

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Data Requirement: PMRA DATA CODE
EPA DP Barcode D284719
OECD Data Point
EPA MRID 45386229
EPA Guideline §71-4b

11/9/04

Test material: AE F130060 Technical Purity: 94.6%
Common name: Mesosulfuron-methyl
Chemical name: IUPAC: Methyl 2-[3-(4,6-dimethoxypyrimidin-2-yl)ureidosulfonyl]-4-methanesulfonamidomethylbenzoate (p. 135)
CAS name: Not reported
CAS No.: Not reported
Synonyms: Code: AE F130060 00 1C95 0001

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Staff Scientist, Dynamac Corporation

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Date: 8/22/03

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Secondary Reviewer(s): *Leo LaSota*
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Date: 01/09/04 *Leo LaSota*

Reference/Submission No.:

Company Code:
Active Code:
EPA PC Code: 122009

Date Evaluation Completed:

CITATION: Frey, L.T., et al. 1999. Mallard Duck Dietary Reproduction Toxicity Study. Unpublished study performed by Wildlife International Ltd., Easton, MD. Laboratory Project No 312-115. Study sponsored by Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany. Study initiated May 19, 1998 and completed August 17, 1999.

EXECUTIVE SUMMARY:

The one-generation reproductive toxicity of AE F130060 Technical (Mesosulfuron-methyl) to groups (16 pens/treatment level) of 1 male and 1 female, 24-week-old Mallard duck was assessed over approximately 21 weeks. AE F130060 Technical was administered to the birds in the diet at mean-measured concentrations of <1 (LOD, negative control), 38, 180, or 990 ppm a.i.

There was a significant reduction in the ratio of live embryos to viable embryos at the lowest treatment group. No other significant treatment-related effects on any adult or offspring parameter were detected. However, because a reproductive parameter was adversely affected, the NOEC could not be determined in this study (<38 ppm).

This toxicity study is scientifically sound. However, because the lowest concentration elicited an adverse effect on a reproductive parameter (i.e., ratio of live embryos to viable embryos), a NOEC was not established. This study is therefore classified as SUPPLEMENTAL and it does not fulfill the US EPA guideline requirement (§71-4) for a reproductive toxicity study with mallard duck.

Results Synopsis

Test Organism Size/Age: 24 weeks old at test initiation (845-1301 g)

NOEC: <38 ppm

LOEC: 38 ppm

Endpoint(s) Affected: ratio of live embryos to viable embryos

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study protocol was based on procedures of the U.S. EPA Pesticide Assessment Guidelines, Subsection 71-4 (1982); OECD Guideline 206 (1984); and ASTM Standard E1062-86 (1986). Deviations from §71-4 are:

1. Mortality of the ducks during acclimation was not described.
2. The photo-period was 6 hours light/day up through Week 10, instead of 7 hours light/day up through Week 8.
3. The average egg storage temperature (prior to setting for incubation) was $13.3 \pm 0.3^\circ\text{C}$, slightly lower than the recommended level of 16°C .
4. The average temperature during hatching was $37.2 \pm 0.0^\circ\text{C}$, slightly lower than the recommended temperature of 39°C . The photo-period during hatching was not specified.
5. The number of normal hatchlings was not monitored, and the health of the chicks during the 14-day maintenance period was not specified.
6. Raw data pertaining to clinical effects observed in parental ducks and hatchlings were not provided.

These deviations did not affect the scientific validity of the study; however, this study does not fulfill guideline requirements.

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6. The number of normal hatchlings was not monitored, and the health of the chicks during the 14-day maintenance period was not specified.
7. Raw data pertaining to clinical effects observed in parental ducks and hatchlings were not provided.

These deviations did not affect the scientific validity of the study; however, this study does not fulfill guideline requirements.

COMPLIANCE: Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. This study was conducted in accordance with United States, OECD, and Japan MAFF GLP standards (p. 3).

A. MATERIALS:

1. **Test Material** AE F130060 Technical

Description: Light beige powder

Lot No./Batch No.: Pfl. 35316

Purity: 94.6% (w:w)

Stability of Compound

Under Test Conditions: The stability of AE F130060 Technical was assessed in the treated feed prepared at all test levels after 7 days of ambient storage and 4 weeks of frozen storage. Recoveries averaged 94-103% of initial values after 7 days of ambient storage and 106-113% of initial values after 4 weeks of frozen storage (reviewer-calculated from mean recoveries provided in table on p. 118).

Storage conditions

of test chemical: At ambient temperature under locked storage.

OECD requires water solubility, stability in water and light, pK_a , P_{ow} , and vapor pressure of the test compound. OECD requirements were not reported.

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2. Test organism:

Table 1: Test organism.

Parameter	Details	Remarks
		Criteria
Species (common and scientific names):	Mallard duck (<i>Anas platyrhynchos</i>)	<i>EPA requires: a wild waterfowl species, preferably the mallard, Anas platyrhynchos, or an upland game species, preferably the northern bobwhite, Colinus virginianus.</i>
Age at Study Initiation:	24 weeks	It was stated that birds were approaching their first breeding season. <i>EPA requires: birds should be approaching their first breeding season.</i>
Body Weight: (mean and range)	Males: Overall range (n=64) 961 to 1301 g, with group means of 1102 to 1125 g. Females: Overall range (n=64) 845 to 1107 g, with group means of 966 to 1010 g.	Individual body weights were recorded at Weeks 0, 2, 4, 6, 8 and 21 (test termination). <i>EPA requires that body weights should be recorded at test initiation and at biweekly intervals up to week eight or up to the onset of egg laying and at termination.</i>
Source:	Whistling Wings, Inc. Hanover, IL.	Birds were from the same hatch, and were phenotypically indistinguishable from wild birds. <i>EPA requires that all birds should be from the same source.</i>

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B. STUDY DESIGN:

1. Experimental Conditions

- a. Range-finding Study - None conducted.
- b. Definitive Study

Table 2: Experimental Parameters.

Parameter	Details	Remarks
		<i>Criteria</i>
Acclimation period:	10 weeks	The study author reported that at test initiation, all birds were examined for physical injuries and general health, and birds that did not appear healthy were excluded from the study.
Conditions (same as test or not):	Same as test	
Feeding:	Water and feed were provided <i>ad libitum</i> .	
Health (any mortality observed):	Pre-test mortality was not reported.	
		<i>EPA recommends a 2-3 week health observation period prior to selection of birds for treatment. Birds must be generally healthy without excess mortality. Feeding should be <u>ad libitum</u>, and sickness, injuries or mortality be noted.</i>

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Parameter	Details	Remarks
		Criteria
Test duration		
pre-laying exposure:	Approximately 10 weeks	
egg-laying exposure:	Approximately 11 weeks	
withdrawal period, if used:	None	<p><i>EPA requires</i></p> <p><u>Pre-laying exposure duration</u> At least 10 weeks prior to the onset of egg-laying.</p> <p><u>Exposure duration with egg-laying</u> At least 10 weeks.</p> <p><u>Withdrawal period</u> If reduced reproduction is evident, a withdrawal period of up to 3 weeks should be added to the test phase.</p>

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Parameter	Details	Remarks
		Criteria
Pen (for parental and offspring) size: construction materials: number:	Parents (one pair) were housed in 75- x 90- x 45-cm battery pens. Offspring (by set and group) were housed in 62- x 92- x 25.5-cm battery brooders. Vinyl-coated wire mesh (both parental and offspring). 16 parental pens/treatment level	<u>Pens</u> Adequate room and arranged to prevent cross contamination <u>Materials</u> Nontoxic material and nonbinding material, such as galvanized steel. <u>Number</u> At least 5 replicate pens are required for mallards housed in groups of 7. For other arrangements, at least 12 pens are required, but considerably more may be needed if birds are kept in pairs. Chicks are to be housed according to parental grouping.
Number of birds per pen (male:female)	2 birds/pen (1 male:1 female)	EPA requires one male and 1 female per pen. For quail, 1 male and 2 females is acceptable. For ducks, 2 males and 5 females is acceptable.
Number of pens per group/treatment negative control: solvent control: treated:	16 pens N/A 16 pens/treatment	EPA requires at least 12 pens, but considerably more if birds are kept in pairs. At least 16 is strongly recommended.

