

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Data Requirement:

PMRA DATA CODE
EPA DP Barcode D284719
OECD Data Point
EPA MRID 45386228
EPA Guideline §71-4a

4/17/04

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. 127)
CAS name: Not reported
CAS No.: Not reported
Synonyms: Code: AE F130060 00 1C95 0001

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Date: 8/22/03

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Date: *[Signature]*
4/17/04

Reference/Submission No.:

Company Code:
Active Code:
EPA PC Code: 122009

Date Evaluation Completed:

CITATION: Ebert, E. 2000. Bobwhite Quail Dietary Reproduction Study. Unpublished study performed and submitted by Aventis Pharma Deutschland GmbH, Hattersheim, Germany. Laboratory Report No. 2000.0138. Study initiated April 20, 1998 and completed July 18, 2000.



2013020

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, 7-month-old Northern Bobwhite quail was assessed over approximately 20 weeks. AE F130060 Technical was administered to the birds in the diet at mean-measured concentrations of <1 (LOD, negative control), 38, 190, or 1000 ppm a.i.

There were no significant treatment-related effects on any adult or offspring parameter. The NOEC and LOEC levels were 1000 and >1000 ppm, respectively.

This toxicity study is scientifically sound. The highest concentration tested did not elicit an adverse effect on any parental or reproductive parameter. The maximum expected field residue levels are expected to be far lower than the maximum tested. This study is considered acceptable - core.

Results Synopsis

Test Organism Size/Age: Approximately 7-months old at test initiation
Males: 207 ± 13 g, females: 204 ± 14 g

NOEC: 1000 ppm

LOEC: >1000 ppm

Endpoint(s) Affected: None

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) and OECD Guideline for Testing of Chemicals No. 206 (1984). Deviations from §71-4 are:

1. The health, including mortality, of the quail during acclimation was not described.
2. The construction materials for parental pens were not specified.
3. The maximum anticipated field residue level for proposed wheat use application rates is 3 PPM.
4. Details pertaining to the preparation and storage of test diets was not specified. AE F 130060 Technical was shown to be stable in treated feed (all test levels) prepared and stored at room temperature for 35 days.
5. A high level of AE F130060 Technical variability was observed in treated feed prepared at all test levels during Week 8; coefficients of variation (C.V.) were 26.8 to 28.5% (p. 119). As a result, additional feed was prepared and analyzed during Week 10. C.V. were acceptable (<10%) for all remaining intervals (Weeks 1, 4, 10, 12, and 16).
6. The photo-period was 8 hours light/day up through Week 7, instead up through Week 8.
7. The set temperature during hatching was approximately 37.2°C, slightly lower than the recommended temperature of 39°C. Additionally, the photo-period during hatching was not specified.

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

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7. The set temperature during hatching was approximately 37.2°C, slightly lower than the recommended temperature of 39°C. Additionally, the photo-period during hatching was not specified.

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 German/OECD and U.S. EPA GLP standards (p. 3).

A. MATERIALS:

1. Test Material AE F130060 Technical

Description: Pale cream solid

Lot No./Batch No.: 35316 (p. 127)

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 35 days of ambient storage. Recoveries averaged 97-107% of initial values (reviewer-calculated from mean recoveries provided in second table on p. 16; individual data provided on pp. 114-117 of the analytical report).

Storage conditions

of test chemical: At approximately 22°C.

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):	Northern Bobwhite quail (<i>Colinus virginianus</i>)	<i>EPA requires: a wild waterfowl species, preferably the mallard, <i>Anas platyrhynchos</i>, or an upland game species, preferably the northern bobwhite, <i>Colinus virginianus</i>.</i>
Age at Study Initiation:	Approximately 7 months	<i>EPA requires: birds should be approaching their first breeding season.</i>
Body Weight: (mean and range)	Males (overall, n=64): 207 ± 13 g Females (overall, n=64): 204 ± 14 g	Individual body weights were recorded at Weeks 0, 2, 4, 6, 8, and 20 (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:	Morris Quail Farm Inc. Goulds, FL	Birds were phenotypically indistinguishable from wild birds. <i>EPA requires that all birds should be from the same source.</i>

B. STUDY DESIGN:

1. Experimental Conditions

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

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Table 2: Experimental Parameters.

Parameter	Details	Remarks
		Criteria
Acclimation period: Conditions (same as test or not): Feeding: Health (any mortality observed):	2 weeks Same as test Water and feed were provided <i>ad libitum</i> . Pre-test mortality was not reported.	Bobwhite were fed an Ssniff Complete Diet for Quails - Breeding (p. 93) and provided tap water. Results of analysis of feed for select chlorinated hydrocarbons, pesticides, and metals are provided on pp. 94-95. <hr/> 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.
Test duration pre-laying exposure: egg-laying exposure: withdrawal period, if used:	Approximately 10 weeks Approximately 10 weeks None	<hr/> EPA requires <u>Pre-laying exposure duration</u> . At least 10 weeks prior to the onset of egg-laying. <u>Exposure duration with egg-laying</u> At least 10 weeks. <u>Withdrawal period</u> If reduced reproduction is evident, a withdrawal period of up to 3 weeks should be added to the test phase.

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Parameter	Details	Remarks
		Criteria
Pen (for parental and offspring) size: construction materials: number:	Parents (one male and one female) were housed in 76 x 33 x 24 cm pens with sloping floors and egg catchers. The floor space of the offspring pens was approximately 4200 cm ² (≥ 50 cm ² /chick). Not specified for parental pens. The offspring pens were plastic boxes on corrugated cardboard. 16 parental pens/treatment level	<hr/> <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)	<hr/> 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	<hr/> 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, 190, or 1000 ppm a.i.	Mean-measured concentrations were reviewer-calculated from data provided in the second table on p. 16. Samples for all test levels were collected from treated feed prepared for Weeks 1, 4, 8, 10, 12, and 16. <i>EPA requires at least two concentrations other than the control are required; three or more are recommended.</i>
Maximum labeled field residue anticipated and source of information:	Not specified	It was reported that 1000 ppm is the limit concentration according to relevant OECD testing guidelines (p. 8). <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>
Solvent/vehicle, if used type: amount:	Not specified	A detailed description of the test feed preparation was not provided. <i>EPA requires corn oil or other appropriate vehicle not more than 2% of diet by weight</i>

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Parameter	Details	Remarks
		Criteria
Was detailed description and nutrient analysis of the basal diet provided? (Yes/No)	Yes	Basal diets contained 25.0% protein, 5.0% fat, 3.5% fiber, and 3.0% calcium (p. 93). Offspring received Ssniff Complete Diet for Quails - Rearing (p. 92). <i>EPA requires a commercial breeder feed (or its equivalent) that is appropriate for the test species.</i>
Preparation of test diet	Details pertaining to the preparation and storage of test diets was not specified.	<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	
Were concentrations in diet verified by chemical analysis?	Yes	Samples were analyzed from feed prepared during Weeks 1, 4, 8, 10, 12, and 16 (individual values provided on pp. 114-123 of the analytical report).

