

FINAL REPORT



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Study Title: A Dermal Prenatal Developmental Toxicity Study of
Ultra-Low Sulfur Diesel Fuel in Rats

Laboratory Project ID: WIL-402014

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Test Guidelines: OPPTS 870.3700
OECD Guideline 414

Study Completion Date: 11 July 2012

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COMPLIANCE STATEMENT

The following is a detailed description of all differences between the practices used in this study, WIL-402014, and those required by the United States EPA GLP Standards (40 CFR Part 792), 18 September 1989; the OECD Principles of GLP [C(97) 186/Final], 26 November 1997; WIL Research's SOPs; and the protocol as approved by the Sponsor.

- The Sponsor conducted test substance characterization according to non-GLP standards and provided the characterization report to WIL Research (presented in Appendix B).
- The stability of the bulk test substance was not provided; however, it is the professional judgment of the Sponsor that the formulations are considered stable under the conditions of the study. The expiration date for the test substance is unknown.

These exceptions had no effect on the integrity or quality of the study.

The study was conducted in general accordance with the United States EPA Health Effects Test Guidelines OPPTS 870.3700, Prenatal Developmental Toxicity Study, August, 1998 and the OECD Guidelines for Testing of Chemicals Guideline 414, Prenatal Developmental Toxicity Study, 22 January 2001.



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11 July 2012

Date

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1. SUMMARY

1.1. OBJECTIVE

The objectives of the study were to determine the effects of prenatal, dermal exposure to the test substance on pregnant rats and developing offspring, to provide data to verify/expand the domain of the polycyclic aromatic compounds (PAC) prenatal models for predicting the toxicity of high-boiling petroleum substances from their PAC content, and to further test the hypothesis that developmental toxicity endpoints are more sensitive to effects of high-boiling petroleum substances than other reproductive endpoints, such as fertility or reproductive organ weight and histopathology.

1.2. STUDY DESIGN

The test substance, ultra-low sulfur diesel fuel (petroleum products, diesel oil [CAS no. 68334-30-5]), in the vehicle (mineral oil) was administered by dermal application to the dorsal scapular area (approximately 10% of total body surface area) of 3 groups (Groups 3-5) of 25 bred female Crl:CD(SD) rats once daily from gestation days 0 through 19; animals were exposed to the test substance for 6 hours each day. Exposure levels were 100, 300, and 600 mg/kg/day administered at a dosage volume of 1.5 mL/kg. A concurrent vehicle control group (Group 2) composed of 25 bred females received the vehicle on a comparable regimen. A concurrent sham control group (Group 1) was subjected to the same procedures (*i.e.* shaving, collaring, sham dosing with a glass rod, and removal of residual test substance) as Groups 2-5; however, no vehicle or test substance was applied to these animals. The females were approximately 13 weeks of age at the initiation of test substance exposure. All animals were observed twice daily for mortality and moribundity. Clinical observations, body weights, and food consumption were recorded at appropriate intervals. On gestation day 20, a laparohysterectomy was performed on each female. The uteri, placentae, and ovaries were examined, and the numbers of fetuses, early and late resorptions, total implantations, and corpora lutea were recorded. Gravid uterine weights were recorded, and net body weights and net body weight changes were calculated. Selected organs

from all females were weighed. The fetuses were weighed, sexed, and examined for external, visceral, and skeletal malformations and developmental variations.

1.3. RESULTS

All females in the sham control, vehicle control, 100, 300, and 600 mg/kg/day groups survived to the scheduled necropsy on gestation day 20. There were no test substance-related clinical or dermal findings noted in the 100, 300, or 600 mg/kg/day groups.

Mean body weights, body weight gains, net body weights, net body weight gains, gravid uterine weights, and food consumption in the 100, 300, and 600 mg/kg/day groups were unaffected by test substance exposure.

There were no remarkable macroscopic findings noted at the scheduled necropsy in the 100, 300, and 600 mg/kg/day groups. In addition, no test substance-related organ weight changes were noted at any exposure level.

Intrauterine growth and survival and fetal morphology at 100, 300, and 600 mg/kg/day were unaffected by test substance exposure.

The vehicle control group generally performed similarly to the sham control group during the study, indicating that the vehicle (mineral oil) does not produce maternal or developmental toxicity. Higher mean food consumption was noted with contradicting sporadic lower mean body weight gains in the vehicle control group compared to the sham control group during gestation days 6-20; these differences were attributed to biological variability. In addition, a lower mean thymus weight was noted in the vehicle control group compared to the sham control group. This difference was also attributed to biological variability.

1.4. CONCLUSIONS

Based on the lack of maternal toxicity or effects on intrauterine growth and survival and fetal morphology at any exposure level tested, the no-observed-adverse-effect level (NOAEL) was determined to be 600 mg/kg/day (the highest dose level evaluated) for both maternal and embryo/fetal developmental toxicity when ultra-low sulfur diesel fuel was administered by dermal application to bred CrI:CD(SD) rats.

2. INTRODUCTION

2.1. GENERAL STUDY INFORMATION

This report presents the data from “A Dermal Prenatal Developmental Toxicity Study of Ultra-Low Sulfur Diesel Fuel in Rats.” Due to software spacing constraints, the study title is presented as “Dermal Rat Dev Tox Study of Ultra-Low Sulfur Diesel Fuel” on the report tables.

The study protocol and deviations from the protocol are presented in Appendix A. A list of abbreviations potentially used in this report is presented in Section 12.

The computer protocol reference number and types of data collected were identified as follows:

<u>Computer Protocol</u>	<u>Type of Data Collected</u>
WIL-402014	Main study data

2.2. KEY STUDY DATES

<u>Date(s)¹</u>	<u>Event(s)</u>
9 September 2011	Study initiation date (date protocol signed by Study Director)
15 September 2011	Experimental starting date (animal receipt)
27 September 2011	Experimental start date (initiation of test substance exposure; first gestation day 0)
27 September - 19 October 2011	Test substance exposure period
20 October 2011	Last laparohysterectomy
14 December 2011	Experimental termination/completion date (last fetal skeletal examination)

2.3. PARTICIPATING SCIENTIST

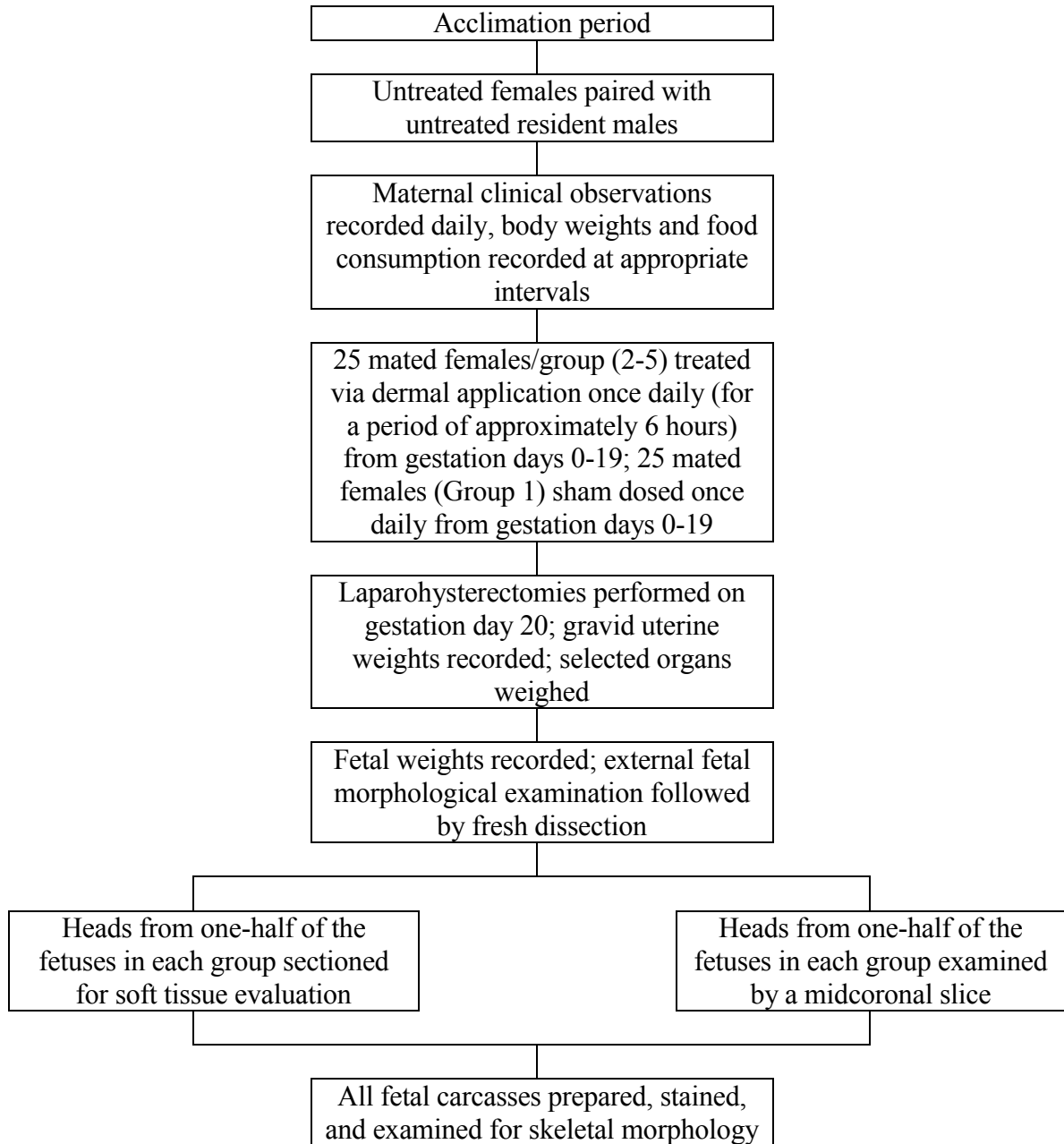
Analyses of Dosing Formulations	Robert E. Boes, MS WIL Research Laboratories, LLC
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¹ Date ranges represent the first and last dates of evaluation.

