(3-8-96)

DATA EVALUATION RECORD
FRESHWATER FISH EARLY LIFE-STAGE TEST
GUIDELINE 72-4(A)

1. **CHEMICAL:** Alachlor **Shaughnessey #:** 090501

2. **TEST MATERIAL:** Alachlor technical **Purity:**

3. **CITATION:**

Authors: Rhodes, Jon E. and Michelle Muckerman
Title: Early Life-Stage Toxicity of Alachlor to the Rainbow Trout(*Onchorhynchus mykiss*) Under Flow-Through Conditions
Study Completion Date: 6/20/95
Duration of Exposure: 96 days
Laboratory: ABC Laboratories, Columbia, Mo.
Laboratory Report ID: ABC # 42187
Sponsor: Monsanto Chemical Company
MRID No.: 438626-01
Barcode: D221890

4. **REVIEWED BY:** Brian Montague, Fisheries Biologist
Ecological Effects Branch, EFED

Signature: Brian J. Montague Date: 3/7/96

5. **APPROVED BY:** Les Touart PhD, Section Supervisor
Ecological Effects Branch, EFED (7507C)

Signature: Date: 3/8/96

6. **CONCLUSIONS:** The study has shown Alachlor to be highly toxic to rainbow trout when chronically exposed from eggs to 60 days post hatch. Growth(both length and weight) were significantly affected. Survival was also affected at higher dosage levels. No effects were observed on hatch success or time to hatch(avg 36 days all levels). Exopthalmia was noted at 1.63 mg ai/L in some fry as was a 3 day delay in time to swim-up of larvae.

Parameter Effected	LOEC	NOEC
A. Growth(length)	0.388 PPM	0.187 PPM
B. Growth(wet wt.)	0.388 PPM	0.187 PPM
C. Posthatch Srv.(60D)	1.63 PPM	0.809 PPM

7. **ADEQUACY OF THE STUDY:**
A. Classification: Core

B. Rationale: Study was conducted according to EPA accepted methodology and study director's conclusions are supported by the Agency's independent statistical analysis.

C. Reparability: N.A.

8. **MAJOR GUIDELINE DEVIATIONS:** No major guideline deviations were noted. A finer mesh screen is recommended for embryo cups in Agency guidelines. At termination it was discovered that one control fish was missing and that the dilution control had mysterious gained a new occupant. Since the controls were pooled in the laboratory analysis this would have been accounted for in the overall comparisons.

9. **MATERIALS AND METHODS:**

A. Biological System:

Guideline Criteria	Reported Information
Species:	Onchorynchus mykiss
Source	Unfertilized eggs obtained from Mt. Lassen Trout Farms on March 15, 1995.
Age at beginning of test: Embryos 2 to 24 hours old.	Eggs were fertilized 1 hour before intro into incubation cups.
Replicates: Minimum of 20 embryos per replicate cup, 4 replicates per concentration. Minimum of 30 fish per treatment for post-hatch exposure.	30 embryos/cup 4 replicate cups/test level (50 embryos used in dilution control cups)
Post Hatch: % Viability and Hatch Success	76-90% Viable Eggs-Controls 93-100% Egghatch-All levels
Feeding: Feed Schedule and Types of Feed utilized.	12 Days Posthatch-live brine shrimp. 21 Days posthatch-salmon starter added to diet. Finally starter pellets were fed. Feeding-2-3 times per day minimum. Food withheld 24 hours prior to termination.
Counts: Posthatch Fry Counts and Observation Frequency	Daily Counts and observations of fry mortality were made.
Controls Survival: Mean and Individual Replicate	Control and Solvent Control Survival: Mean=98.7% Min. Replicate=>93%
Solvent Controls:	Solvent Control employed

Comments:

