

Recall

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

Data Requirement:	PMRA Data Code	{.....}
	EPA DP Barcode	D319377
	OECD Data Point	{.....}
	EPA MRID	465789-56
	EPA Guideline	72-4b; 850.1300

Test material:	IR5878 Technical
Purity:	98.56%
Common name	Orthosulfamuron
Chemical name:	IUPAC: Not reported
	CAS No.: 213464-77-8

Primary Reviewer: Christie E. Padova
Staff Scientist, Dynamac Corporation

Signature: *Christie E. Padova*
Date: 3/1/06

Secondary Reviewer: Teri S. Myers
Senior Scientist, Cambridge Environmental Inc.

Signature: *Teri S. Myers*
Date: 3/17/06

Primary Reviewer: Christopher Salice
Biologist, EPA/OPP/EFED/ERBIV

Signature: *Chris Salice*
Date: 6/30/06

Secondary Reviewer: Kristina Garber
Biologist, EPA/OPP/EFED/ERBIV

Signature: *Kristina Garber*
Date: 7/27/06

Reference/Submission No. {.....}

Company Code	{.....}	[For PMRA]
Active Code	{.....}	[For PMRA]
Use Site Category	{.....}	[For PMRA]
EPA PC Code	108209	

Date Evaluation Completed: 31-07-2006

CITATION: Palmer, S.J., Thomas, S.T., Kendall, T.Z., and H.O. Krueger. 2003. IR5878: A Semi-Static Life-Cycle Toxicity Test with the Cladoceran (*Daphnia magna*). Unpublished study performed by Wildlife International, Ltd., Easton, MD. Laboratory Project No. 544A-123. Study submitted by Isagro S.p.A., Milano, Italy. Study initiated March 31, 2003 and completed September 22, 2003.

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

EXECUTIVE SUMMARY:

The 21-day-chronic toxicity of IR5878 Technical (orthosulfamuron) to *Daphnia magna* was studied under static renewal conditions. Daphnids were exposed to IR5878 Technical at nominal concentrations of 0 (negative control), 6.3, 13, 25, 50, and 100 mg/L. Mean-measured concentrations were <3.00 (LOQ, control), 6.5, 14, 26, 52, and 105 mg a.i./L. Length was the most sensitive endpoint, with significant reductions at treatment levels equal to and greater than 14 mg a.i./L. Based on this effect, the 21-day NOEC and LOEC were 6.5 and 14 mg a.i./L, respectively. Additionally, there was a treatment-related effect on first-generation survival at the 105 mg a.i./L treatment level. Exposure to IR5878 Technical had no effect on reproduction or dry weight of surviving first generation daphnids. The 21-day LC₅₀/EC₅₀ based on survival and reproduction was >105 mg a.i./L, the highest concentration tested.

This study is scientifically sound and does satisfy the guideline requirement for a chronic toxicity study with freshwater invertebrates. This study is classified ACCEPTABLE.

Results Synopsis

Test Organism Age (eg. 1st instar): Neonates, <24 hours old
Test Type: Static renewal
NOEC: 6.5 mg a.i./L (based on total length)
LOEC: 14 mg a.i./L (based on total length)
EC₅₀: >105 mg a.i./L (based on first-generation survival)
Most Sensitive Endpoints: Total length
Endpoints Affected: First-generation survival and total lengths
Endpoints Not Affected: dry weight and reproduction

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study protocol was based on procedures outlined in the U.S. Environmental Protection Agency Series 850-Ecological Effects Test Guidelines (*draft*), OPPTS Number 850.1300: *Daphnid Chronic Toxicity Test*. Other guidelines cited included: OECD, USEPA SEP, ASTM (see references). A deviation from the USEPA series 850 guideline includes the following:

Offspring were apparently not observed for immobility or other toxicological effects.

This deviation does not affect the scientific soundness of the study.