2.4. WIL RESEARCH KEY STUDY PERSONNEL

Eric S. Bodle, PhD	Assistant Director, Analytical Chemistry
Sally A. Keets, AS	Senior Operations Manager, Vivarium
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Robert A. Wally, BS	Operations Manager, Reporting & Technical Support Services

3. STUDY DESIGN



4. EXPERIMENTAL PROCEDURES - MATERIALS AND METHODS

4.1. TEST SUBSTANCE AND VEHICLE

4.1.1. TEST SUBSTANCE

The test substance, ultra-low sulfur diesel fuel (petroleum products, diesel oil), was received from EPL Archives, Inc., Sterling, VA, on behalf of the Sponsor, on 24 August 2011, as follows:

Identification	Physical Description
Ultra-Low Sulfur Diesel Fuel (Petroleum products, diesel oil) (CAS No. 68334-30-5; 7 Sample blend) [WIL ID no. 110129]	Yellow, clear liquid

A test substance characterization was provided by the Sponsor and is presented in Appendix B. For purposes of dose calculations, the purity of the test substance was considered to be 100.0%. The test substance was stored at room temperature, protected from light, and was considered stable under these conditions. A reserve sample of the test substance was collected and stored in the WIL Research Archives.

4.1.2. VEHICLE

The vehicle used in preparation of the test substance formulations and for administration to the vehicle control group was mineral oil, USP (lot no. 2AF0729, exp. date: 3 August 2013, manufactured by Spectrum Chemical Manufacturing Corporation, New Brunswick, NJ).

4.1.3. PREPARATION

A sufficient amount of mineral oil was transferred to a formulation container approximately weekly for administration to the vehicle control group (Group 2); aliquots were prepared for daily dispensation and stored at room temperature, protected from light.

Dosing formulations were prepared at the test substance concentrations indicated in the following table:

Group Number	Treatment	Exposure Level (mg/kg/day)	Test Substance Concentration ^a (mg/mL)
1	Sham Control	NA	NA
2	Vehicle Control	0	0
3	Test Substance ^b	100	66.7
4	Test Substance ^b	300	200
5	Test Substance ^b	600	400

^a = The dosing formulations were not adjusted for purity.

^b = The test substance for this study was ultra-low sulfur diesel fuel (petroleum products, diesel oil [CAS no. 68334-30-5]).

NA = Not applicable.

The test substance formulations were weight/volume (test substance/vehicle) mixtures. The test substance formulations were prepared approximately weekly as single formulations for each exposure level, divided into aliquots for daily dispensation, and stored at room temperature, protected from light. The test substance formulations were stirred continuously throughout the preparation, sampling, and dose administration procedures.

4.1.4. SAMPLING AND ANALYSES

Homogeneity, stability, and resuspension homogeneity of the test substance formulations were previously established at concentrations of 50 and 500 mg/mL following 8 days of room temperature storage (Bodle, 2012, WIL-402028). Therefore, stability and resuspension homogeneity analyses were not conducted during the current study.

Samples for homogeneity and concentration analyses were collected from the top, middle, and bottom strata of each dosing formulation (including the vehicle control group) prepared for use on the first and last days of preparation. One set of samples from each collection was subjected to the appropriate analyses. The remaining set of samples was stored at room temperature as back-up. All analyses were conducted by the WIL

Research Analytical Chemistry Department using a validated gas chromatography method using mass spectrometric detection with electron impact ionization. Details about the methodology and results of these analyses are presented in Appendix C, and the results are summarized in Section 6.1.

4.2. TEST SYSTEM, ANIMAL RECEIPT, AND ACCLIMATION

Sexually mature, virgin female Sprague Dawley [CrI:CD(SD)] rats were used as the test system on this study. This species and strain of animal is recognized as appropriate for developmental toxicity studies. WIL Research has historical control data on the background incidence of fetal malformations and developmental variations in the CrI:CD(SD) rat. This animal model has been proven to be susceptible to the effects of developmental toxicants. The number of animals selected for this study (see Section 4.7.) was based on the United States EPA Health Effects Test Guidelines OPPTS 870.3700, Prenatal Developmental Toxicity Study, August 1998 and the OECD Guidelines for Testing of Chemicals Guideline 414, Prenatal Developmental Toxicity Study, January 2001.

CrI:CD(SD) rats (155 females) were received in good health from Charles River Laboratories, Inc., Portage, MI, on 15 September 2011. The animals were approximately 79 days old upon receipt. Each female was examined by a qualified biologist on the day of receipt. The day following receipt, all animals were weighed and clinical observations were recorded. Each rat was uniquely identified by a Monel[®] metal ear tag displaying the animal number and housed for 12 days for acclimation purposes. During the acclimation period, the rats were observed twice daily for mortality and changes in general appearance and behavior.

Animals were acclimated to wearing Elizabethan-style collars on an incremental basis, starting with approximately 1 hour and ending with approximately 24 hours of acclimation, starting approximately 1 week prior to the initiation of dose application as outlined below:

Study Day	Approximate Acclimation Period (Hours)
-8	1
-7	4
-6	8
-5	24

4.3. ANIMAL HOUSING

Upon arrival and until pairing, all rats were individually housed in clean, stainless steel wire-mesh cages suspended above cage-board. The cage-board was changed at least 3 times per week. The rats were paired for mating in the home cage of the male. Following positive evidence of mating, the females were returned to individual suspended wire-mesh cages; nesting material was not required as the females were euthanized prior to the date of expected parturition. Animals were maintained in accordance with the *Guide for the Care and Use of Laboratory Animals* (National Research Council, 1996). The animal facilities at WIL Research are fully accredited by AAALAC International.

4.4. DIET, DRINKING WATER, AND MAINTENANCE

The basal diet used in this study, PMI Nutrition International, LLC Certified Rodent LabDiet[®] 5002, was a certified feed with appropriate analyses performed by the manufacturer and provided to WIL Research. Feed lots used during the study were documented in the study records. The feeders were changed and sanitized once per week. Municipal water supplying the facility was regularly sampled for contaminants according to WIL Research's SOPs. The results of the diet and water analyses are maintained at WIL Research. No contaminants were present in animal feed or water at concentrations

sufficient to interfere with the objectives of this study. Reverse osmosis-purified (on-site) drinking water, delivered by an automatic watering system, and the basal diet were provided *ad libitum* throughout the acclimation period and during the study. The animal feed containers were provided without savers and lids to accommodate feeding with collars.

4.5. ENVIRONMENTAL CONDITIONS

All rats were housed throughout the acclimation period and during the study in an environmentally controlled room. The room temperature and humidity controls were set to maintain environmental conditions of 71°F ± 5°F (22°C ± 3°C) and 50% ± 20%, respectively (see Appendix A, Deviations from the Protocol). Room temperature and relative humidity data were monitored continuously and were scheduled for automatic collection on an hourly basis. These data are summarized in Appendix D. Actual mean daily temperature ranged from 70.9°F to 77.2°F (21.6°C to 25.1°C) and mean daily relative humidity ranged from 38.0% to 50.4% during the study. Fluorescent lighting provided illumination for a 12-hour light (0600 hours to 1800 hours)/12-hour dark photoperiod. The light status (on or off) was recorded once every 15 minutes. Air handling units were set to provide a minimum of 10 fresh air changes per hour.

4.6. ASSIGNMENT OF ANIMALS TO TREATMENT GROUPS AND BREEDING PROCEDURES

At the conclusion of the acclimation period, all available females were weighed and examined in detail for physical abnormalities. At the discretion of the Study Director, each animal judged to be in good health and meeting acceptable body weight requirements was placed in a suspended wire-mesh cage with a resident male from the same strain and source for breeding. Resident males were untreated, sexually mature Crl:CD(SD) rats utilized exclusively for breeding; males were received from Charles River Laboratories, Inc. These rats were maintained under similar laboratory conditions as the females. A breeding record containing the male and female identification numbers

and the dates of cohabitation was maintained. The selected females were approximately 13 weeks old when paired for breeding.