B. Physical System:

Guideline Criteria	Reported Information
Test Water: Source Filtration procedures Hardness Range pH Range	Well water subjected to reverse osmosis and then blended with unfiltered well water. Subsequent blend then polypropene cartridge filtered and UV sterilized. Hardness:136-152 mg/L as CaCO3 pH: 7.94-8.36
Test Temperature Ranges:	Replicate Means=10.1-10.5^{0}C Overall Range=9.5-11.0^{0}C
Photoperiod and Intensity:	Embryos-darkness until 1 week post hatch. Thereafter, all aquaria at 16D/8N photoperiod at 37-49 footcandle intensity
Dosing Apparatus: Type and description of construction materials	2-L proportional diluter(Mount and Brungs) with introduction of test solution to each test exposure chamber. Dilution factor=0.5. Construction: Plate glass, silicon adhesive, glass delivery tubing.
Toxicant Mixing:	Flow splitting and mixing cells divided each aliquot before delivery to test aquaria where they were split again. Pretest and day 95 volumetric measurement were made: <10% variation.
Test Vessels: Description and materials	Glass aquaria divided in half with a glass partition. Individual chambers measured 15.8x30.4 cm with 24.3 cm depth. Volume-11.7 L. Screened side drains on each chamber. Top screens after swim-up.
Embryo Cups: Description and materials.	Glass jars-9 cm diameter-with ends covered with 16 mesh Nytex screen. Suspended on steel wire and oscillated by motor driven rocker arm.

Guideline Criteria	Reported Information
Flow Rate: Rate and volume replacements per day.	Initial Rate:95.5 L/replicate/day with an 8.2 volume replacement rate per day. This was gradually increased to 138 L/rep/Day as biomass load increased.
Bioload Factor	0.189 g/L/day at study termin.
Aeration:	Not described

Comments: No comments.

C. Chemical System:

Guideline Criteria	Reported Information
Concentrations: Nominal concentration spred: Toxicant concentration measurement regime:	-0.11, 0.23, 0.45, 0.90, 1.8 mg ai/L with solvent & dilution controls. -10 ml concentration samples from 2 of 4 replicates were composited on alternate sample days and analyzed using GL Chromatography with ECD detection. Sample days were days -6, 0, 1, 7, and weekly thereafter.
Water Quality Measurement: 2) Freshwater parameters in a control and one concentration must be analyzed once a week.	**DO:** Measured alternately in 2 of 4 reps(each level) on days 0, 1, 7 and weekly thereafter. **Temperature:** measured days 0, 1, 7 and weekly thereafter in 2 of 4 replicates-each conc. Continuous temp. meas-one replicate centrally located. **Conductivity, Hardness, Alkalinity and pH:** Day 0 and weekly thereafter in 1 replicate of control, 0.11, 0.45, and 1.8 test levels.
Solvents:	Stock Solutions: 7.452 g alachlor in 100 ml DMF Highest Conc. 0.025 ml DMF/L

Comments:

10. REPORTED RESULTS:

Guideline Criteria	Reported Information
Data Endpoints Biological Endpoints Monitored during this study :	1. % Egg Hatch Success 2. Time to Hatch 3. Viability 3. 35 Day and 60 Day Hatch Survival 4. 35D and 60D Length 5. 60D blotted wet weight 6. Time to Swimup 7. Behavioral and physical aberrations.
Raw data :	Raw data is included with report

Effects Data:All data below is based on mean of 4 replicates per concentration level.

Toxicant Conc. (µg/L) 1		% Hatch	Time to Hatch	35D Survival	60D Survival	Total Length (mm)		Wet wt (gm)
Nom.	M.Meas	%	Days	%	%	35D	60D	60D
Ctrl	____	100	36	98.3	98.3	33.9	47.3	1.641
Solv	____	100	35	100	98.3	34.1	47.8	1.677
0.11	0.0945	100	36	100	100	33.9	47.4	1.647
0.23	0.187	100	36	100	98.3	33.9	46.9	1.586
0.45	0.388	100	37	100	98.3	33.0	45.8	1.460
0.90	0.809	98.3	36	96.7	93.3	33.1	44.8	1.400
1.8	1.63	100	37	96.7	88.3	29.3	35.2	0.651

Toxicity Observations: In the 1.63 mg/L concentration fish were observed resting on the bottom, displaying irregular respiration, and exopthalmia. They were not noted in other concentration levels. Time to swimup was delayed in the 1.63 mg ai/L test concentration by 3 days over the lower concentrations and controls(52 days vs.48-49 days).

Statistical Results:

Statistical Method: Contingency tables for proportional scale data . Untransformed ANOVA and one tailed Dunnet's multiple comparison. SAS with $p \leq 0.05$.