COMPLIANCE: Signed and dated GLP, Quality Assurance, and Data Confidentiality claims statements were provided.

A. MATERIALS:

1. Test Material	IR5878 Technical
Description:	White powder
Lot No./Batch No. :	G009/02
Purity:	98.56%

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

Stability of compound under test conditions:

Stable, as indicated by relatively constant (within 20% of mean) measured concentrations of old/new test solutions (as applicable) determined on days 0, 2, 5, 9, 12, 16, 19, and 21 at all test levels. Recoveries from "new" solutions ranged from 102-109% of nominal, and from "old" solutions ranged from 100-106% of nominal.

Storage conditions of test chemicals:

Ambient temperature in the dark

2. Test Organism:

Species: *Daphnia magna* (commonly referred to as daphnids), <24 hours old

Age of the parental stock: ≥10 days old

Source: Laboratory cultures

B. STUDY DESIGN:

1. Experimental Conditions

a. Range-finding Study: The concentrations for the definitive study were selected in consultation with the Sponsor, and were based on exploratory range-finding toxicity data (not further specified).

b. Definitive Study: See Table 1.

Table 1: Experimental parameters relevant to chronic toxicity test using *D. magna*.

Parameter	Details	Remarks
<u>Parental acclimation:</u> Period: Conditions: (same as test or not) Feeding: Health (any mortality observed):	Continuous Same as test During culturing and testing, the daphnids were fed once daily with a mixture of yeast, Cerophyll®, and trout chow, as well as a suspension of the freshwater green alga, <i>Selenastrum capricornutum</i> . No signs of disease or stress were observed in adults.	Neonate daphnids were obtained from 3 individual adult daphnids that had produced at least one prior brood.

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

Parameter	Details	Remarks
<u>Test condition:</u> static renewal/flow-through:	Static renewal	-
Renewal rate for static renewal	Three times/week (Monday, Wednesday, and Friday)	-
Aeration, if any	None reported	-
Duration of the test	21 days	-
<u>Test vessel</u> Material:	Glass beakers	-
Size:	250 mL	-
Fill volume:	200 mL	-
Other:	Each container was "loosely covered"	-
Source of dilution water	Moderately-hard freshwater was obtained from a well approximately 40 m deep located on site. The well water was passed through a sand filter, aerated, filtered again (0.45 µm), and UV sterilized prior to use.	During the 4-week period preceding the test, analysis of the dilution water yielded the following average values (4 measurements): specific conductance 316 µmhos/cm, hardness 126 mg/L as CaCO ₃ , alkalinity 183 mg as CaCO ₃ , and pH 8.4.

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

Parameter	Details	Remarks
<u>Water parameters:</u> Hardness	120-136 mg/L as CaCO ₃	Dilution water sampling and results fulfilled all OPPTS criteria. Results of periodic analysis for pesticides, organics, and metals were provided from water collected on 07/31/02.
pH	8.2-8.8	
Dissolved oxygen	≥6.7 mg/L (≥74% saturation)	
Temperature	19.4-21.0°C (constant throughout study)	
Total Organic Carbon	<1 mg C/L	
Particulate matter	Not determined	
Metals	Calcium at 28.2 ppm, magnesium at 11.6 ppm, potassium at 5.45 ppm, selenium at 0.009 ppm, and sodium at 18.6 ppm (from periodic analysis)	
Pesticides	<LOD (from periodic analysis)	
Chlorine	Not determined	
Number of replicates	10 per level	
Number of organisms:	1 per replicate	-
<u>Treatment Concentrations:</u> nominal: measured:	0 (negative control), 6.3, 13, 25, 50, and 100 mg/L <3.00 (LOQ, control), 6.5, 14, 26, 52, and 105 mg a.i./L	Water samples were analyzed from each treatment and control group at test initiation, at the beginning and the end of the longest renewal cycle each week (i.e., Friday and Monday), and at test termination.
Solvent (type, percentage, if used)	N/A	-
Lighting	16 hours light/8 hours dark, with 30-minute transition periods	-
Recovery of chemical: Frequency of measurement:	100 ± 0.73% of nominal At each test solution sampling interval	Based on concurrently-analyzed QC samples fortified at 6.00, 25.0, and 100 mg a.i./L.