Positive evidence of mating was confirmed by the presence of a vaginal copulatory plug or the presence of sperm in a vaginal lavage and verified by a second biologist. Each mating pair was examined daily. The day on which evidence of mating was identified was termed gestation day 0 and the animals were separated.

The experimental design consisted of 3 test substance-treated groups, 1 vehicle control group, and 1 sham control group composed of 25 rats per group. The bred females were assigned to groups using a WTDMS™ computer program which randomized the animals based on stratification of the gestation day 0 body weights in a block design. Animals not assigned to study were transferred to the WIL Research stock colony or euthanized by carbon dioxide inhalation and discarded. Body weight values ranged from 219 g to 304 g on gestation day 0.

4.7. ORGANIZATION OF TEST GROUPS, DOSAGE LEVELS, AND TREATMENT REGIMEN

On the day prior to the initiation of dose administration, and as often as necessary thereafter, the hair was clipped (in a manner that would not abrade the skin) from the dorsal scapular area; repeated clippings were performed prior to or at least 2-4 hours after dose administration. A different set of clippers was used for the sham control, vehicle control, and the test substance-treated groups to avoid the potential for cross-contamination; a record of hair removal is retained in the raw data. The vehicle or test substance was applied evenly to the clipped, unabraded skin and spread evenly using a glass rod (to ensure contact with an area of approximately 10% of the total body surface) once daily (for a period of 6 hours) during gestation days 0-19.

The four corners of the application site were marked with indelible ink to allow proper identification of the treated and untreated skin. Elizabethan-style collars were applied to all animals to minimize ingestion of the test substance. The collars were worn

continually during the exposure period and removed only during weighing procedures. At the end of the 6-hour exposure period, the test sites were gently patted using a disposable paper towel in an effort to remove any remaining test substance or vehicle from the skin. If needed, the test site could be gently patted with gauze moistened with mineral oil and then patted again with dry gauze or a dry disposable paper towel. The area of test substance application was measured and recorded once per week for 2 representative (close to mean body weight) animals in each group. The total percentage of body surface to which the test substance was applied was to be approximately 10% of the total body surface area. The mean area of coverage was calculated as follows:

$$\text{Total body surface area (cm}^2\text{)} = K \cdot \text{body weight (grams)}^{(2/3)}$$

Where:

K = 9 for rats (Freireich *et al.*, 1966)

The following table presents the approximate percentages of body surface area covered by the test substance for each group/week.

	Percent Coverage (%)				
Group	1	2	3	4	5
Exposure Level (mg/kg/day)	NA	0	100	300	600
Study Week 0	10.9	10.9	11.0	11.0	10.9
Study Week 1	10.9	9.5	10.1	11.2	10.7
Study Week 2	9.6	9.5	10.1	10.1	9.8
Mean Coverage	10.4	9.9	10.4	10.8	10.5
Standard Deviation	0.8	0.8	0.5	0.6	0.6

NA = Not applicable

Individual dosages and dose volumes were based on the most recently recorded body weights to provide the correct mg/kg/day dose. All animals were dosed at approximately the same time each day.

The animals in the sham control group were subjected to the same procedures (*i.e.* shaving, collaring, sham dosing with glass rod, and removal of residual test

substance) as the vehicle control and test substance-treated animals, but were not exposed to the vehicle or the test substance.

The following table presents the study group assignment:

Group Number	Treatment	Exposure Level (mg/kg/day)	Dosage Volume (mL/kg)	Number of Females
1	Sham Control	NA	NA	25
2	Vehicle Control	0	1.5	25
3	Test Substance ^a	100	1.5	25
4	Test Substance ^a	300	1.5	25
5	Test Substance ^a	600	1.5	25

^a = The test substance for this study was ultra-low sulfur diesel fuel (petroleum products, diesel oil [CAS no. 68334-30-5]).

NA = Not applicable.

Dosage levels were determined based on the results of previous studies and were provided by the Sponsor Representative after consultation with the WIL Study Director.

The selected route of administration for this study was dermal as this is a potential route of exposure for humans.

5. PARAMETERS EVALUATED

5.1. MATERNAL OBSERVATIONS DURING GESTATION

5.1.1. CLINICAL OBSERVATIONS AND SURVIVAL

All rats were observed twice daily, once in the morning and once in the afternoon, for moribundity and mortality. Individual clinical observations were recorded from gestation days 0 through 20 (prior to dose administration during the treatment period). Animals were also observed for signs of toxicity at the time of dose administration and approximately 1-2 hour following dose administration. The absence or presence of findings was recorded for individual animals.

5.1.2. DERMAL OBSERVATIONS

The application site was scored daily (prior to dose administration) during the treatment period for erythema and edema in accordance with a 4-step grading system (Draize, 1965) of very slight, slight, moderate, and severe as described in Appendix E. Other remarkable dermal findings, if present, were recorded.

5.1.3. BODY WEIGHTS AND GRAVID UTERINE WEIGHTS

Individual maternal body weights were recorded on gestation days 0, 3, 6, 9, 12, 15, 18, and 20. Group mean body weights were calculated for each of these days. Mean body weight changes were calculated for each corresponding interval and also for gestation days 0-20. Collars were removed from the animals during the collection of body weights.

Gravid uterine weight was collected and net body weight (the gestation day 20 body weight exclusive of the weight of the uterus and contents) and net body weight change (the gestation day 0-20 body weight change exclusive of the weight of the uterus and contents) were calculated and presented for each gravid female at the scheduled laparohysterectomy.

5.1.4. FOOD CONSUMPTION

Individual food consumption was recorded on gestation days 0, 3, 6, 9, 12, 15, 18, and 20. Food intake was reported as g/animal/day and g/kg/day for the corresponding body weight change intervals.

5.1.5. GESTATION DAY 20 LAPAROHYSTERECTOMY

Laparohysterectomies and macroscopic examinations were performed blind to treatment group. All females were euthanized on gestation day 20 by carbon dioxide inhalation. The cranial, thoracic, abdominal, and pelvic cavities were opened by a ventral mid-line incision, and the contents were examined. In all instances, the *postmortem* findings were correlated with the *antemortem* comments, and any abnormalities were recorded. The uterus and ovaries were then exposed and excised. The number of corpora lutea on each ovary was recorded. The trimmed uterus was weighed and opened, and the number and location of all fetuses, early and late resorptions, and the total number of implantation sites were recorded. The placentae were also examined. The individual uterine distribution of implantation sites was documented using the following procedure. All implantation sites, including resorptions, were numbered in consecutive order beginning with the left distal to the left proximal uterine horn, noting the position of the cervix, and continuing from the right proximal to the right distal uterine horn.

The liver, brain, and thymus were weighed from all females. Organ to brain weight ratios were calculated. The following tissues and organs were collected and placed in 10% neutral-buffered formalin:

Treated skin	Brain
Untreated skin (right hindlimb)	Thymus
Liver (2 sections)	All gross lesions ^a

^a = Representative sections of corresponding organs from a sufficient number of controls were retained for comparison.

Uteri with no macroscopic evidence of implantation were opened and subsequently placed in 10% ammonium sulfide solution for detection of early implantation loss (Salewski, 1964).

Intrauterine data were summarized using 2 methods of calculation. An example of each method of calculation follows:

1. Group Mean Litter Basis:

$$\text{Postimplantation Loss/Litter} = \frac{\text{No. Dead Fetuses, Resorptions (Early/Late)/Group}}{\text{No. Gravid Females/Group}}$$

2. Proportional Litter Basis:

$$\text{Summation Per Group (\%)} = \frac{\text{Sum of Postimplantation Loss/Litter (\%)}}{\text{No. Litters/Group}}$$

Where:

$$\text{Postimplantation Loss/Litter (\%)} = \frac{\text{No. Dead Fetuses, Resorptions (Early/Late)/Litter}}{\text{No. Implantation Sites/Litter}} \times 100$$

5.2. FETAL MORPHOLOGICAL EXAMINATION

Fetal examinations were performed blind to treatment group. Each viable fetus was examined externally, individually sexed, weighed, euthanized by a subcutaneous injection of sodium pentobarbital in the scapular region (if necessary), and tagged for identification. Fetal tags contained the WIL Research study number, the female number, and the fetus number. The detailed external examination of each fetus included, but was not limited to, an examination of the eyes, palate, and external orifices, and each finding was recorded. Crown-rump measurements and degrees of autolysis were recorded for late resorptions, a gross external examination was performed (if possible), and the tissues were discarded.