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Parameter	Details	Remarks
		Criteria
Test concentrations (ppm diet) nominal: measured:	0, 40, 200, or 1000 ppm <1 (LOD), 38, 180, or 990 ppm a.i.	<p>Mean-measured concentrations were reviewer-calculated from data provided in the table on p. 118. Samples for all test levels were collected from treated feed prepared for Weeks 1, 8, 12, and 20 [Weeks 1 (Day 7) and 4 were for stability purposes].</p> <p>Nominal concentrations were selected by the Sponsor based on toxicity data obtained from the LD₅₀ in the Mallard, sub-chronic feeding studies in rodents and non-rodents, the initial Estimated Environmental Concentration (EEC) at the maximum application rate (not specified), and the OECD testing guideline for such studies (pp. 15-16).</p> <hr/> <p><i>EPA requires at least two concentrations other than the control are required: three or more are recommended.</i></p>
Maximum labeled field residue anticipated and source of information:	Not specified	<p>It was reported (p. 8 of the companion avian reproduction study, MRID 45386228) that 1000 ppm is the limit concentration according to relevant OECD testing guidelines.</p> <hr/> <p><i>EPA requires that the highest test concentrations should show a significant effect or be at or above the actual or expected field residue level. The source [i.e., maximum label rate (in lb ai/A & ppm), label registration no., label date, and site should be cited]</i></p>

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Parameter	Details	Remarks
		Criteria
Solvent/vehicle, if used type: amount:	None used.	 <i>EPA requires corn oil or other appropriate vehicle not more than 2% of diet by weight</i>
Was detailed description and nutrient analysis of the basal diet provided? (Yes/No)	Yes	Basal diets contained $\geq 27\%$ protein, $\geq 2.5\%$ fat, $\leq 5\%$ fiber, and 5% limestone (p. 14). Offspring received basal diet without the addition of test substance or limestone. <i>EPA requires a commercial breeder feed (or its equivalent) that is appropriate for the test species.</i>
Preparation of test diet	The appropriate amount of sifted (600 μm) AE F130060 Technical was blended with a portion of basal ration for 1 minute in a Waring blender (Appendix XII, p. 111). The mixture was transferred to a Hobart mixer bowl containing additional basal ration and mixed for approximately 15 minutes. Separate pre-mixes were prepared for each concentration level approximately every 3-4 weeks, and were stored frozen until needed. Final diets were prepared weekly. The pre-mixes were combined with additional basal ration and limestone and mixed for approximately 20 minutes in a Patterson-Kelly twin shell dry blender prior to offering.	 <i>A premixed containing the test substance should be mechanically mixed with basal diet. If an evaporative vehicle is used, it must be completely evaporated prior to feeding.</i>
Indicate whether stability and homogeneity of test material in diet determined (Yes/No)	Yes	

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Parameter	Details	Remarks
		Criteria
Were concentrations in diet verified by chemical analysis?	Yes	Samples were analyzed from feed prepared during Weeks 1, 8, 12, and 20 [Weeks 1 (Day 7) and 4 were for stability purposes; Table on p. 118].
Did chemical analysis confirm that diet was stable? and homogeneous?	Yes Yes	<p>The stability of AE F130060 Technical was assessed in the treated feed prepared at all test levels after 7 days of ambient storage and 4 weeks of frozen storage. Recoveries averaged 94-103% of initial values after 7 days of ambient storage and 106-113% of initial values after 4 weeks of frozen storage (reviewer-calculated from mean recoveries provided in table on p. 118).</p> <p>The homogeneity of AE F130060 Technical was assessed in the treated feed prepared at all test levels; duplicate samples were collected from the top, middle, and bottom of batches prepared for Week 1. Coefficients of Variation were 2.0% for the 40 ppm level, 4.0% for the 200 ppm level, and 7.9% for the 1000 ppm level (reviewer-calculated from individual data provided on p. 129).</p>
Feeding and husbandry	Feeding and husbandry conditions appeared to be adequate, given guideline recommendations.	

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Parameter	Details	Remarks
		Criteria
Test conditions (pre-laying) temperature: relative humidity: photo-period:	$21.7 \pm 2.6^{\circ}\text{C}$ $62 \pm 19\%$ 6 hr light/day up through Week 10; 17 hr light/day thereafter.	Light intensity ranged from 335 ± 118 lux. Illumination was provided by fluorescent lights which closely approximated noon-day sunlight. <i>EPA Requires</i> <i>Temperature:</i> <i>About 21°C (70°F)</i> <i>Relative humidity:</i> <i>About 55%</i> <i>Lighting</i> <i>First 8 weeks: 7 h per day.</i> <i>Thereafter: 16-17 h per day.</i> <i>At least 6 foot candles at bird level.</i>
Egg Collection and Incubation		
Egg collection and storage collection interval: storage temperature: storage humidity:	Daily $13.3 \pm 0.3^{\circ}\text{C}$ $69 \pm 12\%$	To prevent pathogen contamination, the collected eggs were washed in a commercial egg washer with a chlorine-based detergent at 46°C for approximately 3 minutes. The washed eggs were allowed to cool to approximately room temperature and rinsed with fresh water prior to storage. <i>EPA requires eggs to be collected daily; egg storage temperature approximately 16°C (61°F); humidity approximately 65%.</i>
Were eggs candled for cracks prior to setting for incubation?	Yes	<i>EPA requires eggs to be candled on day 0</i>
Were eggs set weekly?	Yes	
Incubation conditions temperature: humidity:	$37.5 \pm 0.1^{\circ}\text{C}$ Approximately 56%	

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Parameter	Details	Remarks
		Criteria
When candling was done for fertility?	Days 14 or 15 for fertility and Day 20 for viability.	EPA requires: Quail: approx. day 11 Ducks: approx. day 14
When the eggs were transferred to the hatcher?	Day 24	EPA requires: Bobwhite: day 21 Mallard: day 23
Hatching conditions temperature:	37.2 ± 0.0°C	EPA requires: temperature of 39°C (102°F) humidity of 70%
humidity:	Approximately 76%	
photoperiod:	Not specified	
Day the hatched eggs were removed and counted	Days 27 or 28	EPA requires Bobwhite: day 24 Mallard: day 27
Were egg shells washed and dried for at least 48 hrs before measuring?	Yes, shells were washed and air-dried for at least 1 week.	
Egg shell thickness no. of eggs used:	One egg was collected (when available) from each odd numbered cage during odd numbered weeks and from each even numbered cage during the even numbered weeks.	EPA requires newly hatched eggs be collected at least once every two weeks. Thickness of the shell plus membrane should be measured to the nearest 0.01 mm; 3 - 4 measurements per shell.
intervals:	Once weekly throughout the egg laying period.	
mode of measurement:	Five points around the equatorial circumference were measured to the nearest 0.002 mm.	
Reference chemical, if used	None used	

2. Observations:

Table 3: Observations.