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

Parameter	Details	Remarks
LOD: LOQ:	Not reported 3.00 mg a.i./L	
Positive control	N/A	-
Other parameters	Test containers were "indiscriminately placed" within the environmental chamber where the replicates were maintained	-

2. Observations: See Table 2.

Table 2: Observations made during the test period.

Parameters	Details
Data endpoints measured	Survival of first-generation daphnids Number of live young produced per 21-day surviving adult Measurement of growth (total length, and dry weight) Sub-lethal signs of toxicity
Observation intervals	Each first-generation daphnid was observed daily. With the onset of reproduction, neonates were counted and discarded every Monday, Wednesday, and Friday. Growth was determined for each surviving first-generation daphnid at the end of the test.
Were raw data included?	Yes, data were included for water characteristics (measured concentrations of the test substance, water temperatures, dissolved oxygen, pH, specific conductance, hardness, alkalinity) and daphnid observations (mortality, clinical observations, reproduction, lengths, and dry weights).

II. RESULTS AND DISCUSSION

A. MORTALITY:

21-Day survival (mortality and/or immobility) was statistically-reduced compared to the negative control at the 105 mg a.i./L level. Survival rates were 100, 90, 80, 80, 90, and 60% in the control, and mean-measured 6.5, 14, 26, 52, and 105 mg a.i./L treatment groups, respectively. The subsequent NOEC for survival was 52 mg a.i./L. Since there was <50% mortality/immobility among first-generation daphnids in any treatment group during the test, the 21-day EC₅₀ value for survival was >105 mg a.i./L, the highest concentration tested (Table 3).

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

Table 3: Effects of IR5878 Technical on Survival, growth and reproduction of *D. magna*.

Measured treatment concentrations In mg a.i./L (nominal in mg/L)	Mortality (dead or immobile)		First Day of Reproduction	Mean No. Offspring/- Surviving Adult	Mean Length (mm)	Mean Dry Weight (mg)
	No. Dead	%				
Control (dilution water)	0	0	8	132	4.79	1.21
6.5 (6.3)	1	10	7	200	4.68	0.96
14 (13)	2	20	7	215	4.52*	0.98
26 (25)	2	20	8	175	4.53*	1.06
52 (50)	1	10	7	179	4.61*	1.08
105 (100)	4	40*	8	138	4.43*	1.11
NOEC	52		105	105	52	105
LOEC	105		>105	>105	105	>105

* Statistically significant difference from the negative control (Bonferroni t-test, $p \leq 0.05$).

B. SUBLETHAL EFFECTS (growth and reproduction):

Mean total length of surviving first-generation daphnids was statistically-reduced at treatment levels ≥ 14 mg a.i./L. The report indicated that differences observed at the 14, 26, and 52 mg a.i./L levels were slight and not concentration responsive and therefore not considered to be a result of treatment. Mean total length was 4.79 mm for the negative control group, and 4.68, 4.52, 4.53, 4.61, and 4.43 mm for the 6.5, 14, 26, 52, and 105 mg a.i./L test groups, respectively. The reported NOEC for total length was 52 mg a.i./L. This contradicts the conclusions of the study reviewer (see reviewer's comments section).

Mean dry weight of surviving first-generation daphnids was not affected by treatment, with no statistically-significant differences observed. Mean dry weight was 1.21 mg for the negative control group, and 0.96, 0.98, 1.06, 1.08, and 1.11 mg for the 6.5, 14, 26, 52, and 105 mg a.i./L test groups, respectively. The NOEC for dry weight was 105 mg a.i./L.

