquarium, resulting in 20 mysids per treatment. Self-starting siphons in the aquaria caused water depth to fluctuate, ensuring an exchange of water in containers. Mysids were counted by gently lifting containers from the aquaria, draining water through the nylon screen to the depth of the Petri dish, and placing them on a back-lighted table. Mysids were fed 48-h-old Artemia nauplii.

When dissolved oxygen concentrations in water of static and flow-through tests were less than 50% saturation—a violation in the procedures in the method stipulated by The Committee on Methods for Toxicity Tests with Aquatic Organisms (1975)—data were presented in Tables 1, 2, and 3, but were appropriately footnoted.

CHRONIC TOXICITY TESTS

Mysid Shrimp Entire Life-cycle Test

Aldicarb Test (BMRL)

The aldicarb test was conducted in a closed diluter constructed to deliver 0.5 e/cycle/test aquarium at a dilution rate of 60%. The stock solution, prepared with reagent grade TEG (19.5 mg technical aldicarb/100 me TEG), was delivered to the chemical mixing chamber by a 50-me glass syringe to produce five nominal test concentrations that ranged from 0.6 to 5.0 ug/e. A seawater control and a solvent control were maintained.

Sheepshead minnow embryos for the aldicarb embryo-juvenile tests were obtained from fish collected from Big Lagoon, a Gulf of Mexico estuary adjacent to BMRL. Eggs were obtained from females whose egg production was enhanced by injections of human chorionic gonadotrophic hormone on two consecutive days. The eggs were fertilized by the addition of a sperm suspension made from macerated testes excised from adult male fish.

All tests were conducted in an intermittent-flow system by using a proportional diluter (Mount and Brungs, 1967) constructed to deliver 1 e/cycle/test aquarium at a dilution rate of 60%. For each test, a stock solution of the pesticide was delivered into a mixing chamber where it was diluted, then siphoned down into the chemical cells. A Teflon solenoid valve, controlled by a float switch, regulated seawater flow into the water cells. Mixing of uncontaminated dilution seawater with test solution in the chemical cells produced the five concentrations of test solution that were distributed to the appropriate test chambers.

Five concentrations, a control, and a solvent control were all duplicated. Selection of concentrations was based on the results of 96-h flow-through tests.

Light was provided by two 3.7-m fluorescent bulbs suspended 53 centimeters (cm) above the test containers, providing approximately 1,300 lux incident to the water surface. Photoperiod was 12 h.

To begin each test, the diluter cycled for about 4 days to permit system equilibration. Eggs and sperm were obtained as previously described, and within 4 h after visual confirmation of fertilization, two groups of 50 embryos each per treatment were placed randomly in incubator cups (Pyrex^R tubing 51 mm in diameter and 75 mm in length with 315 μ m square mesh nylon screen attached to one end with silicone sealant). The incubator cups were placed into embryo cup holding chambers equipped with automatic siphons which allowed the holding chambers to fill and empty with each diluter cycle. Embryos were removed from each cup by pipette daily, counted, and the cups washed with seawater to clean the screens. This procedure was repeated until all living embryos had hatched. Embryo mortality and time to hatch were recorded. After hatch, 40 juveniles from each replicate were impartially selected and placed in glass chambers (14 cm wide x 20.5 cm high x 26 cm long with 480 μ m square mesh nylon screen over one end). Juveniles were maintained in the growth chambers until the end of the test and fed live brine shrimp (*Artemia salina*) nauplii daily. Survival was monitored daily for 28 days posthatch and any changes in physical appearance of the fish or changes in behavior were recorded. Growth of juveniles (standard length) was determined photographically at the end of the exposure. All surviving fish were collected, pooled according to treatment, wrapped in aluminum foil, placed in a glass jar, and frozen for later chemical analysis.

Diluter function was checked daily by observation and weekly by measurement of toxicant concentration. Water samples were collected every 7 days, starting on Day 1; 450-me samples were taken from both replicates and combined for each treatment.

Salinity and temperature were measured daily, except as noted. The pH and DO concentrations were measured in one duplicate set of test containers daily, except as noted.