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Parameter	Details	Remarks
		Criteria
<p>Did chemical analysis confirm that diet was stable?</p> <p>and homogeneous?</p>	<p>Yes</p> <p>Yes, although ideally C.V. should be <5%.</p>	<p>The stability of AE F130060 Technical was assessed in the treated feed prepared at all test levels after 35 days of ambient storage. Recoveries averaged 97-107% of initial values (reviewer-calculated from mean recoveries provided in second table on p. 16; individual data provided on pp. 114-117 of the analytical report).</p> <p>The homogeneity of AE F130060 Technical was assessed in the treated feed prepared at all test levels; duplicate (or triplicate) samples were collected from the top, middle, and bottom of batches prepared for Weeks 1, 4, 8, 10, 12, and 16. High variability was observed during Week 8 (C.V. of 26.8-28.5%), and therefore additional samples were prepared and analyzed at Week 10. Excluding Week 8 results, Coefficients of Variation ranged from 1.2-6.5% for the 40 ppm level, 4.2-8.9% for the 200 ppm level, and 1.8-11.8% for the 1000 ppm level (reviewer-calculated from mean values provided on pp. 114-123).</p>
<p>Feeding and husbandry</p>	<p>Feeding and husbandry conditions appeared to be adequate, given guideline recommendations.</p>	

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Parameter	Details	Remarks <i>Criteria</i>
Test conditions (pre-laying) temperature: relative humidity: photo-period:	22 ± 1°C 50-80% 8 hr light/day up through Week 7; 16 hr light/day thereafter.	Light intensity ranged from 200-300 lux. <i>EPA Requires</i> Temperature: About 21°C (70°F) Relative humidity: About 55% Lighting First 8 weeks: 7 h per day. Thereafter: 16-17 h per day. At least 6 foot candles at bird level.
Egg Collection and Incubation		
Egg collection and storage collection interval: storage temperature: storage humidity:	Daily 12-16°C 50-70%	<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:	37.3-38.8°C 60-70%	
When candling was done for fertility?	Between Days 8 and 11 for fertility and Day 18 for viability.	<i>EPA requires:</i> Quail: approx. day 11 Ducks: approx. day 14

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Parameter	Details	Remarks
		Criteria
When the eggs were transferred to the hatcher?	Day 21	<i>EPA requires: Bobwhite: day 21 Mallard: day 23</i>
Hatching conditions temperature:	Approximately 37.2°C	<i>EPA requires: temperature of 39°C (102°F) humidity of 70%</i>
humidity:	Approximately 80%	
photoperiod:	Not specified	
Day the hatched eggs were removed and counted	Days 24 or 25	<i>EPA requires Bobwhite: day 24 Mallard: day 27</i>
Were egg shells washed and dried for at least 48 hrs before measuring?	Shells were washed and dried in a drying cabinet at 60°C for 24 hours.	
Egg shell thickness no. of eggs used: intervals:	All eggs laid during one day during Weeks 11, 13, 15, 17, and 19 in each replicate.	<i>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.</i>
mode of measurement:	Four points around the equatorial circumference were measured to the nearest 0.01 mm.	
Reference chemical, if used	None used	

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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 - organ weight <ul style="list-style-type: none"> - eggs laid - eggs cracked or broken - egg weight - egg shell thickness - eggs set - viable embryos - live 3-week embryos - number of hatchlings - severe birth defects - hatchling body weight - mortality and signs of toxicity - number of 14-day-old survivors - 14-day-old survivor body weight - food consumption 	<hr style="border-top: 1px dashed black;"/> 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)	Parents and offspring were observed for daily mortality and signs of toxicity. Parental body weights were at Weeks -2, 0, 2, 4, 6, 8, and 20 (test termination). Parental and offspring group feed consumption was determined weekly. Offspring body weights were determined at 0 and 14 days.	<hr style="border-top: 1px dashed black;"/> Body weights and food consumption must be measured at least biweekly.
Were raw data included?	Yes, sufficient.	

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I. RESULTS AND DISCUSSION:

A. MORTALITY:

No treatment-related mortality occurred during the 20-week study (p. 22). One male bird from the 200 ppm group was found dead on Day 44, one day after its body weight was determined. The study author reported that in the absence of any preceding clinical signs, this death may be the result of rough handling during body weight measurement, and was considered not to be related to treatment. No other mortality was observed.

Table 4: Effect of AE F130060 Technical on Mortality of *Colinus Virginianus*.

Treatment, ppm measured (and nominal) concentrations	Observation Period					
	Week 7		Week 14		Week 20	
	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
190 (200)	1	0	1	0	1	0
1000 (1000)	0	0	0	0	0	0

B. REPRODUCTIVE AND OTHER ENDPOINTS:

Abnormal Effects/Behavior: No clinical signs of toxicity were observed (p. 22).

Food Consumption: No treatment-related effects on food consumption were observed (pp. 22 and 38-40). A statistically-significant increase in mean feed consumption was observed at the 200 ppm level compared to the control group during Week 1; however, after Week 1, the feed consumption normalized and showed no difference from the control group thereafter. Overall feed consumption averaged 38.7 to 42.9 g/pen/day for all test and control groups.

Body Weight: No treatment-related effects on body weight were observed (pp. 22 and 36-37).

Necropsy: No treatment-related pathological changes were observed in any bird upon necropsy (pp. 23 and 41). One male from the 40 ppm group had a slightly pale and enlarged liver. Another male from the 40 ppm group had very enlarged testes. Neither effect was considered related to treatment.

Organ Weights: No treatment-related effects on absolute or relative (to body) weights of the heart, liver, spleen, testes, and oviduct (without developing eggs) were observed (pp. 23 and 42-45).

Reproductive Effects: No treatment-related effects on egg production, fertility, embryonic development, or hatchability were observed (pp. 24 and 46). The study author noted that statistically-significant reductions in viable embryos was observed at the 40 (85.6%) and 1000 ppm (87.5%) groups, but that these slight differences were due to exceptional performance by the control group which achieved 95.4% fertility (compared to typical

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values of 75-90% for this species).