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

No statistically significant treatment-related effects on reproduction were observed. Several of the daphnids in the control and treatment groups had very high reproduction (>200 total neonates), which increased the variability within the groups. However, this had no apparent effect on the results of the study. The mean number of offspring per surviving adult was 132 for the negative control group, and 200, 215, 175, 179, and 138 for the 6.5, 14, 26, 52, and 105 mg a.i./L groups, respectively. The time for first brood release was 7-8 days for all levels. The NOEC for reproduction was 105 mg a.i./L (Table 3). Immobility or other effects on offspring were apparently not monitored.

C. REPORTED STATISTICS:

Data that were statistically analyzed included 1) first-generation survival, 2) the number of live young produced per 21-day surviving adult, 3) the mean total length of surviving first-generation daphnia at study termination, and 4) the mean dry weight of surviving first-generation daphnia at study termination. The time to first brood release was recorded, but not statistically analyzed.

Survival data were analyzed using Chi-square and Fisher's Exact test to identify treatment groups that showed a statistically significant difference from controls ($p \leq 0.05$). Reproduction and growth data were checked for normality using Shapiro-Wilks' test and for homogeneity of variance using Bartlett's test, and were subsequently analyzed using analysis of variance (ANOVA) and Bonferroni's t-test to identify treatments that were significantly different from the control ($p \leq 0.05$).

The NOEC and LOEC were based on significance data. The MATC was calculated as the geometric mean of the NOEC and LOEC. The 21-day EC_{50} was based on first-generation mortality/immobility and reproduction effects data, but was not statistically determined since <50% effects to survival were observed in the highest test concentration. All analyses were performed using TOXSTAT or SAS software programs and mean-measured concentrations.

D. VERIFICATION OF STATISTICAL RESULTS:

Mortality data were analyzed using Fisher's Exact test. Reproduction, length, and dry weight data were analyzed using the Chi-square and Shapiro-Wilks tests for normality and the Hartley and Bartlett's tests for homogeneity of variances. Data did not require transformation to satisfy the assumptions of ANOVA. For neonate production, the reviewer did not exclude reproductive data from daphnids that died. The NOEC values were determined using ANOVA (reproduction and wet weight), followed by Bonferroni's test (length). These analyses were conducted using TOXSTAT statistical software and mean measured concentrations. Results are located in Appendix 1.

First generation survival:

NOEC: 52 mg a.i./L

LOEC: 105 mg a.i./L

Neonate production (reproduction):

NOEC: 105 mg a.i./L

LOEC: >105 mg a.i./L

Total Lengths (growth):

NOEC: 6.5 mg a.i./L

LOEC: 14 mg a.i./L

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

Dry Weight (growth):

NOEC: 105 mg a.i./L

LOEC: >105 mg a.i./L

Endpoint(s) Affected: First-generation survival and total lengths

Most Sensitive Endpoint(s): Total lengths

Endpoint(s) Where No Effects Were Observed: reproduction and dry weight

E. STUDY DEFICIENCIES:

Offspring produced should have been observed for immobility and other toxicological effects. This deviation does not affect the scientific soundness of the study.

F. REVIEWER'S COMMENTS:

The reviewer's statistical results were consistent with those of the study authors. Both analyses detected statistically significant adverse effects at treatment levels ≥ 14 mg a.i./L. The reviewer and the study authors' conclusions regarding the statistical analysis of total length were inconsistent. The study authors described the reductions for levels < 105 mg a.i./L as "slight and not concentration-responsive." They indicated that "a treatment-related effect on lengths in the 105 mg a.i./L treatment group could not be precluded." Thus, the study authors indicated that the NOEC for growth (based on first generation length) was 52 mg a.i./L, and the LOEC was 105 mg a.i./L. The reviewer of this study did not agree with the dismissal of the significant differences observed between controls and treatment levels ≥ 14 mg a.i./L. Since these concentrations were statistically significant, the LOEC was determined to be 14 mg a.i./L, and the resulting NOEC was 6.5 mg a.i./L.