Parameter	Details	Remarks/Criteria
Parameters measured		
Parental: (mortality, body weight, mean feed consumption) Egg collection and subsequent development: (no. of eggs laid, no. of eggs cracked, shell thickness, no. of eggs set, no. of viable embryos, no. of live 3 week embryos, no. hatched, no. of 14-day survivors, average weight of 14-day-old survivors, mortality, gross pathology, others)	<ul style="list-style-type: none"> - mortality - body weight - food consumption - signs of toxicity - necropsy <ul style="list-style-type: none"> - eggs laid - eggs cracked - eggshell thickness - eggs set - viable embryos - live 3-week embryos - number of hatchlings - hatchling body weight - number of 14-day-old survivors - 14-day-old survivor body weight 	<hr/> EPA requires: <ul style="list-style-type: none"> • Eggs laid/pen • Eggs cracked/pen • Eggs set/pen • Viable embryos/pen • Live 3-week embryos/pen • Normal hatchlings/pen • 14-day-old survivors/pen • 14-day-old survivors/pen • Weights of 14-day-old survivors (mean per pen) • Egg shell thickness • Food consumption (mean per pen) • Initial and final body weight (mean per pen)
Indicate if the test material was regurgitated	No indications of dietary regurgitation.	
Observation intervals (for various parameters)	Parental: mortality and signs of toxicity were recorded once daily; body weights were recorded at Weeks 0, 2, 4, 6, 8 and 21 (test termination); and food consumption was determined weekly. Offspring survival was monitored daily, and body weights were recorded at 0 and 14 days.	<hr/> Body weights and food consumption must be measured at least biweekly.
Were raw data included?	Yes, sufficient.	

I. RESULTS AND DISCUSSION:

A. MORTALITY:

No mortality occurred during the 21-week study (p. 22).

Table 4: Effect of AE F130060 Technical on Mortality of *Anas Platyrhynchos*.

Treatment, ppm measured (and nominal) concentrations	Observation Period					
	Week 7		Week 14		Week 21	
	No. Dead Male	No. Dead Female	No. Dead Male	No. Dead Female	No. Dead Male	No. Dead Female
Control	0	0	0	0	0	0
38 (40)	0	0	0	0	0	0
180 (200)	0	0	0	0	0	0
990 (1000)	0	0	0	0	0	0

B. REPRODUCTIVE AND OTHER ENDPOINTS:

Abnormal Effects/Behavior: No clinical signs of toxicity were observed (p. 22). Incidental clinical observations normally associated with pen wear and/or interactions among pen mates were observed and included foot lesions, leg swelling, feather loss, lameness, and lower limb weakness. Raw data pertaining to clinical effects observed in parental ducks were not provided.

Food Consumption: No treatment-related effects on food consumption were observed (Table 2; p. 28). A statistically-significant decrease in mean feed consumption was observed during Week 16 at the 40 ppm level compared to the control group. However, since the difference was observed at the lowest test group and was not consistent over time, it was not considered to be related to treatment. Overall feed consumption averaged 145.6 g/bird/day for the control group, and 130.0, 143.0, and 141.4 g/bird/day for the 40, 200, and 1000 ppm test groups, respectively.

Body Weight: No treatment-related effects on body weight were observed (Table 1, p. 27). A slight statistically-significant increase in body weight was observed in males from the 1000 ppm group at test termination compared to the control group. Since the difference was slight (<10%) and represented an increase in body weight, it was considered not to be treatment-related.

Necropsy: All necropsy findings were considered incidental to treatment (Table 4, pp. 30-31).

Reproductive Effects: No treatment-related effects on egg production, fertility, embryonic development, or hatchability were observed (Tables 5-7, pp. 32-34). A slight statistically-significant reduction in the percentage of live 3-week embryos/viable embryos was observed at the 40 ppm group compared to the control (98 versus 100%). The study authors noted that this slight difference was primarily due to exceptional performance by the control group, and that since the percentage of live 3-week embryos was consistent with the historical control

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value of 98%, and the reduction was not concentration-dependent, that the difference was not considered to be treatment-related (pp. 23-24). A slight statistically-significant reduction in the percentage of hatchlings/live 3-week embryos was observed at the 40 ppm group compared to the control (76 versus 93%). The study authors noted that, again, this difference was primarily due to the exceptional performance by the control group, and that since the hatchability was comparable to the historical control value of $73 \pm 13\%$, and the reduction was not concentration-dependent, that the difference was not considered to be treatment-related (p. 24).

The health of the hatchlings during the 14-day maintenance period was not monitored. No treatment-related effects on hatchling or 14-day old chick body weights were observed (Table 8, p. 35).

Table 5: Reproductive and other parameters (study author-reported).

Parameter	Control	40 ppm	200 ppm	1000 ppm	NOEC/ LOEC
Egg laid	810	803	693	801	N/A
Eggs laid/hen	51	50	43	50	1000 ppm >1000 ppm
Eggs laid/hen/day	0.65	0.64	0.56	0.64	1000 ppm >1000 ppm
Eggs cracked	17	12	3	16	N/A
Eggs cracked/eggs laid (%)	2	2	0	2	1000 ppm >1000 ppm
Shell thickness (mm \pm SD)	0.386 \pm 0.015	0.374 \pm 0.016	0.374 \pm 0.026	0.379 \pm 0.015	1000 ppm >1000 ppm
Eggs set	715	708	625	698	N/A
Viable embryos	655	641	537	599	N/A
Viable embryos/eggs set (%)	91	91	86	86	1000 ppm >1000 ppm
Live 3-week embryos	653	628	534	591	N/A
Live 3-week embryos/viable embryos (%)	100	98*	100	99	1000 ppm >1000 ppm
No. of hatchlings	598	502	484	515	N/A
No. of hatchlings/live 3-week embryos (%)	93	76*	91	86	1000 ppm >1000 ppm
No. of hatchlings/eggs set (%)	83	71	78	73	1000 ppm >1000 ppm
Hatchling weight (g)	34	34	35	35	1000 ppm >1000 ppm

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Parameter	Control	40 ppm	200 ppm	1000 ppm	NOEC/LOEC
No. of 14-day old survivors	592	494	475	513	N/A
No. of 14-day old survivors/hen	37	31	30	32	N/A
No. of 14-day old survivors/No. of hatchlings (%)	99	99	98	100	1000 ppm >1000 ppm
No. of 14-day old survivors/eggs set (%)	83	70	76	73	1000 ppm >1000 ppm
14-day old survivors weight (g)	263	271	272	274	1000 ppm >1000 ppm
Mean adult food consumption (g/pen/day)	145.6	130.0	143.0	141.4	1000 ppm >1000 ppm
Weight of adult males, g at start of treatment: at Week 8: at Week 20 (study termination):	1104 1147 1183	1125 1187 1207	1102 1197 1220	1114 1221 1297**	1000 ppm >1000 ppm
Weight of adult females, g at start of treatment: at Week 8: at Week 20 (study termination):	996 1041 1207	1010 1072 1252	966 1015 1191	969 1012 1215	1000 ppm >1000 ppm
Gross pathology (proportion of birds with pathological incidents)	15/32	13/32	12/32	16/32	1000 ppm >1000 ppm

N/A = Not statistically-analyzed.

* Statistically different from the control at $p < 0.05$.

** Statistically different from the control at $p < 0.01$.

C. REPORTED STATISTICS:

The following variables were statistically analyzed: adult body weight, adult feed consumption, eggs laid of maximum laid, eggs cracked of eggs laid, viable embryos of eggs set, live 3-week embryos of viable embryos, hatchlings of 3-week embryos, 14-day old survivors of hatchlings, hatchlings of eggs set, 14-day old survivors of eggs set, hatchlings of maximum set, 14-day old survivors of maximum set, egg shell thickness, and offspring's body weight.

An analysis of variance (ANOVA) was performed to determine statistically-significant differences between groups. Dunnett's multiple comparison procedure was then used to compare the treatment means with the control group mean. Sample units were the individual pens within each experimental group, except adult body weights, where the sample unit was the individual bird. Percentage data were examined using Dunnett's method following arcsine square root transformation. Nominal concentrations were used for all estimations.

D. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: Analysis was conducted using "chicks.sas" (Ver. 3; March 2002), a SAS program provided by EFED/OPP/USEPA. Data for all endpoints were examined graphically using box plots to determine if they exhibited a dose-dependent response, which was ultimately used to select the multiple comparison test to detect LOAEC and NOAEC. Data for each endpoint were tested to determine if their distributions were normal and if their variances were homogeneous using Shapiro-Wilk's and Levene's tests, respectively. Data that satisfied these assumptions were subjected to Dunnett's and William's tests and data that did not satisfy these assumptions were subjected to the nonparametric Mann-Whitney-U (with a Bonferroni adjustment) and Jonckheere's tests. Data for dead birds were excluded from the analyses. See Appendix I for output of reviewer's statistical verification and graphs for affected endpoints to support any reviewer-generated conclusions that may differ from those reported in the study.