NOEC: 0.187 mg ai/L LOEC:0.388 mg ai/L MATC:0.269
Most sensitive endpoint: Growth

Comments: None

11. Reviewer's Statistical Results:

Statistical Method: Dunnett's, Bonferroni T, and William's Test using Toxstat.

NOEL:0.187 PPM LOEC:0.388 PPM MATC: N.D.

Most sensitive endpoint: Growth, 60 Day length and weight

Comments:

12. COMPLETION OF ONE-LINER FOR STUDY: Yes

Alachlor Rainbow Trout ELS 60D Length
File: AlacRBT.len Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Solvent Control	4	46.800	48.200	47.800
2	Dilution Contro	4	46.100	48.400	47.375
3	0.0945	4	46.400	48.400	47.425
4	0.187	4	46.800	47.200	46.950
5	0.388	4	44.700	46.800	45.775
6	0.809	4	44.300	45.900	44.800
7	1.63	4	34.700	35.700	35.250

Alachlor Rainbow Trout ELS 60D Length
File: AlacRBT.len Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Solvent Control	0.447	0.668	0.334
2	Dilution Contro	1.143	1.069	0.534
3	0.0945	0.749	0.866	0.433
4	0.187	0.037	0.191	0.096
5	0.388	0.842	0.918	0.459
6	0.809	0.553	0.744	0.372
7	1.63	0.230	0.480	0.240

Alachlor Rainbow Trout ELS 60D Length
File: AlacRBT.len Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	475.387	79.231	138.516
Within (Error)	21	12.002	0.572	
Total	27	487.390		

Critical F value = 2.57 (0.05,6,21)
Since F > Critical F REJECT Ho:All groups equal

Alachlor Rainbow Trout ELS 60D Length

File: AlacRBT.len Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Solvent Control	47.800	47.800		
2	Dilution Contro	47.375	47.375	0.795	
3	0.0945	47.425	47.425	0.701	
4	0.187	46.950	46.950	1.589	
5	0.388	45.775	45.775	3.787	*
6	0.809	44.800	44.800	5.610	*
7	1.63	35.250	35.250	23.467	*

Dunnett table value = 2.46 (1 Tailed Value, P=0.05, df=20,6)

Alachlor Rainbow Trout ELS 60D Length
File: AlacRBT.len Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Solvent Control	4			
2	Dilution Contro	4	1.316	2.8	0.425
3	0.0945	4	1.316	2.8	0.375
4	0.187	4	1.316	2.8	0.850
5	0.388	4	1.316	2.8	2.025
6	0.809	4	1.316	2.8	3.000
7	1.63	4	1.316	2.8	12.550

Alachlor Rainbow Trout ELS 60D Length
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ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	475.387	79.231	138.516
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Alachlor Rainbow Trout ELS 60D Length
File: AlacRBT.len Transform: NO TRANSFORM

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Solvent Control	47.800	47.800		
2	Dilution Contro	47.375	47.375	0.795	
3	0.0945	47.425	47.425	0.701	
4	0.187	46.950	46.950	1.589	
5	0.388	45.775	45.775	3.787	*
6	0.809	44.800	44.800	5.610	*
7	1.63	35.250	35.250	23.467	*

Bonferroni T table value = 2.60 (1 Tailed Value, P=0.05, df=21,6)

Alachlor Rainbow Trout ELS 60D Length
File: AlacRBT.len Transform: NO TRANSFORM

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Solvent Control	4			
2	Dilution Contro	4	1.392	2.9	0.425
3	0.0945	4	1.392	2.9	0.375
4	0.187	4	1.392	2.9	0.850
5	0.388	4	1.392	2.9	2.025
6	0.809	4	1.392	2.9	3.000
7	1.63	4	1.392	2.9	12.550

Alachlor Rainbow Trout ELS 60D Length
File: AlacRBT.len Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent Control	4	47.800	47.800	47.800
2	Dilution Contro	4	47.375	47.375	47.400
3	0.0945	4	47.425	47.425	47.400
4	0.187	4	46.950	46.950	46.950
5	0.388	4	45.775	45.775	45.775
6	0.809	4	44.800	44.800	44.800
7	1.63	4	35.250	35.250	35.250

Alachlor Rainbow Trout ELS 60D Length
File: AlacRBT.len Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent Control	47.800				
Dilution Contro	47.400	0.748		1.72	k= 1, v=21
0.0945	47.400	0.748		1.80	k= 2, v=21
0.187	46.950	1.590		1.83	k= 3, v=21
0.388	45.775	3.788	*	1.84	k= 4, v=21
0.809	44.800	5.612	*	1.85	k= 5, v=21
1.63	35.250	23.476	*	1.85	k= 6, v=21

s = 0.756

Note: df used for table values are approximate when v > 20.

Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Solvent C	4	1.562	1.722	1.677
2	Dilution C	4	1.498	1.759	1.644
3	0.0945	4	1.568	1.743	1.648
4	0.187	4	1.533	1.661	1.587
5	0.388	4	1.343	1.589	1.458
6	0.809	4	1.345	1.467	1.396
7	1.63	4	0.618	0.682	0.652

Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Solvent C	0.006	0.077	0.038
2	Dilution C	0.015	0.122	0.061
3	0.0945	0.008	0.091	0.045
4	0.187	0.004	0.060	0.030
5	0.388	0.012	0.108	0.054
6	0.809	0.003	0.051	0.026
7	1.63	0.001	0.027	0.014

Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	3.145	0.524	74.857
Within (Error)	21	0.143	0.007	
Total	27	3.288		

Critical F value = 2.57 (0.05,6,21)
Since F > Critical F REJECT Ho:All groups equal

Alachlor Rainbow Trout 60D Mean Wet Wt

File: AlacRBT.wwt Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Solvent C	1.677	1.677		
2	Dilution C	1.644	1.644	0.562	
3	0.0945	1.648	1.648	0.503	
4	0.187	1.587	1.587	1.534	
5	0.388	1.458	1.458	3.702	*
6	0.809	1.396	1.396	4.754	*
7	1.63	0.652	0.652	17.338	*

Dunnett table value = 2.46 (1 Tailed Value, P=0.05, df=20,6)

Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Solvent C	4			
2	Dilution C	4	0.146	8.7	0.033
3	0.0945	4	0.146	8.7	0.030
4	0.187	4	0.146	8.7	0.091
5	0.388	4	0.146	8.7	0.219
6	0.809	4	0.146	8.7	0.281
7	1.63	4	0.146	8.7	1.026

Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	3.145	0.524	74.857
Within (Error)	21	0.143	0.007	
Total	27	3.288		

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Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Solvent C	1.677	1.677		
2	Dilution C	1.644	1.644	0.562	
3	0.0945	1.648	1.648	0.503	
4	0.187	1.587	1.587	1.534	
5	0.388	1.458	1.458	3.702	*
6	0.809	1.396	1.396	4.754	*
7	1.63	0.652	0.652	17.338	*

Bonferroni T table value = 2.60 (1 Tailed Value, P=0.05, df=21,6)

Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Solvent C	4			
2	Dilution C	4	0.154	9.2	0.033
3	0.0945	4	0.154	9.2	0.030
4	0.187	4	0.154	9.2	0.091
5	0.388	4	0.154	9.2	0.219
6	0.809	4	0.154	9.2	0.281
7	1.63	4	0.154	9.2	1.026

Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent C	4	1.677	1.677	1.677
2	Dilution C	4	1.644	1.644	1.646
3	0.0945	4	1.648	1.648	1.646
4	0.187	4	1.587	1.587	1.587
5	0.388	4	1.458	1.458	1.458
6	0.809	4	1.396	1.396	1.396
7	1.63	4	0.652	0.652	0.652

Alachlor Rainbow Trout 60D Mean Wet Wt
File: AlacRBT.wwt Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent C	1.677				
Dilution C	1.646	0.541		1.72	k= 1, v=21
0.0945	1.646	0.541		1.80	k= 2, v=21
0.187	1.587	1.557		1.83	k= 3, v=21
0.388	1.458	3.759	*	1.84	k= 4, v=21
0.809	1.396	4.827	*	1.85	k= 5, v=21
1.63	0.652	17.604	*	1.85	k= 6, v=21

s = 0.082

Note: df used for table values are approximate when v > 20.