Test chambers contained approximately 50 l of control seawater or test solution and there were >2 volume additions every 24 h. The stock solution 0.62 g aldicarb/l of TEG was delivered to the chemical mixing chamber by a 50-me glass syringe to produce the five nominal test concentrations that ranged from 17 to 134 μ g aldicarb/l. Another syringe containing only TEG provided the test with a solvent control.

Number of normal eastern oyster (*Crassostrea virginica*) embryos per milliliter counted following 48 h of exposure to aldicarb in static, unaerated seawater. If all embryos in the initial inoculum had developed, the expected count would have been 739 embryos per milliliter. Salinity was 20 ‰ and temperature, 25±1°C.

Nominal concentration (ug/l)	Number of normal embryos				
	Rep ^a A	Rep B	Rep C	Mean	SD ^b
Control	611	563	592	588	+24
1,000	565	490	552	535	+40
3,200	419	490	501	470	+44
5,600	368	307	373	349	+36
10,000	143	184	212	179	+34
32,000	208	135	164	169	+36

a Rep = replicate

b SD = standard deviation

Toxicity of aldicarb to embryos of eastern oysters (*Crassostrea virginica*) exposed for 48 h in static, unaerated seawater. The criterion of effect was the reduction of the number of normal embryos in test concentrations as compared to the number of normal control embryos. Salinity was 20 ‰ and temperature, 25±1°C.

Nominal concentration (ug/l)	Percentage reduction ^a
Control	-
1,000	9
3,200	20
5,600	41
10,000	70
32,000	71

^apercentage reduction = $\frac{\text{Number of normal 48-h control embryos minus the number of normal 48-h embryos in each test concentration}}{\text{Number of normal 48-h control embryos}} \times 100$

EEB statistical Validation:

The LC₅₀ calculated in-house does not differ significantly from the value reported by the author.

Reviewer's Conclusions:

The conclusions drawn by the author are supported by dose-response mortality data. No deviations from EPA's current guidelines for static bioassays were noted.

Validation Status: Core

Category Repairability: N.A.

Chemical: Aldicarb

Formulation: Technical (99.8% A.I)

Citation: U.S. EPA, 1981. Acephate, aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments: (Unpublished report) Environmental Research Laboratory U.S. Environmental Protection Agency Gulf Breeze, Florida EPA-600/4-81-041. (00066341)

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test Type: 96-hour static marine bioassay

A. Species - White shrimp Penaeus stylirostris

Report Results:

	<u>95% C.L.</u>
96-hour LC ₅₀ = 72 ug/l	(65-82)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is very highly toxic to marine invertebrates. This study will not fulfill the requirements for a 96-hour marine invertebrate.

Methods and Materials:

See oyster embryo larvae study (00066341).

Author's Results:

Test concentrations and mortality of postlarval shrimp (Penaeus stylirostris) exposed to aldicarb in static acute toxicity tests are shown below. Natural seawater was adjusted to 20 ‰; temperature 25±1°C.

Nominal concentration (ug/l)	Mortality (%)			
	24h ^a	48h	72h	96h
Control	3	22	30	35
Carrier control	20	30	43	48
5.6	0	10	10	10
10	0	5	5	5
18	7	20	30	38
32	15	33	37	43
56	34	44	50	58
100	38	58	83	85
180	50	100	100	100

EEB statistical Validation:

The LC₅₀ value calculated in-house does not differ significantly from the value reported by the author.

The conclusions drawn by the author are supported by dose-response mortality data. Deviations from EPA's current guidelines for static marine bioassays are as follows:

1. Control mortality greater than 10%.

Validation Status: Supplemental

Category Repairability: This bioassay is deemed non-repairable due to excessive mortality in both control and carrier control groups.

Chemical: Aldicarb

Formulation: Technical (99.8% A.I.)

Citation: U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, OEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments: (Unpublished report) Environmental Research Laboratory U.S. Environmental Protection Agency Gulf Breeze, Florida EPA-600/4-81-041. (00066341).