The reviewer's analysis detected a significant reduction in the ratio of live embryos to viable embryos at the lowest treatment group.

Table 6. Reproductive and other parameters (reviewer-reported).

Parameter	Control	38 ppm	180 ppm	990 ppm	NOEC/ LOEC
Eggs laid/pen	50.6	50.2	43.3	50.1	990 ppm >990 ppm
Eggs cracked/pen	1.1	0.8	0.2	1.1	990 ppm >990 ppm
Eggs not cracked/eggs laid (%)	97.8	98.2	99.6	97.9	990 ppm >990 ppm
Eggs set/pen	44.7	44.2	39.1	43.6	990 ppm >990 ppm
Shell thickness	0.39	0.37	0.37	0.38	990 ppm >990 ppm
Eggs set/eggs laid (%)	87.9	87.4	83.7	87.0	990 ppm >990 ppm
Viable embryo/pen	40.9	40.1	33.6	37.4	990 ppm >990 ppm
Viable embryos/eggs set (%)	90.6	91.3	85.7	86.4	990 ppm >990 ppm
Live embryos/pen	40.8	39.2	33.4	36.9	990 ppm >990 ppm
Live embryo/viable embryo (%)	99.7	98.0	99.5	98.7	<38 ppm 38 ppm
No. of hatchlings/pen	37.4	31.4	30.2	32.2	990 ppm >990 ppm

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Parameter	Control	38 ppm	180 ppm	990 ppm	NOEC/ LOEC
No. of hatchlings/eggs laid (%)	73.3	62.2	65.3	64.1	990 ppm >990 ppm
No. of hatchlings/eggs set (%)	83.4	70.9	77.9	73.3	990 ppm >990 ppm
No. of hatchlings/live embryo (%)	92.5	76.3	90.8	85.8	990 ppm >990 ppm
Hatchling survival/pen	37.0	30.9	39.7	32.1	990 ppm >990 ppm
Hatchling survival/eggs set (%)	82.5	69.8	76.2	73.1	990 ppm >990 ppm
Hatchling survival/no. of hatchlings (%)	99.0	98.7	97.9	99.7	990 ppm >990 ppm
Hatchling weight (g)	34.4	33.7	35.2	35.3	990 ppm >990 ppm
Survivor weight (g)	262.6	270.7	271.8	274.1	990 ppm >990 ppm
Mean food consumption (g/bird/day)	145.8	129.9	142.7	141.4	990 ppm >990 ppm
Male weight gain (g)	78.9	81.9	118.1	182.9	990 ppm >990 ppm
Female weight gain (g)	210.6	241.9	224.9	246.2	990 ppm >990 ppm

E. STUDY DEFICIENCIES:

This study is considered scientifically valid, and the deficiencies listed were generally considered minor by the reviewer. However, since the study was conducted at concentrations that did not elicit an adverse effect, and since the maximum labeled field residue was not provided, it is unknown if the highest level tested was at an appropriate level to approximate field exposure for this species. Therefore, this study does not fulfill guideline requirements for the reproductive toxicity of AE F130060 Technical (Mesosulfuron-methyl) to the Mallard duck (§71-4b).

F. REVIEWER'S COMMENTS:

Results of the reviewer's statistical analyses were nearly identical to those of the study author. Both the reviewer's and the study author's analyses detected a significant reduction in the ratio of live embryos to viable

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

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embryos at the lowest treatment group; the study author dismissed this adverse effect, attributing it to exceptional performance in the control group. Because response in the lowest treatment group was lower than the control and remaining treatment groups, the reviewer considered the response to be biologically significant. As a result, the reviewer concluded that a NOEC could not be determined in this study (<38 ppm).

Based on mean feed consumption, the study author calculated a mean test substance intake of 4.6, 25.8, and 126 mg/kg bw/day for the 40, 200, and 1000 ppm groups, respectively (Table 3, p. 29).

On Day 1 of the test, a female from the 1000 ppm group began producing eggs. This hen was promptly replaced with a comparable female from the group of birds that had been acclimated with the test birds, and all data provided in the study were from the replacement bird (p. 13).

G. CONCLUSIONS:

This study is scientifically sound, but does not fulfill guideline requirements because the lowest concentration tested elicited an adverse effect on a reproductive parameter. A subsequent NOEC was not established. This study is therefore classified as SUPPLEMENTAL.

NOEC: <38 ppm

LOEC: 38 ppm

Endpoint(s) Affected: ratio of live embryos to viable embryos

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III. REFERENCES:

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

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APPENDIX I. OUTPUT OF REVIEWER'S STATISTICAL VERIFICATION:

Mallard repro, Mesosulfuron-methyl, MRID 45386229

PRINTOUT OF RAW DATA

Obs	TRT	EL	EC	ENC_EL	ES	ES_EL	VE	VE_ES	LE	LE_VE	NH	NH_EL	NH_ES
1	Ctrl	56	1	98.21	51	91.07	47	92.16	47	100.00	44	78.57	86.27
2	Ctrl	62	2	96.77	54	87.10	49	90.74	49	100.00	47	75.81	87.04
3	Ctrl	43	3	93.02	36	83.72	35	97.22	35	100.00	33	76.74	91.67
4	Ctrl	58	0	100.00	53	91.38	52	98.11	51	98.08	45	77.59	84.91
5	Ctrl	61	0	100.00	57	93.44	54	94.74	54	100.00	51	83.61	89.47
6	Ctrl	61	1	98.36	55	90.16	53	96.36	53	100.00	42	68.85	76.36
7	Ctrl	52	0	100.00	47	90.38	46	97.87	46	100.00	45	86.54	95.74
8	Ctrl	60	1	98.33	52	86.67	43	82.69	43	100.00	40	66.67	76.92
9	Ctrl	44	0	100.00	41	93.18	39	95.12	39	100.00	34	77.27	82.93
10	Ctrl	33	0	100.00	30	90.91	15	50.00	15	100.00	15	45.45	50.00
11	Ctrl	68	1	98.53	62	91.18	61	98.39	61	100.00	54	79.41	87.10
12	Ctrl	38	0	100.00	35	92.11	33	94.29	33	100.00	31	81.58	88.57
13	Ctrl	61	5	91.80	47	77.05	37	78.72	36	97.30	32	52.46	68.09
14	Ctrl	55	1	98.18	48	87.27	48	100.00	48	100.00	43	78.18	89.58
15	Ctrl	26	2	92.31	20	76.92	19	95.00	19	100.00	18	69.23	90.00
16	Ctrl	32	0	100.00	27	84.38	24	88.89	24	100.00	24	75.00	88.89
17	Dose1	67	0	100.00	62	92.54	29	46.77	28	96.55	6	8.96	9.68
18	Dose1	64	1	98.44	57	89.06	51	89.47	51	100.00	41	64.06	71.93
19	Dose1	38	0	100.00	34	89.47	32	94.12	32	100.00	31	81.58	91.18
20	Dose1	64	1	98.44	58	90.63	57	98.28	56	98.25	54	84.38	93.10
21	Dose1	56	0	100.00	49	87.50	46	93.88	45	97.83	20	35.71	40.82
22	Dose1	49	0	100.00	44	89.80	43	97.73	40	93.02	36	73.47	81.82
23	Dose1	44	6	86.36	28	63.64	26	92.86	26	100.00	23	52.27	82.14
24	Dose1	0	.	.	C	.	0	.	0	.	0	.	.
25	Dose1	50	0	100.00	44	88.00	43	97.73	43	100.00	38	76.00	86.36
26	Dose1	66	0	100.00	60	90.91	60	100.00	58	96.67	55	83.33	91.67
27	Dose1	65	0	100.00	60	92.31	52	86.67	49	94.23	33	50.77	55.00
28	Dose1	53	0	100.00	48	90.57	47	97.92	46	97.87	44	83.02	91.67
29	Dose1	34	2	94.12	27	79.41	23	85.19	22	95.65	2	5.88	7.41
30	Dose1	53	0	100.00	49	92.45	45	91.84	45	100.00	40	75.47	81.63
31	Dose1	54	1	98.15	49	90.74	49	100.00	49	100.00	44	81.48	89.80
32	Dose1	46	1	97.83	39	84.78	38	97.44	38	100.00	35	76.09	89.74
33	Dose2	55	0	100.00	51	92.73	49	96.08	49	100.00	47	85.45	92.16
34	Dose2	62	0	100.00	56	90.32	54	96.43	53	98.15	47	75.81	83.93
35	Dose2	26	0	100.00	23	88.46	21	91.30	21	100.00	20	76.92	86.96
36	Dose2	0	.	.	0	.	0	.	0	.	0	.	.
37	Dose2	62	0	100.00	58	93.55	57	98.28	57	100.00	47	75.81	81.03
38	Dose2	1	0	100.00	0	0.00	0	.	0	.	0	0.00	.
39	Dose2	55	0	100.00	47	85.45	46	97.87	45	97.83	40	72.73	85.11
40	Dose2	72	0	100.00	66	91.67	42	63.64	42	100.00	28	38.89	42.42
41	Dose2	48	1	97.92	42	87.50	0	0.00	0	.	0	0.00	0.00
42	Dose2	63	1	98.41	57	90.48	54	94.74	54	100.00	51	80.95	89.47
43	Dose2	51	1	98.04	45	88.24	42	93.33	42	100.00	42	82.35	93.33
44	Dose2	43	0	100.00	39	90.70	37	94.87	37	100.00	32	74.42	82.05
45	Dose2	53	0	100.00	48	90.57	45	93.75	45	100.00	45	84.91	93.75
46	Dose2	56	0	100.00	51	91.07	48	94.12	48	100.00	47	83.93	92.16
47	Dose2	46	0	100.00	42	91.30	42	100.00	41	97.62	38	82.61	90.48
48	Dose2	0	.	.	0	.	0	.	0	.	0	.	.