No changes in health or behavior, or increases in malformations of the hatchlings were observed (p. 25). In addition, no treatment-related effect on hatchling body weights or feed consumption were observed.

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

Parameter	Control	40 ppm	200 ppm	1000 ppm	NOEC/ LOEC
Egg laid	810	850	813	875	N/A
Eggs laid/hen	50.6	53.1	54.2	54.7	1000 ppm >1000 ppm
Eggs abnormal or broken	7	3	4	21	N/A
Eggs damaged/eggs laid (%)	0.81	0.13	0.53	2.1	1000 ppm >1000 ppm
Shell thickness (mm)	0.215	0.214	0.217	0.214	1000 ppm >1000 ppm
Eggs set	741	780	747	787	N/A
Viable embryos	707	668	717	689	N/A
Viable embryos/eggs set (%)	95.4	85.6*	96.0	87.5*	1000 ppm >1000 ppm
Live 3-week embryos	698	653	714	670	N/A
Live 3-week embryos/viable embryos (%)	98.7	97.8	99.6	97.2	1000 ppm >1000 ppm
No. of hatchlings	649	585	675	617	N/A
No. of hatchlings/live 3-week embryos (%)	93.0	89.6	94.5	92.1	1000 ppm >1000 ppm
No. of hatchlings/eggs set (%)	87.6	75.0	90.4	78.4	1000 ppm >1000 ppm
Hatchling weight (g)	6.7	6.7	6.8	6.9	1000 ppm >1000 ppm
No. of 14-day old survivors	512	502	600	559	N/A
No. of 14-day old survivors/hen	32.0	31.4	40.0	34.9	N/A
No. of 14-day old survivors/No. of hatchlings (%)	79.5	85.7	89.0	90.2	1000 ppm >1000 ppm

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Parameter	Control	40 ppm	200 ppm	1000 ppm	NOEC/ LOEC
No. of 14-day old survivors/eggs set (%)	69.6	64.1	80.6	69.5	1000 ppm >1000 ppm
14-day old survivors weight (g)	28.0	27.6	28.5	30.0	1000 ppm >1000 ppm
Mean adult food consumption (g/pen/day)	38.7	39.2	42.9	39.8	1000 ppm >1000 ppm
Mean offspring food consumption (g/chick/day)	2.6	2.5	2.6	2.8	1000 ppm >1000 ppm
Weight of adult males, g at start of treatment: at Week 8: at Week 20 (study termination):	204.2 207.0 222.1	210.0 215.3 228.8	206.2 209.7 217.8	208.4 210.9 222.3	1000 ppm >1000 ppm
Weight of adult females, g at start of treatment: at Week 8: at Week 20 (study termination):	204.1 204.4 247.6	204.1 206.1 246.9	203.4 205.7 247.8	203.6 207.1 256.6	1000 ppm >1000 ppm
Gross pathology (proportion of birds with pathological incidents)	0/32	2/32	0/32	0/32	1000 ppm >1000 ppm

N/A = Not statistically-analyzed.

* Statistically different from the control.

C. REPORTED STATISTICS:

The following variables were statistically analyzed: adult body weight, adult feed consumption, adult organ weights (absolute and relative), number of eggs laid per female, percentage of eggs cracked/egg laid, number of normal eggs/hen, egg shell thickness, egg weight, percentage of viable embryos/eggs set, percentage of live 3-week embryos/viable embryos, percentage of number of hatchlings/live 3-week embryos, percentage of number of hatchlings/eggs set, percentage of 14-day old survivors/number of hatchlings, percentage of 14-day old survivors/viable embryos, percentage of 14-day old survivors/eggs set, chick body weights at hatching and at 14 days of age, and offspring feed consumption (statistical report found on pp. 67-89). Nominal concentrations were used in all analyses.

For adult body weight, a one-sided Dunnett's test was conducted at a 5% level of significance. Adult food consumption and absolute organ weights were analyzed using a two-sided Dunnett's test at a 5% level of significance. Relative organs weights were analyzed using the exact two-sided Wilcoxon rank sum test with a multiple significance level of 5%.

For reproductive parameters, a monotonic dose-response relationship was assumed, and a pair-wise comparison between the control and highest dose group was performed using an exact one-sided rank sum test with a 5%

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level of significance. Lower dosages were only tested in cases where higher dose groups showed significant test results.

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 MannWhitney-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.

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

Parameter	Control	38 ppm	190 ppm	1000 ppm	NOEC/ LOEC
Eggs laid/pen	50.6	53.1	54.2	54.7	1000 ppm >1000 ppm
Eggs cracked/pen	0.4	0.1	0.3	1.1	1000 ppm >1000 ppm
Eggs not cracked/eggs laid (%)	99.2	99.9	99.5	97.9	1000 ppm >1000 ppm
Eggs set/pen	46.3	48.8	49.8	49.2	1000 ppm >1000 ppm
Shell thickness	0.21	0.21	0.22	0.21	1000 ppm >1000 ppm
Eggs set/eggs laid (%)	91.3	91.7	91.8	89.6	1000 ppm >1000 ppm
Viable embryo/pen	44.2	41.8	47.8	43.1	1000 ppm >1000 ppm
Viable embryos/eggs set (%)	95.2	85.0	96.0	86.9	1000 ppm >1000 ppm
Live embryos/pen	43.6	40.8	47.6	41.9	1000 ppm >1000 ppm
Live embryo/viable embryo (%)	98.8	97.8	99.6	96.5	1000 ppm >1000 ppm

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Parameter	Control	38 ppm	190 ppm	1000 ppm	NOEC/ LOEC
No. of hatchlings/pen	40.6	36.6	45.0	38.6	1000 ppm >1000 ppm
No. of hatchlings/eggs laid (%)	79.9	68.6	83.1	69.6	1000 ppm >1000 ppm
No. of hatchlings/eggs set (%)	87.5	74.8	90.5	77.0	1000 ppm >1000 ppm
No. of hatchlings/live embryo (%)	93.0	89.3	94.5	90.5	1000 ppm >1000 ppm
Hatchling survival/pen	32.0	31.4	40.0	34.9	1000 ppm >1000 ppm
Hatchling survival/eggs set (%)	69.5	64.1	80.7	69.6	1000 ppm >1000 ppm
Hatchling survival/no. of hatchlings (%)	79.5	85.6	88.9	90.2	1000 ppm >1000 ppm
Hatchling weight (g)	6.7	6.7	6.8	6.9	1000 ppm >1000 ppm
Survivor weight (g)	28.0	27.6	28.5	30.6	1000 ppm >1000 ppm
Mean food consumption (g/bird/day)	38.8	39.2	42.9	39.8	1000 ppm >1000 ppm
Male weight gain (g)	17.9	18.6	11.3	13.9	1000 ppm >1000 ppm
Female weight gain (g)	43.5	42.8	43.8	53.0	1000 ppm >1000 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 Northern Bobwhite quail (§71-4a).