For reproductive data, the reviewer did not exclude data from daphnids that died during the study. As a result, the reviewer's treatment averages are lower than the study authors'; despite the difference in data sets, the NOEC values were consistent.

The test solutions at concentrations ≤ 50 mg a.i./L appeared clear and colorless at test initiation and termination. The 100 mg a.i./L test solution was clear and colorless with some grayish precipitate on the bottom of the beakers at test initiation, but was clear and colorless at termination.

OECD recommends water solubility, stability in water and light, pKa, Pow, and vapor pressure of test compound. These data were not provided in the report.

Experimental test dates were April 23 – May 14, 2003.

G. CONCLUSIONS:

This study is scientifically sound and is acceptable. Based upon treatment-related effects on terminal total lengths (the most sensitive endpoint), the NOEC and LOEC are 6.5 and 14 mg a.i./L, respectively. The 21-day EC_{50} for first-generation survival and reproduction was > 105 mg a.i./L. Endpoints where no effects were observed included dry weight and reproduction.

III. REFERENCES:

Organization for Economic Cooperation and Development. 1997. OECD Guidelines for Testing of Chemicals. Guideline 211: *Daphnia magna* Reproduction Test.

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

U.S. Environmental Protection Agency. 1996. Series 850-Ecological Effects Test Guidelines (draft), OPPTS Number 850.1300: *Daphnid Chronic Toxicity Test*.

U.S. Environmental Protection Agency. 1982. Standard Evaluation Procedure, *Daphnia magna* Life-Cycle (21-Day Renewal) Chronic Toxicity Test. EPA 540/9-86-141. Environmental Protection Agency, Office of Pesticide Programs. Washington DC.

ASTM Standard E1293-87. 1988. *Standard Guide for Conducting Renewal Life-Cycle Toxicity Tests with Daphnia magna*. American Society for Testing and Materials. Philadelphia, PA.

APHA, AWWA, WPCF. 1998. *Standard Methods for the Examination of Water and Wastewater*. 20th Edition, American Public Health Association. American Water Works Association. Water Pollution Control Federation, New York.

West, Inc. and D.D. Gulley. 1996. TOXSTAT[®] Version 3.5. Western EcoSystems Technology, Inc. Cheyenne, Wyoming.

The SAS System for Windows. 1999. Version Eight. SAS Institute, Inc., Cary, North Carolina.

Stephan, C.E. 1978. U.S. EPA, Environmental Research Laboratory, Duluth, Minnesota. Personal communication.

Finney, D.J. 1971. *Statistical Methods in Biological Assay*. Second edition. Griffin Press, London.

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

APPENDIX 1: OUTPUT OF REVIEWER'S STATISTICAL VERIFICATION:

Survival

SUMMARY OF FISHERS EXACT TESTS

GROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	10	0	
1	6.5 mg/L	10	1	
2	14 mg/L	10	2	
3	26 mg/L	10	2	
4	52 mg/L	10	1	
5	105 mg/L	10	4	*

neonate production

File: 8956r Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	38170.150	7634.030	1.485
Within (Error)	54	277651.500	5141.694	
Total	59	315821.650		

Critical F value = 2.45 (0.05, 5, 40)

Since F < Critical F FAIL TO REJECT Ho: All groups equal

neonate production

File: 8956r Transform: NO TRANSFORMATION

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

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	neg control	132.000	132.000		
2	6.5	189.700	189.700	-1.799	
3	14	176.500	176.500	-1.388	
4	26	171.600	171.600	-1.235	
5	52	162.200	162.200	-0.942	
6	105	118.100	118.100	0.433	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40, 5)