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49	Dose3	50	1	98.00	44	88.00	40	90.91	39	97.50	35	70.00	79.55
50	Dose3	64	0	100.00	59	92.19	56	94.92	53	94.64	49	76.56	83.05
51	Dose3	53	0	100.00	49	92.45	48	97.96	48	100.00	47	88.68	95.92
52	Dose3	64	1	98.44	54	84.38	49	90.74	49	100.00	49	76.56	90.74
53	Dose3	43	0	100.00	37	86.05	22	59.46	22	100.00	17	39.53	45.95
54	Dose3	52	2	96.15	44	84.62	40	90.91	39	97.50	36	69.23	81.82
55	Dose3	0	.	.	0	.	0	.	0	.	0	.	.
56	Dose3	58	0	100.00	49	84.48	47	95.92	46	97.87	36	62.07	73.47
57	Dose3	42	3	92.86	35	83.33	35	100.00	35	100.00	22	52.38	62.86
58	Dose3	50	0	100.00	45	90.00	44	97.78	44	100.00	42	84.00	93.33
59	Dose3	59	1	98.31	53	89.83	50	94.34	50	100.00	40	67.80	75.47
60	Dose3	62	1	98.39	54	87.10	0	0.00	0	.	0	0.00	0.00
61	Dose3	55	6	89.09	42	76.36	37	88.10	35	94.59	27	49.09	64.29
62	Dose3	40	1	97.50	35	87.50	34	97.14	34	100.00	25	62.50	71.43
63	Dose3	47	0	100.00	41	87.23	41	100.00	41	100.00	35	74.47	85.37
64	Dose3	62	0	100.00	57	91.94	56	98.25	56	100.00	55	88.71	96.49

Mallard repro, Mesosulfuron-methyl, MRID 45386229

PRINTOUT OF RAW DATA (continued)

Obs	TRT	NH_LE	HS	HS_ES	HS_NH	THICK	HATWT	SURVWT	FOOD	WTGAINM	WTGAINF
1	Ctrl	93.62	44	86.27	100.00	0.37	36	255	132	134	104
2	Ctrl	95.92	46	85.19	97.87	0.38	33	270	99	77	303
3	Ctrl	94.29	33	91.67	100.00	0.41	38	298	108	-15	352
4	Ctrl	88.24	44	83.02	97.78	0.41	32	248	192	100	301
5	Ctrl	94.44	51	89.47	100.00	0.39	34	253	146	111	199
6	Ctrl	79.25	41	74.55	97.62	0.41	37	277	164	217	184
7	Ctrl	97.83	45	95.74	100.00	0.38	32	267	165	34	218
8	Ctrl	93.02	40	76.92	100.00	0.39	36	233	127	103	262
9	Ctrl	87.18	34	82.93	100.00	0.38	34	264	146	63	317
10	Ctrl	100.00	15	50.00	100.00	0.38	36	266	124	236	33
11	Ctrl	88.52	54	87.10	100.00	0.38	35	302	190	-90	252
12	Ctrl	93.94	30	85.71	96.77	0.39	33	289	141	23	287
13	Ctrl	88.89	32	68.09	100.00	0.37	36	289	123	178	343
14	Ctrl	89.58	42	87.50	97.67	0.41	33	246	141	-1	255
15	Ctrl	94.74	18	90.00	100.00	0.38	33	237	196	48	43
16	Ctrl	100.00	23	85.19	95.83	0.36	32	207	138	44	-84
17	Dose1	21.43	6	9.68	100.00	0.36	32	183	117	-50	378
18	Dose1	80.39	41	71.93	100.00	0.38	32	264	139	145	239
19	Dose1	96.88	30	88.24	96.77	0.37	33	244	144	36	124
20	Dose1	96.43	53	91.38	98.15	0.37	33	282	128	38	194
21	Dose1	44.44	20	40.62	100.00	0.38	34	280	107	33	235
22	Dose1	90.00	36	81.82	100.00	0.38	34	312	132	115	255
23	Dose1	88.46	23	82.14	100.00	0.41	35	276	120	33	165
24	Dose1	.	0	.	.	.	.	.	119	49	702
25	Dose1	88.37	35	79.55	92.11	0.37	31	276	137	82	192
26	Dose1	94.83	55	91.67	100.00	0.37	31	268	115	90	123
27	Dose1	67.35	33	55.00	100.00	0.40	35	243	129	53	210
28	Dose1	95.65	44	91.67	100.00	0.35	35	283	133	283	283
29	Dose1	9.09	2	7.41	100.00	0.36	38	314	142	168	235
30	Dose1	88.89	40	81.63	100.00	0.39	37	320	186	77	286
31	Dose1	89.80	41	83.67	93.18	0.36	33	271	126	160	118
32	Dose1	92.11	35	89.74	100.00	0.36	32	245	105	-1	131
33	Dose2	95.92	47	92.16	100.00	0.36	33	253	182	126	130