Each viable fetus was subjected to a visceral examination using a modification of the Stuckhardt and Poppe fresh dissection technique to include the heart and major blood vessels (Stuckhardt and Poppe, 1984). The sex of each fetus was confirmed by internal examination. Fetal kidneys were examined and graded for renal papillae development (Woo and Hoar, 1972). Heads from approximately one-half of the fetuses in each litter were placed in Bouin's fixative for subsequent soft-tissue examination by the Wilson sectioning technique (Wilson, 1965). The heads from the remaining one-half of the fetuses were examined by a midcoronal slice. All carcasses were eviscerated and fixed in 100% ethyl alcohol.

Following fixation in alcohol, each fetus was macerated in potassium hydroxide and stained with Alizarin Red S (Dawson, 1926) and Alcian Blue (Inouye, 1976). Fetuses were then examined for skeletal malformations and developmental variations.

External, visceral, and skeletal findings were recorded as developmental variations (alterations in anatomic structure that are considered to have no significant biological effect on animal health or body conformity and/or occur at high incidence, representing slight deviations from normal) or malformations (those structural anomalies that alter general body conformity, disrupt or interfere with normal body function, or may be incompatible with life).

The fetal developmental findings were summarized by: 1) presenting the incidence of a given finding both as the number of fetuses and the number of litters available for examination in the group; and 2) considering the litter as the basic unit for comparison and calculating the number of affected fetuses in a litter on a proportional basis as follows:

$$\text{Summation per Group (\%)} = \frac{\text{Sum of Viable Fetuses Affected/Litter (\%)}}{\text{No. Litters/Group}}$$

Where:

$$\text{Viable Fetuses Affected/Litter (\%)} = \frac{\text{No. Viable Fetuses Affected/Litter}}{\text{No. Viable Fetuses/Litter}} \times 100$$

5.3. DATA ACQUISITION AND ANALYSIS

5.3.1. ACQUISITION AND REPORTING

Program/System	Description
Archive Management System (AMS)	In-house developed application for storage, maintenance, and retrieval of information for archived materials (<i>e.g.</i> , lab books, study data, wet tissues, slides, <i>etc.</i>)
InSight [®] Publisher	Electronic publishing system (output is Adobe Acrobat, PDF)
Master Schedule	Maintains the master schedule for the company.
Metasys DDC Electronic Environmental Control System	Controls and monitors animal room environmental conditions.
Microsoft [®] Office 2002 and 2007	Used in conjunction with the publishing software to generate study reports.
Provantis Dispense [™]	Comprehensive system (Instem LSS Limited) to manage test materials, including receipt, formulation instructions, and accountability.
WIL Formulations Dispense System (WFDS)	In-house developed system for use in conjunction with Provantis Dispense [™] to ensure proper storage and use of formulations.
WIL Metasys	In-house developed system used to record and report animal room environmental conditions.

Program/System	Description
WIL Toxicology Data Management System™ (WTDMS™)	In-house developed system used for collection and reporting of in-life and <i>postmortem</i> data.

Note: Version numbers of WTDMS™ programs used for the study are presented on the report data tables (reporting programs); version numbers and release dates are otherwise maintained in the study records and/or facility records.

5.3.2. STATISTICAL ANALYSES

All statistical tests were performed using WTDMS™ unless otherwise noted. Analyses were conducted using two-tailed tests (except as noted otherwise) for minimum significance levels of 1% and 5%, comparing each test substance-treated group to the vehicle control group (Group 2). In addition, the vehicle control group (Group 2) was compared separately to the sham control group (Group 1). Each mean was presented with the standard deviation (S.D.), standard error (S.E.), and the number of animals (N) used to calculate the mean. Data obtained from nongravid animals were excluded from statistical analyses. Due to the use of significant figures and the different rounding conventions inherent in the types of software used, the means and standard deviations on the summary and individual tables may differ slightly. Therefore, the use of reported individual values to calculate subsequent parameters or means will, in some instances, yield minor variations from those listed in the report data tables. Where applicable, the litter was used as the experimental unit.

Mean maternal body weights (absolute and net), body weight changes (absolute and net), and food consumption, gravid uterine weights, numbers of corpora lutea, implantation sites, and viable fetuses, fetal body weights (separately by sex and combined), and organ weights were subjected to a parametric one-way ANOVA (Snedecor and Cochran, 1980) to determine intergroup differences. If the ANOVA revealed significant ($p < 0.05$) intergroup variance, Dunnett's test (Dunnett, 1964) or a two-sample t-test (Snedecor and Cochran, 1980), as appropriate, was used to compare the test substance-treated groups to the vehicle control group and the vehicle control group to the sham control group. Mean litter proportions (percent per litter) of prenatal data (viable and nonviable fetuses, early and late resorptions, total resorptions, pre- and postimplantation loss, and fetal sex distribution),

total fetal malformations and developmental variations (external, visceral, skeletal, and combined) and each particular external, visceral, and skeletal malformation or variation were subjected to the Kruskal-Wallis nonparametric ANOVA test (Kruskal and Wallis, 1952) to determine intergroup differences. If the ANOVA revealed significant ($p < 0.05$) intergroup variance, Dunn's test (Dunn, 1964) was used to compare the test substance-treated groups to the vehicle control group and the vehicle control group to the sham control group.

6. RESULTS AND DISCUSSION

6.1. ANALYSES OF DOSING FORMULATIONS

Analyses of Dosing Formulations Report: Appendix C

The analyzed dosing formulations were within WIL Research's SOP range for suspensions (85% to 115%) and were homogeneous with the following exception. The results of the initial assessment of the 26 September 2011 Group 3 (66.7 mg/mL) formulation failed to meet the acceptance criteria. A processing error was suspected to have occurred. The back-up samples were analyzed and the overall mean concentration percent of target was reported as 89.2%, which met the previously stated WIL Research SOP requirements for test substance homogeneity. The test article was not detected in the vehicle formulation that was administered to the control group (Group 1).

Results of the analyses of dosing formulations are summarized below.

Text Table 1. Results of Homogeneity/Concentration Analyses

	Group 3 (66.7 mg/mL)	Group 4 (200 mg/mL)	Group 5 (400 mg/mL)
Homogeneity/Concentration Assessment of the 26 September 2011 Formulations			
Mean Concentration (mg/mL)	59.5	173	359
RSD (%)	12*	5.1	4.2
Mean Concentration % of Target	89.2	86.6	89.7
Homogeneity/Concentration Assessment of the 12 October 2011 Formulations			
Mean Concentration (mg/mL)	67.4	206	413
RSD (%)	4.0	5.1	4.3
Mean Concentration % of Target	101	103	103

* = Original and backup sample sets had mean RSD <10%.

6.2. MATERNAL CLINICAL OBSERVATIONS AND SURVIVAL

Summary Data: Table S1, Table S2, Table S3

Individual Data: Table A1, Table A2, Table A3

All females in the sham control, vehicle control, 100, 300, and 600 mg/kg/day groups survived to the scheduled necropsy on gestation day 20.

No test substance-related clinical findings were noted at the daily examinations, at the time of test substance exposure, or 1 to 2 hours following test substance exposure at any exposure level. Findings noted in the test article-treated groups, including yellow, red, and/or brown material in the urogenital and ventral abdominal areas and hair loss on various body surfaces, occurred infrequently, at similar frequencies in the vehicle control group, and/or in a manner that was not dose-related.

Clinical findings noted in the vehicle control group occurred at similar frequencies in the sham control group.

Red material around the eyes and nose and hair loss around the eyes were noted for almost all females in all groups, including the sham and vehicle control groups, throughout the treatment period (gestation days 1-20) at the daily examinations. Because these findings were found at similar frequencies across all groups, they were likely the result of the animals' inability to groom and discomfort caused by the collar; therefore, these findings were not attributed to test substance administration.

6.3. DERMAL OBSERVATIONS

Summary Data: Table S4

Individual Data: Table A4

No remarkable dermal observations were noted in the 100, 300, and 600 mg/kg/day groups. Observations in these groups occurred infrequently, at similar frequencies in the vehicle control group, and/or in a manner that was not dose-related.

Dermal observations noted in the vehicle control group were generally similar to the sham control group. Differences from the sham control group were slight and attributed to biological variability.

6.4. MATERNAL BODY WEIGHTS AND GRAVID UTERINE WEIGHTS

Summary Data: Table S5, Table S6, Table S7

Individual Data: Table A5, Table A6, Table A7

Mean maternal body weights, body weight gains, net body weights, net body weight gains, and gravid uterine weights in the 100, 300, and 600 mg/kg/day groups were unaffected by test substance administration. Differences from the vehicle control group were slight and not statistically significant.