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test Type: 96-hour static marine bioassay

A. Species - Mysid shrimp (Mysidopsis bahia)

Report Results:

	<u>95% C.L.</u>
96-hour LC ₅₀ = 13 ug/l	(10-15)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is very highly toxic to marine invertebrates. This study will fulfill the requirements for a 96-hour marine invertebrate.

MATERIALS AND METHODS:

See oyster embryo-larvae study (00066341).

AUTHOR'S RESULTS:

Test concentrations and mortality of mysid shrimp (*Mysidopsis bahia*) exposed to aldicarb in static acute toxicity tests using natural seawater adjusted to 20 ‰; temperature 26±2°C. Twenty animals were tested in each treatment.

Nominal concentration (ug/l)	Mortality (%)			
	24h ^a	48h	72h	96h
Control	0	0	5	15
Carrier control	0	0	0	0
10.0	5	30	45	45
13.5	5	5	30	55
18	50	60	60	60
24	60	70	80	80
32	40	60	75	95
42	80	95	100	100

^aHours.

EEB STATISTICAL VALIDATION:

The LC₅₀ value calculated by EEB does not differ significantly from the value reported by the author.

REVIEWER'S CONCLUSIONS

The conclusions drawn by the author are supported by the dose mortality data. No deviations from EPA's current guidelines for marine bioassays were noted.

VALIDATION STATUS: Core

CATEGORY REPAIRABILITY: N.A.

Chemical: Aldicarb

Formulation: Technical (99.8% A.I.)

Citation: U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments. (Unpublished report) Environmental Research Laboratory U.S. Environmental Protection Agency Gulf Breeze, Florida EPA-600/4-81-041. (00066341).

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test Type: 96-hour flow-through marine bioassay

A. Species - Pinfish Lagodon rhomboides

Report Results:

	<u>95% C.L.</u>
96-hour LC ₅₀ = 80 ug/L	(43-150)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is very highly toxic to fish marine fish. This study will fulfill the requirements for a 96-hour marine fish bioassay.

MATERIALS AND METHODS:

See oyster embryo-larvae bioassay (00066341).

AUTHOR'S RESULTS:

Test concentrations and mortality of pinfish (Lagodon rhomboides) exposed to aldicarb in a flowing seawater test are shown below. Fish size ranged from 53 to 90 mm, standard length; twenty animals were tested in each treatment. Test temperature averaged $22 \pm 1^\circ\text{C}$; salinity ranged from 29 to 32‰.

Nominal concentration (ug/l)	measured	Mortality (%)			
		24h ^a	48h	72h	96h
Control	ND ^b	0	0	0	0
Carrier control	ND	0	0	0	0
52	26	0	0	0	0
86	40	0	0	0	0
140	54	0	0	0	0
240	80	50	80	85	85
400	160	100	100	100	100

^aHours.

^bND = Nondetectable (<0.2 ug/l).

EEB STATISTICAL VALIDATION:

The LC₅₀ value calculated by EEB does not differ significantly from the value reported by the author.

REVIEWER'S CONCLUSIONS

The conclusions drawn by the author are supported by the dose response mortality data. No deviations from EPA's recommended guidelines for static marine bioassays were noted.

VALIDATION STATUS: Core

CATEGORY REPAIRABILITY: N.A.

Chemical: Aldicarb

Formulation: Technical (99.8% A.I.)

Citation: U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments. (unpublished report) Environmental Research Laboratory U.S. Environmental Protection Agency Gulf Breeze, Florida EPA-600/4-81-041. (00066341).

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test Type: 96-hour static marine bioassay

A. Species - Spot Leiostomus xanthurus

Report Results:

96-hour LC₅₀ = 202 ug/L

95% C.L.

(116-293)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is very highly toxic to marine fish. This study will fulfill the requirements for a 96-hour marine fish bioassay.

MATERIALS AND METHODS:

See oyster embryo-larvae bioassay (00066341).

AUTHOR'S RESULTS:

Test concentrations and mortality of spot (Leiostomus xanthurus) exposed to aldicarb in static acute toxicity tests using ten animals per treatment are shown below. Natural seawater was adjusted to 20 ‰; temperature 25 ± 1°C.