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34	Dose2	88.68	47	83.93	100.00	0.36	35	237	105	62	331
35	Dose2	95.24	19	82.61	95.00	0.35	36	286	105	170	116
36	Dose2	.	0	.	.	.	.	.	120	120	300
37	Dose2	82.46	47	81.03	100.00	0.42	38	291	193	49	316
38	Dose2	.	0	.	.	0.35	.	.	139	97	314
39	Dose2	88.89	38	80.85	95.00	0.38	38	274	175	122	345
40	Dose2	66.67	28	42.42	100.00	0.41	39	287	191	187	312
41	Dose2	.	0	0.00	.	0.35	.	.	109	31	253
42	Dose2	94.44	51	89.47	100.00	0.39	35	275	149	168	153
43	Dose2	100.00	40	88.89	95.24	0.36	35	269	130	197	144
44	Dose2	86.49	31	79.49	96.88	0.37	34	304	162	148	95
45	Dose2	100.00	44	91.67	97.78	0.42	33	270	149	24	160
46	Dose2	97.92	46	90.20	97.87	0.34	35	234	117	131	194
47	Dose2	92.68	37	88.10	97.37	0.37	31	281	117	70	243
48	Dose2	.	0	.	.	.	.	.	140	188	192
49	Dose3	89.74	35	79.55	100.00	0.37	36	262	141	222	216
50	Dose3	92.45	48	81.36	97.96	0.39	37	298	156	153	311
51	Dose3	97.92	46	93.88	97.87	0.38	35	287	112	400	394
52	Dose3	100.00	49	90.74	100.00	0.38	37	279	112	25	202
53	Dose3	77.27	17	45.95	100.00	0.36	38	248	127	127	345
54	Dose3	92.31	36	81.82	100.00	0.38	31	217	144	199	-47
55	Dose3	.	0	.	.	.	.	.	91	118	183
56	Dose3	78.26	36	73.47	100.00	0.40	34	266	189	266	174
57	Dose3	62.86	22	62.86	100.00	0.38	36	309	184	191	251
58	Dose3	95.45	42	93.33	100.00	0.37	35	283	116	138	434
59	Dose3	80.00	40	75.47	100.00	0.37	39	303	127	191	442
60	Dose3	.	0	0.00	.	0.40	.	.	132	198	230
61	Dose3	77.14	27	64.29	100.00	0.37	34	276	200	129	225
62	Dose3	73.53	25	71.43	100.00	0.39	35	290	125	278	182
63	Dose3	85.37	35	85.37	100.00	0.40	35	255	155	176	237
64	Dose3	98.21	55	96.49	100.00	0.36	32	265	152	116	161

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE EL (Eggs Laid)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.863	<.001	1.858	0.146	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	50.63	12.84	3.21	25.36	43.78,	57.47
Dose1	16	50.19	16.70	4.18	33.28	41.29,	59.09
Dose2	16	43.31	23.62	5.90	54.53	30.73,	55.90
Dose3	16	50.06	15.46	3.86	30.88	41.82,	58.30

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	55.50	26.00	68.00	.	.
Dose1	53.00	0.00	67.00	99.14	0.86
Dose2	52.00	0.00	72.00	85.56	14.44
Dose3	52.50	0.00	64.00	98.89	1.11

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.56	0.906

MannWhit (Bonf) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bonf adjust) p-value	Jonckheere p-value
Ctrl	55.50	.	.
Dose1	53.00	1.000	0.597
Dose2	52.00	0.901	0.311
Dose3	52.50	1.000	0.407

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE NEG_EC (Eggs Cracked)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.711	<.001	1.543	0.214	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	1.06	1.39	0.35	130.72	0.32,	1.80
Dose1	15	0.80	1.57	0.40	195.94	0.00,	1.67
Dose2	14	0.21	0.43	0.11	198.71	0.00,	0.46
Dose3	15	1.07	1.62	0.42	152.27	0.17,	1.97

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	1.00	0.00	5.00	.	.
Dose1	0.00	0.00	6.00	75.29	24.71
Dose2	0.00	0.00	1.00	20.17	79.83
Dose3	1.00	0.00	6.00	100.39	-0.39

 NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	5.31	0.150

MannWhit(Bon) - testing each trt median signif. greater than control
 Jonckheere - test assumes dose-response relationship, testing positive trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	1.00	.	.
Dose1	0.00	1.000	0.823
Dose2	0.00	1.000	0.983
Dose3	1.00	1.000	0.721

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE ENC_EL ((EL-EC)/EL (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.710	<.001	2.025	0.121	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	97.85	2.89	0.72	2.95	96.31,	99.39
Dose1	15	98.22	3.65	0.94	3.71	96.20,	100.00
Dose2	14	99.60	0.81	0.22	0.81	99.13,	100.00
Dose3	15	97.92	3.14	0.81	3.20	96.18,	99.65

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	98.45	91.80	100.00	.	.
Dose1	100.00	86.36	100.00	100.38	-0.38
Dose2	100.00	97.92	100.00	101.79	-1.79
Dose3	98.44	89.09	100.00	100.07	-0.07

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests
 Kruskal-Wallis test - equality among treatment groups
 Degrees of Freedom TestStat P-value
 3 4.64 0.201

MannWhit(Bonf) - testing each trt median signif. less than control
 Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bonf adjust)p-value	Jonckheere p-value
Ctrl	98.45	.	.
Dose1	100.00	1.000	0.797
Dose2	100.00	1.000	0.973
Dose3	98.44	1.000	0.667

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE ES (Eggs Set)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.886	<.001	1.754	0.166	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	44.69	11.97	2.99	26.79	38.31,	51.07
Dose1	16	44.25	16.12	4.03	36.43	35.66,	52.84
Dose2	16	39.06	21.62	5.40	55.34	27.54,	50.58
Dose3	16	43.63	13.87	3.47	31.78	36.24,	51.01

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	47.50	20.00	62.00	.	.
Dose1	48.50	0.00	62.00	99.02	0.98
Dose2	46.00	0.00	66.00	87.41	12.59
Dose3	44.50	0.00	59.00	97.62	2.38

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests
 Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.37	0.947

MannWhit (Bon) - testing each trt median signif. less than control
 Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bonf adjust) p-value	Jonckheere p-value
Ctrl	47.50	.	.
Dose1	48.50	1.000	0.590
Dose2	46.00	1.000	0.349
Dose3	44.50	1.000	0.357

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229

ANALYSIS RESULTS FOR VARIABLE ES_EL (EggsSet/EggsLaid (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.466	<.001	2.116	0.108	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	87.93	5.17	1.29	5.87	85.18,	90.68
Dose1	15	87.45	7.41	1.91	8.47	83.35,	91.56
Dose2	14	83.72	24.19	6.46	28.89	69.75,	97.68
Dose3	15	87.03	4.19	1.08	4.81	84.71,	89.35

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	90.27	76.92	93.44	.	.
Dose1	89.80	63.64	92.54	99.46	0.54
Dose2	90.52	0.00	93.55	95.21	4.79
Dose3	87.23	76.36	92.45	98.97	1.03

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.27	0.352

MannWhit (Bonf) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bonf adjust) p-value	Jonckheere p-value
Ctrl	90.27	.	.
Dose1	89.80	1.000	0.492
Dose2	90.52	1.000	0.699
Dose3	87.23	0.603	0.169

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE VE (Viable Embryo(d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.893	<.001	2.104	0.109	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	40.94	13.12	3.28	32.04	33.95,	47.93
Dose1	16	40.06	15.14	3.78	37.78	32.00,	48.13
Dose2	16	33.56	21.61	5.40	64.39	22.05,	45.08
Dose3	16	37.44	16.95	4.24	45.29	28.40,	46.47

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	44.50	15.00	61.00	.	.
Dose1	44.00	0.00	60.00	97.86	2.14
Dose2	42.00	0.00	57.00	81.98	18.02
Dose3	40.50	0.00	56.00	91.45	8.55

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.63	0.890

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	44.50	.	.
Dose1	44.00	1.000	0.440
Dose2	42.00	0.807	0.224
Dose3	40.50	1.000	0.236

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229

ANALYSIS RESULTS FOR VARIABLE VE_ES (ViableEmbryo/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.568	<.001	1.267	0.295	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	90.64	12.28	3.07	13.55	84.10,	97.19
Dose1	15	91.32	13.16	3.40	14.41	84.03,	98.61
Dose2	13	85.72	27.32	7.58	31.87	69.21,	100.00
Dose3	15	86.43	25.87	6.68	29.93	72.10,	100.00

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	94.87	50.00	100.00	.	.
Dose1	94.12	46.77	100.00	100.75	-0.75
Dose2	94.74	0.00	100.00	94.57	5.43
Dose3	94.92	0.00	100.00	95.35	4.65