Mean body weight parameters in the vehicle control group were generally similar to the sham control group. Significantly ($p < 0.01$) lower mean body weight gains were noted in the vehicle control group compared to the sham control group during gestation days 9-12 and 15-18. As a result, a significantly ($p < 0.01$) lower mean body weight gain was noted in this group for the overall treatment period (gestation days 0-20). In addition, mean body weight in this group was significantly ($p < 0.05$) lower (4.1%) than the sham control group on gestation day 18. Net body weight gain in the vehicle control group was also significantly ($p < 0.05$) lower than the sham control group. The differences in mean body weights and mean body weight gains between the vehicle control and sham control groups were sporadic and/or slight in magnitude, and despite the difference in mean net body weight gain, net body weights were similar between these 2 groups. Therefore, the aforementioned differences in body weight parameters between the vehicle control and sham control groups were attributed to biological variability.

6.5. MATERNAL FOOD CONSUMPTION

Summary Data: Table S8, Table S9

Individual Data: Table A8, Table A9

Maternal food consumption, evaluated as g/animal/day and g/kg/day, in the 100, 300, and 600 mg/kg/day groups was unaffected by test substance administration. Differences from the vehicle control group were slight and not statistically significant.

Mean food consumption in the vehicle control group was similar to the sham control group during gestation days 0-6. However, higher mean g/animal/day and/or g/kg/day food consumption was noted in the vehicle control group during gestation days 6-9, 9-12, 12-15, 15-18, 18-20 and when the entire treatment period (gestation days 0-20) was evaluated compared to the sham control group; differences were generally significant ($p < 0.05$ or $p < 0.01$). Because there was no corresponding effect on mean body weight parameters in the vehicle control group, as mean body weight gains in the vehicle control group were often lower than the sham control group, these changes were attributed to biological variability.

6.6. ANATOMIC PATHOLOGY AND LAPAROHYSTERECTOMY

6.6.1. MATERNAL NECROPSY DATA

Summary Data: Table S10

Individual Data: Table A10

At the scheduled necropsy on gestation day 20, no test substance-related internal findings were observed at exposure levels of 100, 300, and 600 mg/kg/day. Macroscopic findings observed in the test substance-treated groups occurred infrequently and/or in a manner that was not dose-related.

No remarkable macroscopic findings were noted in the vehicle control group compared to the sham control group. Findings noted in the vehicle control group were limited to single females.

Three, 4, and 3 females in the sham control, vehicle control, and 300 mg/kg/day groups, respectively, were determined to be nongravid.

6.6.2. ORGAN WEIGHTS

Summary Data: Table S11

Individual Data: Table A11, Table A12

No test substance-related effects on organ weights (absolute and relative to brain weight) were observed in the 100, 300, and 600 mg/kg/day groups. Differences from the vehicle control group were slight and not statistically significant.

Mean organ weights (absolute and relative to brain weight) in the vehicle control group were generally similar to the sham control group. Differences from the sham control group were slight and not statistically significant with the following exception. A significantly ($p < 0.05$) lower mean thymus weight was noted in the vehicle control group compared to the sham control group. This difference was attributed to biological variability.

6.6.3. GESTATION DAY 20 LAPAROHYSTERECTOMY DATA

Summary Data: Table S12, Table S13

Individual Data: Table A13, Table A14, Table A15

Historical Control Data: Appendix F

Intrauterine growth and survival were unaffected by test substance administration at exposure levels of 100, 300, and 600 mg/kg/day. Parameters evaluated included postimplantation loss, live litter size, mean fetal body weights, and fetal sex ratios. Mean numbers of corpora lutea and implantation sites and the mean litter proportions of pre-implantation loss were similar between the vehicle control and test substance-treated groups. Differences from the vehicle control group were slight and not statistically significant.

Intrauterine growth and survival in the vehicle control group were similar to the sham control group. Differences from the sham control group were slight and not statistically significant.

6.7. FETAL MORPHOLOGICAL DATA

Summary Data: Table S14, Table S15, Table S16, Table S17

Individual Data: Table A16

Historical Control Data: Appendix F

The numbers of fetuses (litters) available for morphological evaluation were 334(22), 302(21), 368(25), 330(22), and 374(25) in the sham control, vehicle control, 100, 300, and 600 mg/kg/day groups, respectively. Malformations were observed in 1(1), 2(2), 1(1), 0(0), and 0(0) fetuses (litters) in these same respective dose groups and were considered spontaneous in origin.

6.7.1. EXTERNAL MALFORMATIONS AND VARIATIONS

No test substance-related external malformations were noted for fetuses in the test substance-treated groups. In the 100 mg/kg/day group, fetus no. 27543-16 was noted with tarsal flexure (right). There was no apparent skeletal origin for this finding. This external malformation was not considered test substance-related as it did not occur at higher exposure levels (300 or 600 mg/kg/day).

No external malformations were noted in fetuses in the sham or vehicle control groups. However, late resorption no. 27458-14 in the vehicle control group was noted with body shorter than normal and gastroschisis (a portion of the liver and stomach protruded through an opening in the ventral midline, covered by a membranous sac).

No external developmental variations were noted in fetuses in this study.

6.7.2. VISCERAL MALFORMATIONS AND VARIATIONS

No visceral malformations were noted in the test-substance treated groups.

Two fetuses (nos. 27431-16 and 27467-10) in the vehicle control group were noted with situs inversus (trachea, esophagus, heart, great and major vessels, liver, stomach, pancreas, spleen, kidneys, adrenal glands, and intestine laterally transposed) and lobular dysgenesis of the lungs (one lobe present, bilateral). In the sham control group, fetus no. 27468-06 was noted with a right-sided aortic arch (the aortic arch and descending aorta coursed to the right of the vertebral column, the right carotid and right subclavian arteries arose independently from the aortic arch [no brachiocephalic trunk], and the left carotid and left subclavian arteries arose from a common vessel from the aortic arch).

A major blood vessel variation (right carotid and subclavian arteries arose independently from the aortic arch [no brachiocephalic trunk]) was noted for 1 fetus each in the 100 and 300 mg/kg/day groups. This visceral developmental variation was not considered to be test substance-related as it occurred in single fetuses and in a manner that was not dose-related. Distended ureters were noted for 3 fetuses from 1 litter in the 300 mg/kg/day group and 4 fetuses from 1 litter in the 600 mg/kg/day group. The mean litter proportions of this finding in these groups (1.4% and 1.1% per litter, respectively) were not statistically significantly different from the vehicle control group (0.0% per litter) and the values were within the range of values in the WIL historical control data (0.0% to 4.0% per litter). Therefore, this finding was not considered test article-related.

No visceral developmental variations were noted in the vehicle control group. In the sham control group, 1 fetus was noted with distended ureters (bilateral) and another fetus was noted with a major blood vessel variation (right subclavian artery coursed retroesophageally and joined the aortic arch adjacent to the ductus arteriosus [no brachiocephalic trunk]); the mean litter proportions for these findings were within the ranges of the WIL developmental historical control data.

Renal papilla(e) that were not fully developed (Woo and Hoar Grade 1) were noted for fetus nos. 27457-02, 27518-11, 27551-07, and 27551-08 in the 600 mg/kg/day group. This finding was not classified as either a malformation or developmental variation, was not included on the summary tables, and in the absence of other signs of developmental toxicity was not considered to be test substance-related.

6.7.3. SKELETAL MALFORMATIONS AND VARIATIONS

There were no skeletal malformations in the test substance-treated groups.

In the vehicle control group, fetus no. 27431-16 (with the visceral findings of lobular dysgenesis of the lungs and situs inversus) was noted with a vertebral anomaly without an associated rib anomaly consisting of absent, fused, malpositioned, and/or malproportioned centra and arches.

Skeletal developmental variations observed in the test substance-treated groups consisted of hyoid unossified, sternebra(e) nos. 5 and/or 6 unossified, cervical centrum no. 1 ossified, sternebra(e) malaligned (slight or moderate), reduced ossification of the 13th rib(s), reduced ossification of the vertebral arches, 14th rudimentary rib(s), 7th cervical rib(s), 27 presacral vertebrae, unco-ossified vertebral centra, 25 presacral vertebrae, sternebra(e) nos. 1, 2, 3, and/or 4 unossified, reduced ossification of the skull, and bent rib(s). These findings occurred infrequently or at a frequency similar to the vehicle control group, did not occur in a dose-related manner, and/or the mean litter proportions were within the WIL historical control data range.

No remarkable differences in skeletal developmental variations were noted between the vehicle control and sham control groups.

6.7.4. SUMMARY OF EXTERNAL, VISCERAL, AND SKELETAL EXAMINATIONS

The numbers of fetuses (litters) available for morphological evaluation were 334(22), 302(21), 368(25), 330(22), and 374(25) in the sham control, vehicle control, 100, 300, and 600 mg/kg/day groups, respectively. Malformations were observed in 1(1), 2(2), 1(1), 0(0), and 0(0) fetuses (litters) in these same respective dose groups and were considered spontaneous in origin. When the total malformations and developmental variations were evaluated on a proportional basis, no statistically significant differences from the vehicle control group were noted. Fetal malformations and developmental variations, when observed in the test substance-treated groups, occurred infrequently or at a frequency similar to that in the vehicle control group, did not occur in a dose-related manner, and/or were within the WIL historical control data ranges. Based on these data, no fetal malformations or developmental variations were attributed to the test substance.