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

neonate production
File: 8956r Transform: NO TRANSFORMATION

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	neg control	10			
2	6.5	10	74.076	56.1	-57.700
3	14	10	74.076	56.1	-44.500
4	26	10	74.076	56.1	-39.600
5	52	10	74.076	56.1	-30.200
6	105	10	74.076	56.1	13.900

neonate production
File: 8956r Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	neg control	10	132.000	132.000	167.450
2	6.5	10	189.700	189.700	167.450
3	14	10	176.500	176.500	167.450
4	26	10	171.600	171.600	167.450
5	52	10	162.200	162.200	162.200
6	105	10	118.100	118.100	118.100

neonate production
File: 8956r Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
neg control	167.450				
6.5	167.450	1.105		1.68	k= 1, v=54
14	167.450	1.105		1.76	k= 2, v=54
26	167.450	1.105		1.79	k= 3, v=54
52	162.200	0.942		1.80	k= 4, v=54
105	118.100	0.433		1.80	k= 5, v=54

s = 71.706

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

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

length
File: 89561 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.651	0.130	7.647
Within (Error)	44	0.737	0.017	
Total	49	1.388		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

length
File: 89561 Transform: NO TRANSFORMATION

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

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	neg control	4.785	4.785		
2	6.5	4.678	4.678	1.790	
3	14	4.519	4.519	4.305	*
4	26	4.531	4.531	4.103	*
5	52	4.611	4.611	2.903	*
6	105	4.433	4.433	5.223	*

Bonferroni T table value = 2.42 (1 Tailed Value, P=0.05, df=40,5)

length
File: 89561 Transform: NO TRANSFORMATION

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	neg control	10			
2	6.5	9	0.145	3.0	0.107
3	14	8	0.150	3.1	0.266
4	26	8	0.150	3.1	0.254
5	52	9	0.145	3.0	0.174
6	105	6	0.163	3.4	0.352

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

length
File: 89561 Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	neg control	10	4.785	4.785	4.785
2	6.5	9	4.678	4.678	4.678
3	14	8	4.519	4.519	4.556
4	26	8	4.531	4.531	4.556
5	52	9	4.611	4.611	4.556
6	105	6	4.433	4.433	4.433

length
File: 89561 Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
neg control	4.785				
6.5	4.678	1.803	*	1.68	k= 1, v=44
14	4.556	3.729	*	1.76	k= 2, v=44
26	4.556	3.729	*	1.79	k= 3, v=44
52	4.556	3.850	*	1.80	k= 4, v=44
105	4.433	5.260	*	1.80	k= 5, v=44

s = 0.129

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

dry weight
File: 8956w Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.441	0.088	1.173
Within (Error)	44	3.304	0.075	
Total	49	3.745		

Data Evaluation Report on the Chronic Toxicity of Orthosulfamuron to Freshwater Invertebrates - *Daphnia magna*

EPA MRID No. 465789-56

Critical F value = 2.45 (0.05,5,40)

Since F < Critical F FAIL TO REJECT Ho:All groups equal

dry weight
File: 8956w

Transform: NO TRANSFORMATION

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

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	neg control	1.208	1.208		
2	6.5	0.957	0.957	1.997	
3	14	0.979	0.979	1.765	
4	26	1.057	1.057	1.159	
5	52	1.080	1.080	1.017	
6	105	0.947	0.947	1.848	

Bonferroni T table value = 2.42 (1 Tailed Value, P=0.05, df=40,5)

dry weight
File: 8956w

Transform: NO TRANSFORMATION

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	neg control	10			
2	6.5	9	0.305	25.2	0.251
3	14	8	0.315	26.1	0.229
4	26	8	0.315	26.1	0.151
5	52	9	0.305	25.2	0.128
6	105	6	0.343	28.4	0.261

dry weight
File: 8956w

Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	neg control	10	1.208	1.208	1.208
2	6.5	9	0.957	0.957	1.018
3	14	8	0.979	0.979	1.018
4	26	8	1.057	1.057	1.018
5	52	9	1.080	1.080	1.018