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F. REVIEWER'S COMMENTS:

Results of the reviewer's statistical analyses were nearly identical to those of the study author. The reviewer's analysis did not detect any reductions in viable embryos or any other endpoint.

Based on mean feed consumption, the study author calculated a mean test substance intake of 3.7, 20.3, and 93.0 mg/kg bw/day for the 40, 200, and 1000 ppm groups, respectively (table on p. 22).

G. CONCLUSIONS:

This study is scientifically sound, but does not fulfill guideline requirements since the highest concentration tested did not elicit adverse effects in any parental or reproductive parameter. A subsequent LOEC was not established. ~~This study is therefore classified as SUPPLEMENTAL.~~ This study may be upgraded to Core status if additional information is provided indicating that the doses selected in this study were representative of maximum exposure levels.

NOEC: 1000 ppm
LOEC: >1000 ppm
Endpoint(s) Affected: None

Core max appropriate
1x 0.013359 lbs a/d
2x 0.062813 lbs a/d
1000 ppm is well above any
expected field residue level
for this chemical.

III. REFERENCES:

A reference list was not provided.

Blair Montoya

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

APPENDIX I. OUTPUT OF REVIEWER'S STATISTICAL VERIFICATION:

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228

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	55	1	98.18	50	90.91	50	100.00	50	100.00	44	80.00	88.00
2	Ctrl	33	0	100.00	30	90.91	23	76.67	23	100.00	23	69.70	76.67
3	Ctrl	53	3	94.34	46	86.79	45	97.83	42	93.33	36	67.92	78.26
4	Ctrl	34	1	97.06	29	85.29	29	100.00	29	100.00	26	76.47	89.66
5	Ctrl	57	0	100.00	53	92.98	52	98.11	50	96.15	45	78.95	84.91
6	Ctrl	55	0	100.00	51	92.73	50	98.04	49	98.00	43	78.18	84.31
7	Ctrl	53	1	98.11	48	90.57	48	100.00	48	100.00	47	88.68	97.92
8	Ctrl	54	0	100.00	50	92.59	41	82.00	41	100.00	31	57.41	62.00
9	Ctrl	47	0	100.00	44	93.62	43	97.73	43	100.00	43	91.49	97.73
10	Ctrl	47	0	100.00	43	91.49	43	100.00	43	100.00	42	89.36	97.67
11	Ctrl	55	0	100.00	51	92.73	47	92.16	46	97.87	43	78.18	84.31
12	Ctrl	52	0	100.00	48	92.31	48	100.00	48	100.00	48	92.31	100.00
13	Ctrl	51	0	100.00	46	90.20	44	95.65	44	100.00	41	80.39	89.13
14	Ctrl	52	0	100.00	48	92.31	45	93.75	45	100.00	44	84.62	91.67
15	Ctrl	62	0	100.00	58	93.55	55	94.83	55	100.00	54	87.10	93.10
16	Ctrl	50	0	100.00	46	92.00	44	95.65	42	95.45	39	78.00	84.78
17	Dose1	48	0	100.00	44	91.67	44	100.00	44	100.00	40	83.33	90.91
18	Dose1	50	0	100.00	46	92.00	44	95.65	44	100.00	42	84.00	91.30
19	Dose1	55	0	100.00	50	90.91	50	100.00	50	100.00	47	85.45	94.00
20	Dose1	58	0	100.00	54	93.10	53	98.15	51	96.23	44	75.86	81.48
21	Dose1	59	0	100.00	54	91.53	49	90.74	48	97.96	48	81.36	88.89
22	Dose1	54	0	100.00	49	90.74	45	91.84	44	97.78	43	79.63	87.76
23	Dose1	53	0	100.00	49	92.45	48	97.96	45	93.75	42	79.25	85.71
24	Dose1	60	0	100.00	56	93.33	54	96.43	54	100.00	51	85.00	91.07
25	Dose1	59	0	100.00	54	91.53	47	87.04	43	91.49	36	61.02	66.67
26	Dose1	58	0	100.00	54	93.10	53	98.15	50	94.34	39	67.24	72.22
27	Dose1	54	0	100.00	48	88.89	21	43.75	20	95.24	15	27.78	31.25
28	Dose1	45	0	100.00	41	91.11	36	87.80	36	100.00	34	75.56	82.93
29	Dose1	52	0	100.00	48	92.31	0	0.00	0		0	0.00	0.00
30	Dose1	54	0	100.00	50	92.59	49	98.00	49	100.00	44	81.48	88.00
31	Dose1	31	0	100.00	28	90.32	22	78.57	22	100.00	20	64.52	71.43
32	Dose1	60	1	98.33	55	91.67	53	96.36	53	100.00	40	66.67	72.73
33	Dose2	56	0	100.00	52	92.86	46	88.46	45	97.83	36	64.29	69.23
34	Dose2	58	0	100.00	53	91.38	49	92.45	48	97.96	42	72.41	79.25
35	Dose2	55	0	100.00	51	92.73	47	92.16	47	100.00	42	76.36	82.35
36	Dose2	62	0	100.00	58	93.55	56	96.55	56	100.00	55	88.71	94.83
37	Dose2	52	0	100.00	48	92.31	47	97.92	47	100.00	44	84.62	91.67
38	Dose2	61	1	98.36	56	91.80	53	94.64	53	100.00	51	83.61	91.07
39	Dose2	64	1	98.44	58	90.63	58	100.00	58	100.00	57	89.06	98.28
40	Dose2	47	1	97.87	42	89.36	40	95.24	40	100.00	37	78.72	88.10
41	Dose2												
42	Dose2	57	0	100.00	53	92.98	53	100.00	53	100.00	52	91.23	98.11
43	Dose2	44	0	100.00	40	90.91	40	100.00	39	97.50	38	86.36	95.00
44	Dose2	46	0	100.00	42	91.30	40	95.24	40	100.00	40	86.96	95.24
45	Dose2	46	0	100.00	42	91.30	42	100.00	42	100.00	42	91.30	100.00
46	Dose2	51	0	100.00	47	92.16	46	97.87	46	100.00	45	88.24	95.74
47	Dose2	58	0	100.00	54	93.10	54	100.00	54	100.00	51	87.93	94.44
48	Dose2	56	1	98.21	51	91.07	46	90.20	46	100.00	43	76.79	84.31