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.07	0.995

MannWhit (Bonf) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bonf adjust)p-value	Jonckheere p-value
Ctrl	94.87	.	.
Dose1	94.12	1.000	0.609
Dose2	94.74	1.000	0.517
Dose3	94.92	1.000	0.532

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE LE (Live Embryo(d21))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.893	<.001	2.165	0.101	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	40.81	13.09	3.27	32.06	33.84	47.79
Dose1	16	39.25	14.79	3.70	37.68	31.37	47.13
Dose2	16	33.38	21.49	5.37	64.38	21.93	44.82
Dose3	16	36.94	16.70	4.18	45.22	28.04	45.84

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	44.50	15.00	61.00	.	.
Dose1	44.00	0.00	58.00	96.17	3.83
Dose2	42.00	0.00	57.00	81.78	18.22
Dose3	40.00	0.00	56.00	90.51	9.49

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.61	0.894

MannWhit(Bonf) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bonf adjust)p-value	Jonckheere p-value
Ctrl	44.50	.	.
Dose1	44.00	1.000	0.403
Dose2	42.00	0.771	0.227
Dose3	40.00	0.921	0.228

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229

ANALYSIS RESULTS FOR VARIABLE LE_VE (LiveEmbryo/ViableEmbryo (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.865	<.001	7.658	<.001	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	99.71	0.80	0.20	0.81	99.28,	100.00
Dose1	15	98.00	2.34	0.60	2.38	96.71,	99.30
Dose2	12	99.47	0.97	0.28	0.98	98.85,	100.00
Dose3	14	98.72	2.00	0.53	2.03	97.57,	99.88

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	100.00	97.30	100.00	.	.
Dose1	98.25	93.02	100.00	98.29	1.71
Dose2	100.00	97.62	100.00	99.75	0.25
Dose3	100.00	94.59	100.00	99.01	0.99

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	7.34	0.062

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	98.25	0.027	0.006
Dose2	100.00	1.000	0.182
Dose3	100.00	1.000	0.164

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	<lowest dose	Dose1
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE NH (Number Hatched)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.913	<.001	1.811	0.155	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	37.38	11.34	2.84	30.35	31.33,	43.42
Dose1	16	31.38	16.99	4.25	54.14	22.32,	40.43
Dose2	16	30.25	19.73	4.93	65.21	19.74,	40.76
Dose3	16	32.19	16.31	4.08	50.69	23.49,	40.88

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	41.00	15.00	54.00	.	.
Dose1	35.50	0.00	55.00	83.95	16.05
Dose2	39.00	0.00	51.00	80.94	19.06
Dose3	35.50	0.00	55.00	86.12	13.88

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests
 Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.87	0.832

MannWhit(Bonf) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bonf adjust)p-value	Jonckheere p-value
Ctrl	41.00	.	.
Dose1	35.50	0.515	0.163
Dose2	39.00	0.881	0.245
Dose3	35.50	0.789	0.266

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229

ANALYSIS RESULTS FOR VARIABLE NH_EL (NumberHatched/EggsLaid (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.806	<.001	3.059	0.036	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	73.31	10.91	2.73	14.88	67.50,	79.12
Dose1	15	62.16	26.39	6.81	42.44	47.55,	76.78
Dose2	14	65.34	29.99	8.02	45.90	48.02,	82.66
Dose3	15	64.11	22.65	5.85	35.33	51.56,	76.65

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	77.01	45.45	86.54	.	.
Dose1	75.47	5.88	84.38	84.80	15.20
Dose2	76.36	0.00	85.45	89.13	10.87
Dose3	69.23	0.00	88.71	87.44	12.56

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.96	0.580

MannWhit (Bonf) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bonf adjust) p-value	Jonckheere p-value
Ctrl	77.01	.	.
Dose1	75.47	0.619	0.198
Dose2	76.36	1.000	0.488
Dose3	69.23	0.265	0.212

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229

ANALYSIS RESULTS FOR VARIABLE NH_ES (NumberHatched/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.763	<.001	2.289	0.089	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	83.35	11.18	2.80	13.42	77.39,	89.30
Dose1	15	70.93	29.30	7.56	41.31	54.70,	87.15
Dose2	13	77.91	26.94	7.47	34.58	61.63,	94.19
Dose3	15	73.31	24.53	6.33	33.46	59.73,	86.90

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	87.07	50.00	95.74	.	.
Dose1	82.14	7.41	93.10	85.10	14.90
Dose2	86.96	0.00	93.75	93.48	6.52
Dose3	79.55	0.00	96.49	87.96	12.04

NON-PARAMETRIC ANALYSES

- use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.02	0.569

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	87.07	.	.
Dose1	82.14	0.896	0.290
Dose2	86.96	1.000	0.619
Dose3	79.55	0.334	0.269

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229

ANALYSIS RESULTS FOR VARIABLE NH_LE (NumberHatched/LiveEmbryo (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.812	<.001	9.341	<.001	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	92.47	5.34	1.33	5.77	89.62,	95.31
Dose1	15	76.27	28.36	7.32	37.18	60.57,	91.98
Dose2	12	90.78	9.35	2.70	10.30	84.84,	96.72
Dose3	14	85.75	11.14	2.98	12.99	79.32,	92.18

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	93.78	79.25	100.00	.	.
Dose1	88.89	9.09	96.88	82.49	17.51
Dose2	93.56	66.67	100.00	98.18	1.82
Dose3	87.55	62.86	100.00	92.74	7.26

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	4.43	0.219

MannWhit (Bonf) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bonf adjust) p-value	Jonckheere p-value
Ctrl	93.78	.	.
Dose1	88.89	0.186	0.055
Dose2	93.56	1.000	0.399
Dose3	87.55	0.210	0.188

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust),	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE HS (Hatching Survival(d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.919	<.001	1.712	0.174	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	37.00	11.31	2.83	30.56	30.97,	43.03
Dose1	16	30.88	16.70	4.18	54.09	21.98,	39.77
Dose2	16	29.69	19.49	4.87	65.65	19.30,	40.07
Dose3	16	32.06	16.19	4.05	50.49	23.44,	40.69

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	40.50	15.00	54.00	.	.
Dose1	35.00	0.00	55.00	83.45	16.55
Dose2	37.50	0.00	51.00	80.24	19.76
Dose3	35.50	0.00	55.00	86.66	13.34

 NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups
 Degrees of Freedom TestStat P-value
 3 0.93 0.818

MannWhit(Bonf) - testing each trt median signif. less than control
 Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bonf adjust)p-value	Jonckheere p-value
Ctrl	40.50	.	.
Dose1	35.00	0.488	0.154
Dose2	37.50	0.825	0.216
Dose3	35.50	0.826	0.266

SUMMARY
 MannWhit (Bonf adjust) NOEC Dose3 >highest dose
 Jonckheere Dose3 >highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229

ANALYSIS RESULTS FOR VARIABLE HS_ES (HatchingSurvival/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.763	<.001	2.246	0.093	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	82.46	10.98	2.74	13.32	76.61,	88.31
Dose1	15	69.76	28.60	7.39	41.01	53.92,	85.60
Dose2	13	76.22	26.26	7.28	34.45	60.35,	92.08
Dose3	15	73.07	24.36	6.29	33.34	59.58,	86.56

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	85.45	50.00	95.74	.	.
Dose1	81.82	7.41	91.67	84.59	15.41
Dose2	83.93	0.00	92.16	92.43	7.57
Dose3	79.55	0.00	96.49	88.61	11.39

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.83	0.608

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	85.45	.	.
Dose1	81.82	0.454	0.143
Dose2	83.93	1.000	0.377
Dose3	79.55	0.356	0.200

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229

ANALYSIS RESULTS FOR VARIABLE HS_NH (HatchingSurvival/NumberHatched (3))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.842	<.001	4.885	0.005	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	98.97	1.45	0.36	1.46	98.20,	99.74
Dose1	15	98.68	2.63	0.68	2.66	97.23,	100.00
Dose2	12	97.93	2.07	0.60	2.12	96.61,	99.25
Dose3	14	99.70	0.76	0.20	0.76	99.27,	100.00