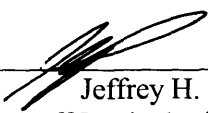
No significant differences in fetal malformations or developmental variations were noted when the vehicle control group was compared to the sham control group.

7. CONCLUSIONS

Based on the lack of maternal toxicity or effects on intrauterine growth and survival and fetal morphology at any exposure level tested, the no-observed-adverse-effect level (NOAEL) was determined to be 600 mg/kg/day (the highest dose level evaluated) for both maternal and embryo/fetal developmental toxicity when ultra-low sulfur diesel fuel was administered by dermal application to bred CrI:CD(SD) rats.

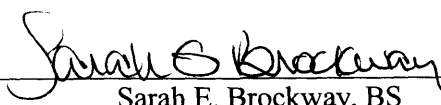
8. REPORT REVIEW AND APPROVAL

Report Authored and Approved By:


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Staff Toxicologist, Developmental
and Reproductive Toxicology
Study Director

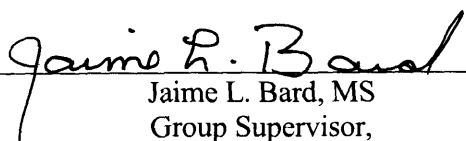
11 July 2012
Date

Report Prepared By:


Sarah E. Brockway, BS
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11 July 2012
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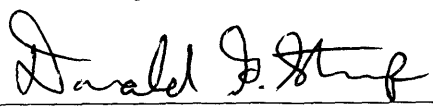
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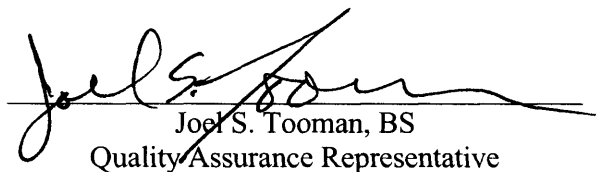
9. QUALITY ASSURANCE STATEMENT

<u>Date(s) of Inspection(s)</u>	<u>Phase Inspected</u>	<u>Date(s) Findings Reported to Study Director</u>	<u>Date(s) Findings Reported to Management</u>
08-Sep-2011, 09-Sep-2011	Protocol Review	09-Sep-2011	25-Oct-2011
20-Sep-2011	Protocol Amendment 1	20-Sep-2011	25-Oct-2011
26-Sep-2011	Test Article Preparation	26-Sep-2011	25-Oct-2011
26-Sep-2011	Cohabitation	26-Sep-2011	25-Oct-2011
27-Sep-2011	Confirmation of Breeding	27-Sep-2011	25-Oct-2011
17-Oct-2011	Laparohysterectomy and Fetal Examinations	17-Oct-2011	28-Nov-2011
03-Nov-2011	Protocol Amendment 2	03-Nov-2011	20-Dec-2011
09-Nov-2011	Protocol Amendment 3	09-Nov-2011	20-Dec-2011
21-Nov-2011, 22-Nov-2011, 14-Dec-2011, 15-Dec-2011, 16-Dec-2011, 20-Dec-2011	Study Records (I-1)	20-Dec-2011	16-Jan-2012
23-Nov-2011, 15-Dec-2011, 16-Dec-2011, 20-Dec-2011	Study Records (I-2)	20-Dec-2011	16-Jan-2012
28-Nov-2011, 29-Nov-2011, 15-Dec-2011, 16-Dec-2011, 20-Dec-2011	Study Records (I-3)	20-Dec-2011	16-Jan-2012
30-Nov-2011, 15-Dec-2011, 16-Dec-2011, 20-Dec-2011	Study Records (Rx-1)	20-Dec-2011	16-Jan-2012
06-Dec-2011, 07-Dec-2011	Study Records (A-1, A-2)	07-Dec-2011	16-Jan-2012

<u>Date(s) of Inspection(s)</u>	<u>Phase Inspected</u>	<u>Date(s) Findings Reported to Study Director</u>	<u>Date(s) Findings Reported to Management</u>
19-Dec-2011	Analytical Chemistry Report	19-Dec-2011	16-Jan-2012
20-Dec-2011, 22-Dec-2011	Study Records (N-1)	22-Dec-2011	16-Jan-2012
22-Dec-2011	Study Records (N-2)	22-Dec-2011	16-Jan-2012
02-Jan-2012	Draft Report (without Analyses of Dosing Formulations Appendix)	02-Jan-2012	23-Feb-2012
09-Jan-2012	Audited Analytical Chemistry Report	09-Jan-2012	23-Feb-2012
09-Jan-2012	Audited Draft Report	09-Jan-2012	23-Feb-2012
10-Jul-2012	Final Report	10-Jul-2012	10-Jul-2012

This study was inspected in accordance with the United States EPA GLP Standards (40 CFR Part 792), the OECD Principles of GLP [C(97)186/Final], WIL Research's SOPs, and the Sponsor's protocol and protocol amendments, with the following exception. The data located in Appendix B (Test Substance Characterization) were the responsibility of the Sponsor. A yearly internal facility inspection is conducted by the WIL Research Quality Assurance Department. A status report is submitted to management monthly.

This report accurately reflects the data generated during the study. The methods and procedures used in the study were those specified in the protocol, its amendments, and WIL Research's SOPs.


Joel S. Tooman, BS
Quality Assurance Representative

11 July 2012
Date

10. REFERENCES

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11. DATA RETENTION

The Sponsor has title to all documentation records, raw data, specimens, or other work product generated during the performance of the study. Any remaining dosing formulation samples were discarded upon issuance of the final report. All remaining work product generated by WIL Research, including raw paper data and specimens, are retained in the WIL Research Archives as specified in the study protocol.

Reserve samples of the test substance, pertinent electronic storage media, and the original final report are retained in the WIL Research Archives in compliance with regulatory requirements.

12. **ABBREVIATIONS**

The following abbreviations may apply to this report:

μ	-	micro
AAALAC	-	Association for Assessment and Accreditation of Laboratory Animal Care
ANOVA	-	analysis of variance
cm	-	centimeter
dB	-	decibels
dL	-	deciliter
EPA	-	Environmental Protection Agency
exp.	-	expiration
g	-	gram
GLP	-	Good Laboratory Practices
hr	-	hour(s)
kg	-	kilogram
L	-	liter
M	-	molar
mg	-	milligram
mL	-	milliliter
mm	-	millimeter
ms	-	milliseconds
mM	-	millimolar
NA	-	not applicable
no.	-	number
OECD	-	Organisation for Economic Cooperation and Development
OPPTS	-	Office of Prevention, Pesticides, and Toxic Substances
PAC	-	polycyclic aromatic compounds
ppm	-	parts per million
RSD	-	Relative standard deviation
SOP	-	standard operating procedure
TSCA	-	Toxic Substances Control Act
USP	-	United States Pharmacopeia
WIL Research	-	WIL Research Laboratories, LLC
WTDMS™	-	WIL Toxicology Data Management System
wt.	-	weight
wt.	-	weights

TABLES S1 - S17

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S1
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF MATERNAL SURVIVAL AND PREGNANCY STATUS

PAGE 1

DOSE GROUP :	1		2		3		4		5	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
FEMALES ON STUDY	25		25		25		25		25	
FEMALES THAT ABORTED OR DELIVERED	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FEMALES THAT DIED	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FEMALES THAT ABORTED NONGRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
GRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FEMALES THAT WERE EUTHANIZED NONGRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
GRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FEMALES EXAMINED AT SCHEDULED NECROPSY	25	100.0	25	100.0	25	100.0	25	100.0	25	100.0
NONGRAVID	3	12.0	4	16.0	0	0.0	3	12.0	0	0.0
GRAVID	22	88.0	21	84.0	25	100.0	22	88.0	25	100.0
WITH RESORPTIONS ONLY	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
WITH VIABLE FETUSES	22	100.0	21	100.0	25	100.0	22	100.0	25	100.0
TOTAL FEMALES GRAVID	22	88.0	21	84.0	25	100.0	22	88.0	25	100.0

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

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11/15/2011

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S2 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF CLINICAL FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