Nominal concentration (ug/l)	Mortality (%)			
	24h ^a	48h	72h	96h
Control	0	0	0	
Carrier control	0	10	10	10
100	0	10	20	20
320	60	60	60	60
560	100	100	100	100
1,000	100	100	100	100

^aHours.

EEB STATISTICAL VALIDATION:

The LC₅₀ value calculated in-house does not differ significantly from the value reported by the author.

REVIEWER'S CONCLUSIONS

The conclusions drawn by the author are supported by the dose response mortality data. No deviations from EPA's current guidelines for static marine bioassays were noted.

VALIDATION STATUS: Core

CATEGORY REPAIRABILITY: N.A.

Chemical: Aldicarb

Formulation: Technical (99.8% A.I.)

Citation: U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments. (Unpublished report) Environmental Research Laboratory, U.S. Environmental Protection Agency Gulf Breeze, Florida EPA-600/4-81-041 (00066341).

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test Type: 96-hour flow-through marine bioassay

A. Species - Mysid shrimp (Mysidopsis bahia)

Report Results:

	<u>95% C.L.</u>
96-hour LC ₅₀ = 16 ug/l	(13-20)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is very highly toxic to marine invertebrates. This study will fulfill the requirements for a 96-hour marine invertebrate study.

MATERIALS AND METHODS:

See oyster embryo-larvae bioassay (00066341).

AUTHOR'S RESULTS:

Test concentration and mortality of mysid shrimp (*Mysidopsis bahia*) exposed to aldicarb in a flowing seawater test are shown below. Shrimp size averaged 5 mm, total length; twenty animals were tested in each treatment. Test temperature was 22±1°C; salinity 28 ‰.

<u>Nominal concentration</u>		<u>Mortality (%)</u>			
<u>(ug/l)</u>	<u>measured</u>	<u>24h^a</u>	<u>48h</u>	<u>72h</u>	<u>96h</u>
Control	NO ^b	0	0	0	0
Carrier control	ND	0	0	0	0
6	2.8	0	0	0	0
11	5.4	0	0	0	0
18	9.7	0	0	0	15
30	14.0	5	5	20	40
50	25.0	0	0	25	80

^aHours.

^bNO = Nondetectable (<0.2 ug/l).

EEB STATISTICAL VALIDATION:

The LC₅₀ value calculated by EEB does not differ significantly from the value reported by the author.

REVIEWER'S CONCLUSIONS

The conclusions drawn by the author are supported by the dose response mortality data. No deviations from EPA's recommended guidelines for static marine bioassays were noted.

VALIDATION STATUS: Core

CATEGORY REPAIRABILITY: N.A.

Chemical: Aldicarb

Formulation: Technical (99.8% A.I.)

Citation: U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments. (Unpublished report) Environmental Research Laboratory, U.S. Environmental Protection Agency Gulf Breeze, Florida EPA-600/4-81-041. (00066341).

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test Type: 96-hour flow-through marine bioassay

A. Species - Pink Shrimp Penaeus duorarum

Report Results:

	<u>95% C.L.</u>
96-hour LC ₅₀ = 12 ug/L	(7.5-18)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is very highly toxic to marine fish. This study will fulfill the requirements for a 96-hour marine in fish bioassay.

MATERIALS AND METHODS:

See oyster embryo larvae study (00066341).

AUTHOR'S RESULTS:

Test concentrations and mortality of pink shrimp (*Penaeus duorarum*) exposed to aldicarb in a flowing seawater test are shown below. Shrimp size ranged 19 to 31 mm (rostrum to telson length). Test temperature was 22±1°C; salinity ranged from 28 to 30 ‰.

Nominal concentration (ug/l)	measured	Mortality (%)			
		24h ^a	48h	72h	96h
Control	ND ^b	0	0	0	0
Carrier control	ND	0	0	0	0
13	6.8	0	0	5	5
22	8.6	15	35	45	45
36	16	35	70	70	75
60	23	40	75	75	80
100	41	90	100	100	100

^aHours.

^bND = Nondetectable (<0.2 ug/l).