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

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49	Dose3	50	0	100.00	46	92.00	45	97.83	44	97.78	44	88.00	95.65
50	Dose3	63	0	100.00	59	93.65	56	94.92	56	100.00	53	84.13	89.83
51	Dose3	64	0	100.00	59	92.19	54	91.53	52	96.30	47	73.44	79.66
52	Dose3	65	0	100.00	60	92.31	56	93.33	56	100.00	52	80.00	86.67
53	Dose3	60	0	100.00	56	93.33	55	98.21	54	98.18	53	88.33	94.64
54	Dose3	35	0	100.00	32	91.43	27	84.38	27	100.00	22	62.86	68.75
55	Dose3	57	0	100.00	53	92.98	52	98.11	52	100.00	50	87.72	94.34
56	Dose3	52	15	71.15	32	61.54	24	75.00	18	75.00	15	28.85	46.88
57	Dose3	54	0	100.00	49	90.74	6	12.24	6	100.00	5	9.26	10.20
58	Dose3	65	0	100.00	60	92.31	54	90.00	53	98.15	46	70.77	76.67
59	Dose3	47	0	100.00	43	91.49	40	93.02	35	87.50	29	61.70	67.44
60	Dose3	58	0	100.00	54	93.10	51	94.44	51	100.00	49	84.48	90.74
61	Dose3	38	1	97.37	32	84.21	32	100.00	31	96.88	31	81.58	96.88
62	Dose3	49	0	100.00	44	89.80	34	77.27	33	97.06	23	46.94	52.27
63	Dose3	56	1	98.21	51	91.07	46	90.20	45	97.83	42	75.00	82.35
64	Dose3	62	0	100.00	57	91.94	57	100.00	57	100.00	56	90.32	98.25

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228

PRINTOUT OF RAW DATA (continued)

Obs	TRT	NH_LE	HS	HS_ES	HS_NH	THICK	HATWT	SURVWT	FOOD	WTGAINM	WTGAINF
1	Ctrl	88.00	30	60.00	68.18	0.22	6	30	33	19	36
2	Ctrl	100.00	16	53.33	69.57	0.23	7	30	43	8	35
3	Ctrl	85.71	33	71.74	91.67	0.21	6	30	36	21	7
4	Ctrl	89.66	26	89.66	100.00	0.20	7	27	32	-1	61
5	Ctrl	90.00	39	73.58	86.67	0.21	7	28	38	8	54
6	Ctrl	87.76	35	68.63	81.40	0.20	6	24	51	9	61
7	Ctrl	97.92	35	72.92	74.47	0.21	7	28	33	20	31
8	Ctrl	75.61	25	50.00	80.65	0.21	6	28	49	17	37
9	Ctrl	100.00	30	68.18	69.77	0.22	7	31	36	14	34
10	Ctrl	97.67	39	90.70	92.86	0.22	7	27	39	43	26
11	Ctrl	93.48	30	58.82	69.77	0.23	7	30	39	20	59
12	Ctrl	100.00	37	77.08	77.08	0.21	7	28	40	21	40
13	Ctrl	93.18	32	69.57	78.05	0.23	7	26	43	2	53
14	Ctrl	97.78	31	64.58	70.45	0.22	7	29	40	24	66
15	Ctrl	98.18	40	68.97	74.07	0.21	7	26	33	22	54
16	Ctrl	92.86	34	73.91	87.18	0.23	7	28	36	40	42
17	Dose1	90.91	39	88.64	97.50	0.21	7	29	39	39	37
18	Dose1	95.45	34	73.91	80.95	0.22	6	23	37	9	55
19	Dose1	94.00	39	78.00	82.98	0.20	6	25	46	0	43
20	Dose1	86.27	35	64.81	79.55	0.23	7	29	35	6	63
21	Dose1	100.00	43	79.63	89.58	0.21	7	28	45	7	33
22	Dose1	97.73	39	79.59	90.70	0.22	7	27	41	17	46
23	Dose1	93.33	33	67.35	78.57	0.21	7	30	38	31	60
24	Dose1	94.44	45	80.36	88.24	0.24	7	30	40	-3	45
25	Dose1	83.72	31	57.41	86.11	0.22	7	27	48	21	51
26	Dose1	78.00	36	66.67	92.31	0.21	7	27	38	32	42
27	Dose1	75.00	13	27.08	86.67	0.23	7	28	37	26	53
28	Dose1	94.44	29	70.73	85.29	0.21	7	28	38	2	44
29	Dose1		0	0.00		0.23			35	42	28
30	Dose1	89.80	38	76.00	86.36	0.21	7	30	32	16	55
31	Dose1	90.91	16	57.14	80.00	0.19	6	27	44	19	-19
32	Dose1	75.47	32	58.18	80.00	0.20	6	26	35	33	48
33	Dose2	80.00	34	65.38	94.44	0.23	7	28	63	19	44

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

34	Dose2	87.50	42	79.25	100.00	0.23	7	28	47	-8	36
35	Dose2	89.36	27	52.94	64.29	0.22	7	30	46	4	46
36	Dose2	98.21	41	70.69	74.55	0.21	7	27	33	16	31
37	Dose2	93.62	44	91.67	100.00	0.19	7	31	39	9	45
38	Dose2	96.23	45	80.36	88.24	0.21	7	30	37	16	57
39	Dose2	98.28	54	93.10	94.74	0.22	6	27	51	24	61
40	Dose2	92.50	31	73.81	83.78	0.23	6	27	40	17	35
41	Dose2										
42	Dose2	98.11	50	94.34	96.15	0.22	7	30	56	-3	40
43	Dose2	97.44	36	90.00	94.74	0.22	6	26	32	16	40
44	Dose2	100.00	39	92.86	97.50	0.22	8	30	44	9	64
45	Dose2	100.00	37	88.10	88.10	0.22	7	30	44	10	42
46	Dose2	97.83	43	91.49	95.56	0.22	7	27	36	7	41
47	Dose2	94.44	47	87.04	92.16	0.22	7	30	33	24	38
48	Dose2	93.48	30	58.82	69.77	0.20	7	26	43	10	37
49	Dose3	100.00	40	86.96	90.91	0.20	7	29	43	12	30
50	Dose3	94.64	50	84.75	94.34	0.22	7	34	39	19	54
51	Dose3	90.38	38	64.41	80.85	0.21	7	38	64	-1	51
52	Dose3	92.86	51	85.00	98.08	0.22	7	30	41	7	63
53	Dose3	98.15	43	76.79	81.13	0.21	7	34	37	30	51
54	Dose3	81.48	19	59.38	86.36	0.22	7	31	39	26	41
55	Dose3	96.15	47	88.68	94.00	0.21	7	29	36	21	59
56	Dose3	83.33	10	31.25	66.67	0.20	6	29	39	20	57
57	Dose3	83.33	5	10.20	100.00	0.21	7	31	33	12	58
58	Dose3	86.79	41	68.33	89.13	0.21	7	32	39	-4	58
59	Dose3	82.86	27	62.79	93.10	0.21	7	30	34	11	63
60	Dose3	96.08	44	81.48	89.80	0.22	7	29	34	3	58
61	Dose3	100.00	30	93.75	96.77	0.20	7	28	40	25	35
62	Dose3	69.70	21	47.73	91.30	0.22	8	30	44	16	53
63	Dose3	93.33	41	80.39	97.62	0.22	7	29	35	15	60
64	Dose3	98.25	52	91.23	92.86	0.23	7	27	39	11	57