PAGE 1

----- F E M A L E -----

TABLE RANGE: GROUP:	1	09-27-11 TO 2	10-20-11 3	4	5
NORMAL					
-NO SIGNIFICANT CLINICAL OBSERVATIONS	84/25	107/25	110/25	78/25	73/25
DISPOSITION					
-SCHEDULED EUTHANASIA; GESTATION DAY 20	25/25	25/25	25/25	25/25	25/25
BODY/INTEGUMENT					
-WET YELLOW MATERIAL UROGENITAL AREA	13/ 4	27/18	20/10	29/11	18/ 7
-WET RED MATERIAL UROGENITAL AREA	0/ 0	0/ 0	1/ 1	1/ 1	0/ 0
-DRIED RED MATERIAL UROGENITAL AREA	3/ 3	3/ 2	11/ 3	12/ 5	15/ 8
-WET YELLOW MATERIAL VENTRAL ABDOMINAL AREA	2/ 1	3/ 2	3/ 3	1/ 1	0/ 0
-DRIED YELLOW MATERIAL VENTRAL ABDOMINAL AREA	0/ 0	2/ 2	0/ 0	1/ 1	0/ 0
-HAIR LOSS RIGHT FORELIMB	4/ 4	19/13	32/16	34/17	33/15
-HAIR LOSS LEFT FORELIMB	3/ 2	12/10	27/13	26/14	26/13
-DRIED BROWN MATERIAL VENTRAL ABDOMINAL AREA	3/ 1	0/ 0	3/ 1	2/ 1	1/ 1
-HAIR LOSS VENTRAL ABDOMINAL AREA	11/ 1	0/ 0	0/ 0	0/ 0	0/ 0
-DRIED YELLOW MATERIAL UROGENITAL AREA	1/ 1	0/ 0	0/ 0	2/ 1	0/ 0
-HAIR LOSS UROGENITAL AREA	1/ 1	1/ 1	1/ 1	1/ 1	0/ 0
-WET CLEAR MATERIAL UROGENITAL AREA	0/ 0	2/ 2	0/ 0	0/ 0	0/ 0
1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY					

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S2 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF CLINICAL FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

PAGE 2

----- F E M A L E -----

TABLE RANGE: GROUP:	09-27-11 TO	10-20-11			
1	2	3	4	5	
BODY/INTEGUMENT					
-HAIR LOSS DORSAL HEAD	2/ 2	1/ 1	0/ 0	3/ 2	1/ 1
-UNKEMPT APPEARANCE	0/ 0	7/ 7	3/ 2	4/ 2	1/ 1
EYES/EARS/NOSE					
-DRIED RED MATERIAL AROUND RIGHT EYE	165/20	140/21	180/20	191/22	198/24
-DRIED RED MATERIAL AROUND LEFT EYE	118/16	132/23	197/20	179/20	211/25
-DRIED RED MATERIAL AROUND NOSE	404/25	389/25	356/25	400/25	400/25
-HAIR LOSS AROUND RIGHT EYE	34/15	39/23	62/22	36/21	48/22
-HAIR LOSS AROUND LEFT EYE	28/13	35/23	51/22	36/22	53/22
-DRIED YELLOW MATERIAL AROUND RIGHT EYE	2/ 2	24/15	16/ 7	12/ 7	23/11
-DRIED YELLOW MATERIAL AROUND LEFT EYE	0/ 0	16/11	16/ 8	8/ 6	19/11
-DRIED YELLOW MATERIAL AROUND NOSE	0/ 0	1/ 1	11/ 8	3/ 2	11/10
ORAL/DENTAL					
-UPPER INCISORS MALALIGNED	3/ 1	0/ 0	12/ 1	0/ 0	0/ 0
SPECIAL II					
-ANIMAL FOUND WITHOUT COLLAR	12/ 8	7/ 6	7/ 6	10/ 7	8/ 6
1-0 MG/KG/DAY SHAM	2-0 MG/KG/DAY VEH.	3- 100 MG/KG/DAY	4- 300 MG/KG/DAY	5- 600 MG/KG/DAY	

PCSUV4.07
01/04/2012

PROJECT NO.:WIL-402014
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TABLE S3
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF POST-DOSE FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

PAGE 1

----- F E M A L E -----

TABLE RANGE: 09-27-11 TO 10-19-11						
GROUP:		1	2	3	4	5

NORMAL						
TIME OF DOSE						
-NO SIGNIFICANT CLINICAL OBSERVATIONS		500/25	500/25	500/25	500/25	500/25
1-2 HOURS POST-DOSING						
-NO SIGNIFICANT CLINICAL OBSERVATIONS		499/25	497/25	487/25	492/25	490/25
BODY/INTEGUMENT						
1-2 HOURS POST-DOSING						
-WET YELLOW MATERIAL UROGENITAL AREA		0/0	1/1	5/5	6/5	4/3
-WET RED MATERIAL UROGENITAL AREA		1/1	2/2	4/3	2/2	5/5
-DRIED RED MATERIAL UROGENITAL AREA		0/0	0/0	3/3	0/0	1/1
-WET YELLOW MATERIAL VENTRAL ABDOMINAL AREA		0/0	0/0	1/1	0/0	0/0
-WET CLEAR MATERIAL UROGENITAL AREA		0/0	0/0	1/1	0/0	0/0
SPECIAL II						
TIME OF DOSE						
-ANIMAL FOUND WITHOUT COLLAR		1/1	0/0	0/0	0/0	0/0

1-0 MG/KG/DAY SHAM	2-0 MG/KG/DAY VEH.	3- 100 MG/KG/DAY	4- 300 MG/KG/DAY	5- 600 MG/KG/DAY		

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01/04/2012

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S4 (DERMAL OBSERVATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF CLINICAL FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

PAGE 1

----- F E M A L E -----

TABLE RANGE: GROUP:	1	09-27-11 TO 2	10-20-11 3	4	5
DERMAL OBS					
-SCORED, NOT REMARKABLE	522/25	494/25	515/25	508/25	489/25
-NO ERYTHEMA	3/ 3	7/ 3	3/ 1	3/ 3	11/ 5
-ERYTHEMA - VERY SLIGHT	0/ 0	24/ 5	7/ 2	13/ 5	22/ 9
-ERYTHEMA - SLIGHT	0/ 0	0/ 0	0/ 0	1/ 1	3/ 3
-NO EDEMA	3/ 3	31/ 6	10/ 3	17/ 6	35/ 9
-EDEMA - VERY SLIGHT	0/ 0	0/ 0	0/ 0	0/ 0	1/ 1
-DESQUAMATION	3/ 3	11/ 4	4/ 2	3/ 2	24/ 8
-PINPOINT SCABBING	0/ 0	3/ 2	0/ 0	0/ 0	1/ 1
1-0 MG/KG/DAY SHAM	2-0 MG/KG/DAY VEH.	3- 100 MG/KG/DAY	4- 300 MG/KG/DAY	5- 600 MG/KG/DAY	
					PCSuv4.07 11/15/2011

TABLE S5
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF BODY WEIGHTS DURING GESTATION [G]

GROUP:		0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY	
DAY	0	MEAN S.D. S.E. N	259. 13.5 2.9 22	259. 14.0 3.1 21	260. 13.3 2.7 25	260. 16.7 3.6 22	261. 12.4 2.5 25
DAY	3	MEAN S.D. S.E. N	259. 17.1 3.7 22	259. 15.9 3.5 21	259. 14.2 2.8 25	258. 18.6 4.0 22	259. 16.7 3.3 25
DAY	6	MEAN S.D. S.E. N	273. 18.0 3.8 22	271. 14.4 3.1 21	270. 14.9 3.0 25	273. 19.8 4.2 22	270. 19.4 3.9 25
DAY	9	MEAN S.D. S.E. N	287. 18.9 4.0 22	285. 13.7 3.0 21	284. 13.3 2.7 25	284. 22.0 4.7 22	283. 19.3 3.9 25
DAY	12	MEAN S.D. S.E. N	307. 19.0 4.0 22	298. 14.8 3.2 21	300. 15.9 3.2 25	300. 22.4 4.8 22	298. 18.4 3.7 25

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group
NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S5
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF BODY WEIGHTS DURING GESTATION [G]

PAGE 2

GROUP:		0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
DAY	15	MEAN	325.	319.	317.	320.
		S.D.	21.8	17.6	15.8	22.3
		S.E.	4.6	3.8	3.2	4.5
		N	22	21	25	25
DAY	18	MEAN	364.	349.a	351.	354.
		S.D.	22.6	17.9	17.0	26.9
		S.E.	4.8	3.9	3.4	5.7
		N	22	21	25	22
DAY	20	MEAN	400.	386.	389.	394.
		S.D.	24.4	20.8	20.5	33.1
		S.E.	5.2	4.5	4.1	7.0
		N	22	21	25	22

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

a = Significantly different from control group 1 at 0.05 using two-sample t-test

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PGBWSUV5.10
11/15/2011
R:11/15/2011

TABLE S6
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF BODY WEIGHT CHANGES DURING GESTATION [G]