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	100.00	95.83	100.00	.	.
Dose1	100.00	92.11	100.00	99.71	0.29
Dose2	97.83	95.00	100.00	98.94	1.06
Dose3	100.00	97.87	100.00	100.74	-0.74

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	7.03	0.071

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	100.00	1.000	0.657
Dose2	97.83	0.288	0.138
Dose3	100.00	1.000	0.788

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE THICK (Eggshell thickness)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.957	0.032	2.657	0.057	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	0.39	0.02	0.00	3.95	0.38,	0.39
Dose1	15	0.37	0.02	0.00	4.20	0.37,	0.38
Dose2	14	0.37	0.03	0.01	6.89	0.36,	0.39
Dose3	15	0.38	0.01	0.00	3.90	0.37,	0.39

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	0.38	0.36	0.41	.	.
Dose1	0.37	0.35	0.41	96.86	3.14
Dose2	0.37	0.34	0.42	96.76	3.24
Dose3	0.38	0.36	0.40	98.21	1.79

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	56	1.58	0.205

Dunnnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	0.39	.	0.39	.	0.263	0.250	0.718	.	.
Dose1	0.37	0.086	0.38	0.068	.	1.000	0.863	.	.
Dose2	0.37	0.081	0.38	0.076	.	.	0.841	.	.
Dose3	0.38	0.307	0.38	0.074	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE HATWT (Hatchling Weight)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.980	0.469	0.019	0.996	USE PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	34.38	1.93	0.48	5.61	33.35,	35.40
Dose1	15	33.67	2.06	0.53	6.11	32.53,	34.81
Dose2	12	35.17	2.33	0.67	6.62	33.69,	36.65
Dose3	14	35.29	2.16	0.58	6.13	34.04,	36.53

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	34.00	32.00	36.00	.	.
Dose1	33.00	31.00	38.00	97.94	2.06
Dose2	35.00	31.00	39.00	102.30	-2.30
Dose3	35.00	31.00	39.00	102.65	-2.65

 PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	53	1.82	0.155

Dunnnett - testing each trt mean signif. less than control
 Williams - test assumes dose-response relationship, testing negative trend
 Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	34.38	.	34.58	.	0.786	0.760	0.642	.	.
Dose1	33.67	0.360	34.58	0.694	.	0.268	0.177	.	.
Dose2	35.17	0.967	34.58	0.722	.	.	0.999	.	.
Dose3	35.29	0.981	34.58	0.745	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE SURVWT (Survivor Wt (d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.965	0.099	0.455	0.715	USE PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	16	262.56	25.50	6.38	9.71	248.97, 276.15
Dose1	15	270.73	34.14	8.81	12.61	251.83, 289.64
Dose2	12	271.75	21.20	6.12	7.80	258.28, 285.22
Dose3	14	274.14	24.42	6.53	8.91	260.04, 288.24

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	265.00	207.00	302.00	.	.
Dose1	276.00	183.00	320.00	103.11	-3.11
Dose2	274.50	234.00	304.00	103.50	-3.50
Dose3	277.50	217.00	309.00	104.41	-4.41

 PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	53	0.53	0.666

Dunnnett - testing each trt mean signif. less than control
 Williams - test assumes dose-response relationship, testing negative trend
 Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	262.56	.	269.49	.	0.835	0.810	0.648	.	.
Dose1	270.73	0.954	269.49	0.840	.	1.000	0.986	.	.
Dose2	271.75	0.959	269.49	0.858	.	.	0.996	.	.
Dose3	274.14	0.980	269.49	0.880	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
ANALYSIS RESULTS FOR VARIABLE FOOD (Food Consumption)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.954	0.018	1.890	0.141	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	145.75	28.95	7.24	19.86	130.32,	161.18
Dose1	16	129.94	18.99	4.75	14.61	119.82,	140.06
Dose2	16	142.69	30.44	7.61	21.33	126.47,	158.91
Dose3	16	141.44	30.24	7.56	21.38	125.32,	157.55

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	141.00	99.00	196.00	.	.
Dose1	128.50	105.00	186.00	89.15	10.85
Dose2	139.50	105.00	193.00	97.90	2.10
Dose3	136.50	91.00	200.00	97.04	2.96

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	60	1.01	0.396

Dunnnett - testing each trt mean signif. less than control
Williams - test assumes dose-response relationship, testing negative trend
Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	145.75	.	145.75	.	0.374	0.989	0.971	.	.
Dose1	129.94	0.128	138.02	0.258	.	0.561	0.642	.	.
Dose2	142.69	0.624	138.02	0.276	.	.	0.999	.	.
Dose3	141.44	0.568	138.02	0.285	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE WTGAINM (Male wt gain)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.974	0.196	0.421	0.739	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	78.88	85.62	21.41	108.55	33.25,	124.50
Dose1	16	81.94	79.21	19.80	96.68	39.73,	124.15
Dose2	16	118.13	57.33	14.33	48.54	87.57,	148.68
Dose3	16	182.94	84.79	21.20	46.35	137.76,	228.12

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	70.00	-90.00	236.00	.	.
Dose1	65.00	-50.00	283.00	103.88	-3.88
Dose2	124.00	24.00	197.00	149.76	-49.76
Dose3	183.50	25.00	400.00	231.93	-131.93

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	60	6.22	<.001

Dunnnett - testing each trt mean signif. less than control
 Williams - test assumes dose-response relationship, testing negative trend
 Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	78.88	.	115.47	.	0.999	0.485	0.002	.	.
Dose1	81.94	0.789	115.47	0.953	.	0.555	0.003	.	.
Dose2	118.13	0.989	115.47	0.966	.	.	0.096	.	.
Dose3	182.94	1.000	115.47	0.972	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose3	>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Mallard repro, Mesosulfuron-methyl, MRID 45386229
 ANALYSIS RESULTS FOR VARIABLE WTGAINF (Female wt gain)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
 Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05
 Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.950	0.012	0.190	0.903	USE PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	16	210.56	125.54	31.38	59.62	143.67, 277.46
Dose1	16	241.88	141.78	35.45	58.62	166.33, 317.42
Dose2	16	224.88	86.40	21.60	38.42	178.84, 270.91
Dose3	16	246.25	121.01	30.25	49.14	181.77, 310.73

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	253.50	-84.00	352.00	.	.
Dose1	222.50	118.00	702.00	114.87	-14.87
Dose2	218.50	95.00	345.00	106.80	-6.80
Dose3	227.50	-47.00	442.00	116.95	-16.95

 PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	60	0.30	0.828

Dunnnett - testing each trt mean signif. less than control
 Williams - test assumes dose-response relationship, testing negative trend
 Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	210.56	.	230.89	.	0.882	0.987	0.836	.	.
Dose1	241.88	0.935	230.89	0.769	.	0.978	1.000	.	.
Dose2	224.88	0.855	230.89	0.802	.	.	0.958	.	.
Dose3	246.25	0.948	230.89	0.819	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose3	>highest dose

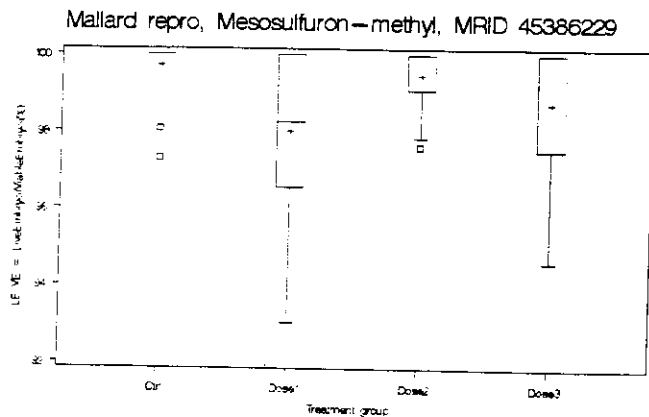
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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Anas platyrhynchos*

PMRA Submission Number

EPA MRID Number 45386229

Box Plots:



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