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.916	<.001	0.732	0.537	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	50.63	7.61	1.90	15.02	46.57,	54.68
Dose1	16	53.13	7.35	1.84	13.83	49.21,	57.04
Dose2	15	54.20	6.28	1.62	11.59	50.72,	57.68
Dose3	16	54.69	9.15	2.29	16.73	49.81,	59.56

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	52.50	33.00	62.00		
Dose1	54.00	31.00	60.00	104.94	-4.94
Dose2	56.00	44.00	64.00	107.06	-7.06
Dose3	56.50	35.00	65.00	108.02	-8.02

 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	3.47	0.325

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	52.50		
Dose1	54.00	1.000	0.890
Dose2	56.00	1.000	0.916
Dose3	56.50	1.000	0.967

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.347	<.001	2.900	0.042	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	0.38	0.81	0.20	214.99	0.00,	0.80
Dose1	16	0.06	0.25	0.06	400.00	0.00,	0.20
Dose2	15	0.27	0.46	0.12	171.65	0.01,	0.52
Dose3	16	1.06	3.73	0.93	351.26	0.00,	3.05

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	0.00	0.00	3.00		
Dose1	0.00	0.00	1.00	16.67	83.33
Dose2	0.00	0.00	1.00	71.11	28.89
Dose3	0.00	0.00	15.00	283.33	-183.33

 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	2.55	0.467

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

Level	Median	MannWhit (Bonf adjust) p-value	Jonckheere p-value
Ctrl	0.00		
Dose1	0.00	1.000	0.928
Dose2	0.00	1.000	0.500
Dose3	0.00	1.000	0.486

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.356	<.001	3.126	0.032	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	16	99.23	1.59	0.40	1.61	98.38, 100.00
Dose1	16	99.90	0.42	0.10	0.42	99.67, 100.00
Dose2	15	99.53	0.82	0.21	0.83	99.07, 99.98
Dose3	16	97.92	7.18	1.79	7.33	94.10, 100.00

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	100.00	94.34	100.00		
Dose1	100.00	98.33	100.00	100.67	-0.67
Dose2	100.00	97.87	100.00	100.30	-0.30
Dose3	100.00	71.15	100.00	98.68	1.32

 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	2.69	0.442

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	0.939
Dose2	100.00	1.000	0.562
Dose3	100.00	1.000	0.507

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.916	<.001	1.956	0.130	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	46.31	7.50	1.87	16.19	42.32,	50.31
Dose1	16	48.75	6.96	1.74	14.28	45.04,	52.46
Dose2	15	49.80	6.03	1.56	12.10	46.46,	53.14
Dose3	16	49.19	10.12	2.53	20.58	43.79,	54.58

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	48.00	29.00	58.00		
Dose1	49.50	28.00	56.00	105.26	-5.26
Dose2	51.00	40.00	58.00	107.53	-7.53
Dose3	52.00	32.00	60.00	106.21	-6.21

 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	2.88	0.410

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	48.00		
Dose1	49.50	1.000	0.887
Dose2	51.00	1.000	0.918
Dose3	52.00	1.000	0.953

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.504	<.001	3.349	0.025	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	91.31	2.31	0.58	2.53	90.08,	92.54
Dose1	16	91.70	1.16	0.29	1.26	91.08,	92.32
Dose2	15	91.83	1.13	0.29	1.23	91.20,	92.45
Dose3	16	89.63	7.80	1.95	8.71	85.47,	93.79

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	92.15	85.29	93.62		
Dose1	91.67	88.89	93.33	100.43	-0.43
Dose2	91.80	89.36	93.55	100.57	-0.57
Dose3	91.97	61.54	93.65	98.16	1.84

 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	0.04	0.998

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	92.15		
Dose1	91.67	1.000	0.485
Dose2	91.80	1.000	0.570
Dose3	91.97	1.000	0.502

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.863	<.001	4.108	0.010	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	44.19	8.07	2.02	18.26	39.89,	48.49
Dose1	16	41.75	15.03	3.76	35.99	33.74,	49.76
Dose2	15	47.80	5.93	1.53	12.41	44.52,	51.08
Dose3	16	43.06	14.78	3.69	34.31	35.19,	50.94

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	45.00	23.00	55.00		
Dose1	47.50	0.00	54.00	94.48	5.52
Dose2	47.00	40.00	58.00	108.18	-8.18
Dose3	48.50	6.00	57.00	97.45	2.55

 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	1.37	0.714

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	45.00		
Dose1	47.50	1.000	0.668
Dose2	47.00	1.000	0.845
Dose3	48.50	1.000	0.845

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.596	<.001	3.467	0.022	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	95.15	6.71	1.68	7.05	91.58,	98.72
Dose1	16	85.03	26.54	6.63	31.21	70.89,	99.17
Dose2	15	96.05	3.86	1.00	4.02	93.91,	98.18
Dose3	16	86.91	21.25	5.31	24.45	75.58,	98.23

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	97.78	76.67	100.00		
Dose1	96.01	0.00	100.00	89.36	10.64
Dose2	96.55	88.46	100.00	100.94	-0.94
Dose3	93.18	12.24	100.00	91.33	8.67

 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 4.81 0.187

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	97.78		
Dose1	96.01	0.362	0.113
Dose2	96.55	1.000	0.453
Dose3	93.18	0.132	0.090