EEB STATISTICAL VALIDATION:

The LC₅₀ value calculated in-house does not differ significantly from the value reported by the author.

REVIEWER'S CONCLUSIONS

The conclusions drawn by the author are supported by dose response mortality data. No deviations from EPA's recommended guidelines for static marine bioassays were noted.

VALIDATION STATUS: Core

CATEGORY REPAIRABILITY: N.A.

Chemical: Aldicarb

Formulation: Technical (99.8% A.I.)

Citation: U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Paration, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments. (Unpublished report) Environmental Research Laboratory, U.S. Environmental Protection Agency Gulf Breeze, Florida EPA-600/4-81-041. (00066341).

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test Type: 96-hour flow-through marine bioassay

A. Species - Sheepshead minnow (Cyprinodon variegatus)

Report Results:

	<u>95% C.L.</u>
96-hour LC ₅₀ = 41 ug/L	(55-72)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is very highly toxic to marine fish. This study will fulfill the requirements for a 96-hour marine fish.

MATERIALS AND METHODS:

See oyster embryo larvae bioassay (00066341).

AUTHORS'S RESULTS:

Test concentrations and mortality of sheepshead minnows (Cyprinodon variegatus) exposed to aldicarb in a flowing seawater test are shown below. Fish size ranged 10 to 15 mm, standard length. Test temperature was 28 + 1°C; salinity 28 ‰.

Nominal concentration (ug/l)	measured	Mortality (%)			
		24h ^a	48h	72h	96h
Control	ND ^b	0	0	0	0
Carrier control	ND	0	0	0	0
33	12	0	0	0	0
55	29	0	0	0	0
91	46	10	25	25	25
151	68	40	85	85	85
252	120	100	100	100	100

^aHours.

^bND = Nondetectable (<0.2 ug/l).

EEB STATISTICAL VALIDATION:

The LC₅₀ value calculated in-house does not differ significantly from the value reported by the author.

REVIEWER'S CONCLUSIONS

The conclusions drawn by the author are supported by the dose response mortality data. No deviations from EPA's recommended guidelines for static marine bioassays were noted.

VALIDATION STATUS: Core

CATEGORY REPAIRABILITY: N.A.

Chemical: Aldicarb

Formulation: Technical (99.8% A.I.)

Citation: U.S. EPA, 1981. Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments. (Unpublished report) Environmental Research Laboratory, U.S. Environmental Protection Agency Gulf Breeze, Florida EPA-600/4-81-041. (00066341).

Reviewed By: Charles A. Bowen II

Title: Fisheries Biologist

ORG: Ecological Effects Branch (EEB)

Test TYPE: 96-hour static marine bioassay

A. Species - Sheepshead minnow (Cyprinodon variegatus)

Reported Results:

	<u>95% C.L.</u>
96-hour LC ₅₀ = 41 ug/L	(55-72)

Reviewer's Conclusions:

This bioassay is scientifically sound and demonstrates that aldicarb is very highly toxic to marine fish. This study will fulfill the requirements for a 96-hour marine fish study.

MATERIALS AND METHODS:

See oyster embryo-larvae bioassay (00066341).

AUTHOR'S RESULTS:

Test concentrations and mortality of sheepshead minnows (Cyprinodon variegatus) exposed to aldicarb in flowing natural seawater are shown below. Salinity was 28 ‰ and temperature, 28 ± 1°C. Twenty animals were tested in each treatment.

Nominal concentration (ug/l)	Mortality (%)			
	24h ^a	48h	72h	96h
Control	0	0	0	0
Carrier control	0	0	0	0
12.5	0	0	0	0
29.5	0	0	0	0
46.5	10	25	25	25
68.5	40	85	85	85
115.0	100	100	100	100

^aHours.

EEB STATISTICAL VALIDATION:

The LC₅₀ value calculated in-house does not differ significantly from the value reported by the author.

REVIEWER'S CONCLUSIONS

The conclusions drawn by the author are supported by the dose mortality data. No deviations from EPA's current guidelines for marine bioassays were noted.

VALIDATION STATUS: Core

CATEGORY REPAIRABILITY: N.A.