Alachlor ELS Rainbow Trt 60D Posthatch
File: AlacHsrv.60D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Solvent Control	4	14.000	15.000	14.750
2	Dilution C	4	14.000	15.000	14.750
3	0.0945	4	15.000	15.000	15.000
4	0.187	4	14.000	15.000	14.750
5	0.388	4	14.000	15.000	14.750
6	0.809	4	12.000	15.000	14.000
7	1.63	4	12.000	14.000	13.250

Alachlor ELS Rainbow Trt 60D Posthatch
File: AlacHsrv.60D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Solvent Control	0.250	0.500	0.250
2	Dilution C	0.250	0.500	0.250
3	0.0945	0.000	0.000	0.000
4	0.187	0.250	0.500	0.250
5	0.388	0.250	0.500	0.250
6	0.809	2.000	1.414	0.707
7	1.63	0.917	0.957	0.479

Alachlor ELS Rainbow Trt 60D Posthatch
File: AlacHsrv.60D Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	9.214	1.536	2.743
Within (Error)	21	11.750	0.560	
Total	27	20.964		

Critical F value = 2.57 (0.05,6,21)
Since F > Critical F REJECT Ho:All groups equal

Alachlor ELS Rainbow Trt 60D Posthatch

File: AlacHsrv.60D Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Solvent Control	14.750	14.750		
2	Dilution C	14.750	14.750	0.000	
3	0.0945	15.000	15.000	-0.472	
4	0.187	14.750	14.750	0.000	
5	0.388	14.750	14.750	0.000	
6	0.809	14.000	14.000	1.417	
7	1.63	13.250	13.250	2.835	*

Dunnett table value = 2.46 (1 Tailed Value, P=0.05, df=20,6)

Alachlor ELS Rainbow Trt 60D Posthatch
File: AlacHsrv.60D Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Solvent Control	4			
2	Dilution C	4	1.302	8.8	0.000
3	0.0945	4	1.302	8.8	-0.250
4	0.187	4	1.302	8.8	0.000
5	0.388	4	1.302	8.8	0.000
6	0.809	4	1.302	8.8	0.750
7	1.63	4	1.302	8.8	1.500

Alachlor ELS Rainbow Trt 60D Posthatch
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ANOVA TABLE

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BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Solvent Control	14.750	14.750		
2	Dilution C	14.750	14.750	0.000	
3	0.0945	15.000	15.000	-0.472	
4	0.187	14.750	14.750	0.000	
5	0.388	14.750	14.750	0.000	
6	0.809	14.000	14.000	1.417	
7	1.63	13.250	13.250	2.835	*

Bonferroni T table value = 2.60 (1 Tailed Value, P=0.05, df=21,6)

Alachlor ELS Rainbow Trt 60D Posthatch
File: AlacHsrv.60D Transform: NO TRANSFORM

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Solvent Control	4			
2	Dilution C	4	1.377	9.3	0.000
3	0.0945	4	1.377	9.3	-0.250
4	0.187	4	1.377	9.3	0.000
5	0.388	4	1.377	9.3	0.000
6	0.809	4	1.377	9.3	0.750
7	1.63	4	1.377	9.3	1.500

Alachlor ELS Rainbow Trt 60D Posthatch
File: AlacHsrv.60D Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent Control	4	14.750	14.750	14.833
2	Dilution C	4	14.750	14.750	14.833
3	0.0945	4	15.000	15.000	14.833
4	0.187	4	14.750	14.750	14.750
5	0.388	4	14.750	14.750	14.750
6	0.809	4	14.000	14.000	14.000
7	1.63	4	13.250	13.250	13.250

Alachlor ELS Rainbow Trt 60D Posthatch
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WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent Control	14.833				
Dilution C	14.833	0.158		1.72	k= 1, v=2
0.0945	14.833	0.158		1.80	k= 2, v=2
0.187	14.750	0.000		1.83	k= 3, v=2
0.388	14.750	0.000		1.84	k= 4, v=2
0.809	14.000	1.418		1.85	k= 5, v=2
1.63	13.250	2.836	*	1.85	k= 6, v=2

s = 0.748

Note: df used for table values are approximate when v > 20.

Page 19 is not included in this copy.

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The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product impurities.

_____ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

✓ FIFRA registration data.

_____ The document is a duplicate of page(s) _____.

_____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.