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

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.882	<.001	4.629	0.006	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	43.63	7.91	1.98	18.12	39.41	47.84
Dose1	16	40.81	14.70	3.68	36.02	32.98	48.65
Dose2	15	47.60	6.05	1.56	12.70	44.25	50.95
Dose3	16	41.88	15.33	3.83	36.60	33.71	50.04

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	44.50	23.00	55.00		
Dose1	44.50	0.00	54.00	93.55	6.45
Dose2	47.00	39.00	58.00	109.11	-9.11
Dose3	48.00	6.00	57.00	95.99	4.01

 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	1.81	0.613

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	44.50	1.000	0.612
Dose2	47.00	1.000	0.878
Dose3	48.00	1.000	0.840

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.657	<.001	3.467	0.022	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	16	98.80	2.09	0.52	2.11	97.69, 99.91
Dose1	15	97.79	2.88	0.74	2.94	96.19, 99.38
Dose2	15	99.55	0.93	0.24	0.94	99.04, 100.00
Dose3	16	96.54	6.52	1.63	6.76	93.07, 100.00

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	100.00	93.33	100.00		
Dose1	100.00	91.49	100.00	98.97	1.03
Dose2	100.00	97.50	100.00	100.76	-0.76
Dose3	98.16	75.00	100.00	97.71	2.29

 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	5.57	0.135

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	0.150
Dose2	100.00	1.000	0.766
Dose3	98.16	0.356	0.234

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.916	<.001	4.665	0.005	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	40.56	8.07	2.02	19.89	36.26,	44.86
Dose1	16	36.56	13.59	3.40	37.18	29.32,	43.81
Dose2	15	45.00	6.63	1.71	14.74	41.33,	48.67
Dose3	16	38.56	15.61	3.90	40.48	30.24,	46.88

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	43.00	23.00	54.00		
Dose1	41.00	0.00	51.00	90.14	9.86
Dose2	43.00	36.00	57.00	110.94	-10.94
Dose3	45.00	5.00	56.00	95.07	4.93

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	3.07	0.381

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	43.00		
Dose1	41.00	0.683	0.219
Dose2	43.00	1.000	0.824
Dose3	45.00	1.000	0.819

SUMMARY

	NCEC	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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.801	<.001	3.668	0.017	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	79.92	9.33	2.33	11.67	74.95,	84.89
Dose1	16	68.63	23.27	5.82	33.91	56.23,	81.03
Dose2	15	83.11	7.80	2.01	9.38	78.79,	87.42
Dose3	16	69.59	23.24	5.81	33.39	57.20,	81.97

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	79.47	57.41	92.31		
Dose1	77.55	0.00	85.45	85.88	14.12
Dose2	86.36	64.29	91.30	103.98	-3.98
Dose3	77.50	9.26	90.32	87.07	12.93

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	7.73	0.052

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	79.47		
Dose1	77.55	0.220	0.066
Dose2	86.36	1.000	0.818
Dose3	77.50	0.449	0.417

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.794	<.001	3.421	0.023	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	16	87.51	9.72	2.43	11.11	82.33, 92.69
Dose1	16	74.77	25.19	6.30	33.69	61.35, 88.19
Dose2	15	90.51	8.47	2.19	9.36	85.82, 95.20
Dose3	16	76.95	23.71	5.93	30.81	64.32, 89.58

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	88.57	62.00	100.00		
Dose1	84.32	0.00	94.00	85.45	14.55
Dose2	94.44	69.23	100.00	103.43	-3.43
Dose3	84.51	10.20	98.25	87.94	12.06

 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 8.73 0.033

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	88.57		
Dose1	84.32	0.139	0.040
Dose2	94.44	1.000	0.836
Dose3	84.51	0.449	0.437

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.927	0.001	1.479	0.230	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	16	92.99	6.69	1.67	7.19	89.42, 96.55
Dose1	15	89.30	7.95	2.05	8.90	84.90, 93.70
Dose2	15	94.47	5.45	1.41	5.77	91.45, 97.48
Dose3	16	90.46	8.49	2.12	9.39	85.93, 94.98

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	93.33	75.61	100.00		
Dose1	90.91	75.00	100.00	96.03	3.97
Dose2	96.23	80.00	100.00	101.59	-1.59
Dose3	93.10	69.70	100.00	97.28	2.72

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	4.21	0.240

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	93.33		
Dose1	90.91	0.367	0.114
Dose2	96.23	1.000	0.751
Dose3	93.10	0.684	0.477

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.929	0.001	4.498	0.007	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	32.00	6.13	1.53	19.16	28.73,	35.27
Dose1	16	31.38	11.97	2.99	38.14	25.00,	37.75
Dose2	15	40.00	7.62	1.97	19.04	35.78,	44.22
Dose3	16	34.94	14.68	3.67	42.01	27.12,	42.76

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	32.50	16.00	40.00		
Dose1	34.50	0.00	45.00	98.05	1.95
Dose2	41.00	27.00	54.00	125.00	-25.00
Dose3	40.50	5.00	52.00	109.18	-9.18

 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	8.14	0.043

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	32.50		
Dose1	34.50	1.000	0.746
Dose2	41.00	1.000	0.997
Dose3	40.50	1.000	0.992

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.881	<.001	2.148	0.104	USE NON-PARAMETRIC TESTS.

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	69.48	11.07	2.77	15.94	63.58,	75.38
Dose1	16	64.09	22.28	5.57	34.76	52.22,	75.97
Dose2	15	80.66	13.47	3.48	16.70	73.20,	88.11
Dose3	16	69.57	23.31	5.83	33.50	57.15,	81.99

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	69.27	50.00	90.70		
Dose1	69.04	0.00	88.64	92.25	7.75
Dose2	87.04	52.94	94.34	116.09	-16.09
Dose3	78.59	10.20	93.75	100.13	-0.13

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	8.08	0.044

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	69.27		
Dose1	69.04	1.000	0.462
Dose2	87.04	1.000	0.991
Dose3	78.59	1.000	0.951

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228

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

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 Shapiro-Wilks Levenes Levenes Conclusion

Test Stat P-value Test Stat P-value

0.970 0.135 2.141 0.105 USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	79.49	9.74	2.43	12.25	74.30,	84.68
Dose1	15	85.65	5.44	1.41	6.35	82.64,	88.67
Dose2	15	88.93	11.12	2.87	12.51	82.77,	95.09
Dose3	16	90.18	8.35	2.09	9.25	85.74,	94.63

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	77.57	68.18	100.00		
Dose1	86.11	78.57	97.50	107.76	-7.76
Dose2	94.44	64.29	100.00	111.88	-11.88
Dose3	92.08	66.67	100.00	113.45	-13.45

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	58	4.56	0.006

Dunnett - 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	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	79.49	.	86.02	.	0.230	0.023	0.007	.	.
Dose1	85.65	0.998	86.02	0.992	.	0.746	0.497	.	.
Dose2	88.93	1.000	86.02	0.996	.	.	0.980	.	.
Dose3	90.18	1.000	86.02	0.997	.	.	.	.	.

SUMMARY

Dunnett
Williams

NOEC

Dose3
Dose3

LOEC

>highest dose
>highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.984	0.569	1.418	0.246	USE PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	0.21	0.01	0.00	4.46	0.21,	0.22
Dose1	16	0.21	0.01	0.00	6.10	0.21,	0.22
Dose2	15	0.22	0.01	0.00	5.19	0.21,	0.22
Dose3	16	0.21	0.01	0.00	4.01	0.21,	0.22

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	0.21	0.20	0.23		
Dose1	0.21	0.19	0.24	99.85	0.15
Dose2	0.22	0.19	0.23	101.05	-1.05
Dose3	0.21	0.20	0.23	99.27	0.73

 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	59	0.34	0.800

Dunnett - 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	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	0.21	.	0.22	.					
Dose1	0.21	0.721	0.22	0.651	1.000	0.937	0.976	.	.
Dose2	0.22	0.911	0.22	0.685	.	0.910	0.988	.	.
Dose3	0.21	0.583	0.21	0.448	.	.	0.757	.	.

SUMMARY

	NOEC	LOEC
Dunnett	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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.991	0.922	0.165	0.920	USE PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	6.73	0.42	0.10	6.18	6.50,	6.95
Dose1	15	6.71	0.36	0.09	5.43	6.51,	6.92
Dose2	15	6.77	0.39	0.10	5.76	6.56,	6.99
Dose3	16	6.88	0.40	0.10	5.83	6.66,	7.09

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	6.70	5.90	7.40		
Dose1	6.70	6.10	7.20	99.83	0.17
Dose2	6.70	6.30	7.80	100.72	-0.72
Dose3	6.90	5.80	7.60	102.23	-2.23

 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	58	0.55	0.649

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	6.73	.	6.77	.	1.000	0.986	0.704	.	.
Dose1	6.71	0.722	6.77	0.719	.	0.975	0.665	.	.
Dose2	6.77	0.859	6.77	0.753	.	.	0.889	.	.
Dose3	6.88	0.972	6.77	0.774	.	.	.	.	.

SUMMARY

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

Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.966	0.088	0.722	0.543	USE PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	28.02	1.85	0.46	6.59	27.03,	29.00
Dose1	15	27.63	1.77	0.46	6.40	26.66,	28.61
Dose2	15	28.48	1.77	0.46	6.20	27.50,	29.45
Dose3	16	30.59	2.69	0.67	8.80	29.16,	32.02

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	27.62	24.08	30.71		
Dose1	27.83	23.39	29.71	98.63	1.37
Dose2	28.14	25.94	30.84	101.64	-1.64
Dose3	30.06	27.07	37.73	109.18	-9.18

 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	58	6.45	<.001

Dunnett - 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	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	28.02	.	28.70	.	0.955	0.926	0.005	.	.
Dose1	27.63	0.538	28.70	0.889	.	0.681	0.001	.	.
Dose2	28.48	0.918	28.70	0.912	.	.	0.030	.	.
Dose3	30.59	1.000	28.70	0.926

SUMMARY
 Dunnett NOEC
 Williams Dose3 LOEC
 >highest dose
 >highest dose

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Data Evaluation Report on the Reproductive Effects of AE F130060 Technical on Avian Species *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.909	<.001	1.447	0.238	USE NON-PARAMETRIC TESTS.

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	38.75	5.58	1.39	14.40	35.78,	41.72
Dose1	16	39.20	4.61	1.15	11.76	36.74,	41.65
Dose2	15	42.89	8.74	2.26	20.38	38.05,	47.74
Dose3	16	39.81	7.08	1.77	17.79	36.04,	43.59

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	38.22	32.18	50.72		
Dose1	37.96	31.93	48.49	101.16	-1.16
Dose2	43.49	31.64	62.67	110.70	-10.70
Dose3	38.89	33.21	63.69	102.75	-2.75

 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	2.46	0.483

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	38.22		
Dose1	37.96	1.000	0.618
Dose2	43.49	1.000	0.923
Dose3	38.89	1.000	0.756

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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.981	0.442	1.640	0.190	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	17.94	11.84	2.96	66.01	11.63,	24.25
Dose1	16	18.56	14.25	3.56	76.79	10.97,	26.16
Dose2	15	11.33	9.04	2.33	79.74	6.33,	16.34
Dose3	16	13.94	9.59	2.40	68.84	8.82,	19.05

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	19.50	-1.00	43.00		
Dose1	18.00	-3.00	42.00	103.48	-3.48
Dose2	10.00	-8.00	24.00	63.18	36.82
Dose3	13.50	-4.00	30.00	77.70	22.30

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	59	1.40	0.253

Dunnett - 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	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	17.94	.	18.25	.	0.999	0.380	0.755	.	.
Dose1	18.56	0.804	18.25	0.616	.	0.301	0.662	.	.
Dose2	11.33	0.131	12.68	0.129	.	.	0.920	.	.
Dose3	13.94	0.329	12.68	0.128	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnett	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 *Colinus virginianus*

PMRA Submission Number

EPA MRID Number 45386228

Bobwhite quail repro, Mesosulfuron-methyl, MRID 45386228
 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
0.895	<.001	1.538	0.214	USE NON-PARAMETRIC TESTS

 BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	43.50	15.79	3.95	36.30	35.09,	51.91
Dose1	16	42.75	18.95	4.74	44.32	32.65,	52.85
Dose2	15	43.80	9.66	2.49	22.05	38.45,	49.15
Dose3	16	53.00	9.65	2.41	18.22	47.86,	58.14

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	41.00	7.00	66.00		
Dose1	45.50	-19.00	63.00	98.28	1.72
Dose2	41.00	31.00	64.00	100.69	-0.69
Dose3	57.00	30.00	63.00	121.84	-21.84

 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	5.86	0.119

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	41.00		
Dose1	45.50	1.000	0.611
Dose2	41.00	1.000	0.442
Dose3	57.00	1.000	0.961

SUMMARY

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

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