GROUP:		0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
DAY	0-	3				
		MEAN	0.	0.	-1.	-2.
		S.D.	8.7	9.3	10.6	8.4
		S.E.	1.9	2.0	2.1	1.8
		N	22	21	25	25
DAY	3-	6				
		MEAN	14.	12.	11.	15.
		S.D.	6.2	7.5	6.0	6.2
		S.E.	1.3	1.6	1.2	1.3
		N	22	21	25	25
DAY	6-	9				
		MEAN	14.	14.	14.	11.
		S.D.	6.1	5.4	7.1	6.4
		S.E.	1.3	1.2	1.4	1.4
		N	22	21	25	22
DAY	9-	12				
		MEAN	20.	13.b	16.	16.
		S.D.	3.8	5.4	6.8	8.5
		S.E.	0.8	1.2	1.4	1.8
		N	22	21	25	22
DAY	12-	15				
		MEAN	18.	21.	17.	19.
		S.D.	5.7	6.8	7.1	8.8
		S.E.	1.2	1.5	1.4	1.9
		N	22	21	25	22

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

b = Significantly different from control group 1 at 0.01 using two-sample t-test

MEAN DIFFERENCES CALCULATED FROM INDIVIDUAL DIFFERENCES

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S6
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF BODY WEIGHT CHANGES DURING GESTATION [G]

PAGE 2

GROUP:			0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
DAY	15-	18					
		MEAN	39.	30. b	34.	34.	31.
		S.D.	8.5	11.8	9.6	14.1	10.7
		S.E.	1.8	2.6	1.9	3.0	2.1
		N	22	21	25	22	25
DAY	18-	20					
		MEAN	36.	37.	38.	40.	36.
		S.D.	6.2	8.9	7.6	12.2	12.8
		S.E.	1.3	1.9	1.5	2.6	2.6
		N	22	21	25	22	25
DAY	0-	20					
		MEAN	140.	127. b	129.	134.	126.
		S.D.	16.1	14.4	18.8	22.2	23.8
		S.E.	3.4	3.1	3.8	4.7	4.8
		N	22	21	25	22	25

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

b = Significantly different from control group 1 at 0.01 using two-sample t-test

MEAN DIFFERENCES CALCULATED FROM INDIVIDUAL DIFFERENCES

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PGBWSUV5.10
11/15/2011
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PROJECT NO.:WIL-402014
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TABLE S7
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

PAGE 1

GROUP:	0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
-----	-----	-----	-----	-----	-----
INITIAL BODY WT.					
MEAN	259.	259.	260.	260.	261.
S.D.	13.5	14.0	13.3	16.7	12.4
S.E.	2.9	3.1	2.7	3.6	2.5
N	22	21	25	22	25
TERMINAL BODY WT.					
MEAN	400.	386.	389.	394.	387.
S.D.	24.4	20.8	20.5	33.1	29.0
S.E.	5.2	4.5	4.1	7.0	5.8
N	22	21	25	22	25
GRAVID UTERINE WT.					
MEAN	87.1	82.5	83.3	85.3	83.0
S.D.	9.03	11.91	9.49	17.47	11.12
S.E.	1.93	2.60	1.90	3.72	2.22
N	22	21	25	22	25
NET BODY WT.					
MEAN	312.5	303.7	305.9	308.3	304.1
S.D.	20.08	16.14	15.57	24.28	21.00
S.E.	4.28	3.52	3.11	5.18	4.20
N	22	21	25	22	25
NET BODY WT. CHANGE					
MEAN	53.2	44.9a	46.1	48.5	43.5
S.D.	11.27	14.55	15.00	11.65	17.23
S.E.	2.40	3.17	3.00	2.48	3.45
N	22	21	25	22	25
-----	-----	-----	-----	-----	-----

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

a = Significantly different from control group 1 at 0.05 using two-sample t-test

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11/15/2011
R:11/15/2011

TABLE S8
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

GROUP:		0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
DAY	0-	3				
		MEAN	20.	20.	20.	19.
		S.D.	3.6	4.2	3.9	3.7
		S.E.	0.8	0.9	0.8	0.7
		N	22	21	25	25
DAY	3-	6				
		MEAN	21.	22.	21.	22.
		S.D.	2.4	2.0	1.9	1.8
		S.E.	0.5	0.4	0.4	0.4
		N	22	21	25	25
DAY	6-	9				
		MEAN	23.	25.a	25.	24.
		S.D.	2.8	1.5	2.6	2.5
		S.E.	0.6	0.3	0.5	0.5
		N	22	21	25	22
DAY	9-	12				
		MEAN	25.	26.	28.	26.
		S.D.	2.3	2.3	3.2	2.6
		S.E.	0.5	0.5	0.6	0.5
		N	22	21	25	22
DAY	12-	15				
		MEAN	27.	30.b	30.	29.
		S.D.	2.6	3.5	3.0	3.8
		S.E.	0.5	0.8	0.6	0.8
		N	22	21	25	22

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

a = Significantly different from control group 1 at 0.05 using two-sample t-test

b = Significantly different from control group 1 at 0.01 using two-sample t-test

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S8
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

PAGE 2

GROUP:			0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
DAY	15-	18					
		MEAN	29.	30.	29.	30.	30.
		S.D.	2.2	2.5	2.0	2.9	2.9
		S.E.	0.5	0.5	0.4	0.6	0.6
		N	22	21	25	22	25
DAY	18-	20					
		MEAN	30.	32.	32.	32.	32.
		S.D.	3.2	3.0	2.4	4.4	3.8
		S.E.	0.7	0.7	0.5	0.9	0.8
		N	22	21	25	22	25
DAY	0-	20					
		MEAN	25.	26.a	26.	26.	26.
		S.D.	2.0	1.4	1.6	1.8	2.0
		S.E.	0.4	0.3	0.3	0.4	0.4
		N	22	21	25	22	25

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

a = Significantly different from control group 1 at 0.05 using two-sample t-test

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PGFWSUV5.16
11/15/2011
R:11/15/2011

TABLE S9
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

GROUP:			0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
DAY	0-	3					
		MEAN	76.	78.	76.	77.	72.
		S.D.	12.6	15.3	14.4	8.2	12.6
		S.E.	2.7	3.3	2.9	1.8	2.5
		N	22	21	25	22	25
DAY	3-	6					
		MEAN	79.	83.	79.	82.	78.
		S.D.	6.7	6.7	5.6	6.6	9.3
		S.E.	1.4	1.5	1.1	1.4	1.9
		N	22	21	25	22	25
DAY	6-	9					
		MEAN	83.	90.b	91.	88.	88.
		S.D.	6.6	4.6	8.4	6.6	9.9
		S.E.	1.4	1.0	1.7	1.4	2.0
		N	22	21	25	22	25
DAY	9-	12					
		MEAN	85.	90.a	95.	88.	90.
		S.D.	6.2	8.5	11.1	7.8	6.1
		S.E.	1.3	1.9	2.2	1.7	1.2
		N	22	21	25	22	25
DAY	12-	15					
		MEAN	86.	98.b	96.	93.	93.
		S.D.	5.8	8.6	10.1	8.2	6.4
		S.E.	1.2	1.9	2.0	1.8	1.3
		N	22	21	25	22	25

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

a = Significantly different from control group 1 at 0.05 using two-sample t-test

b = Significantly different from control group 1 at 0.01 using two-sample t-test

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S9
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

PAGE 2

GROUP:			0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
DAY	15-	18					
		MEAN	84.	89.a	88.	88.	89.
		S.D.	5.7	8.7	5.8	8.7	7.8
		S.E.	1.2	1.9	1.2	1.8	1.6
		N	22	21	25	22	25
DAY	18-	20					
		MEAN	79.	87.b	87.	86.	85.
		S.D.	7.7	8.1	7.2	10.1	8.0
		S.E.	1.7	1.8	1.4	2.1	1.6
		N	22	21	25	22	25
DAY	0-	20					
		MEAN	80.	86.b	86.	85.	84.
		S.D.	3.6	4.0	5.4	2.8	3.1
		S.E.	0.8	0.9	1.1	0.6	0.6
		N	22	21	25	22	25

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

a = Significantly different from control group 1 at 0.05 using two-sample t-test

b = Significantly different from control group 1 at 0.01 using two-sample t-test

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PGFWSUV5.16
11/15/2011
R:11/15/2011

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S10
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF MATERNAL MACROSCOPIC FINDINGS

PAGE 1

GROUP :	1	2	3	4	5
NUMBER EXAMINED	25	25	25	25	25
NO SIGNIFICANT CHANGES OBSERVED	20	18	19	21	24
NONGRAVID -- AMMONIUM SULFIDE NEGATIVE	3	4	0	3	0
OVARIES: CYST(S)	1	1	0	0	0
THYMUS: AREA(S), DARK RED	1	0	2	0	0
THYMUS: DISCOLORATION, DARK RED	0	1	0	0	0
LIVER: MASS	0	0	0	0	1
ORGAN DAMAGED AT NECROPSY	0	0	1	0	0
PLACENTAE: FUSED	0	1	2	0	0
MANDIBULAR SALIVARY GLANDS: EDEMATOUS	0	0	1	0	0
URINARY BLADDER: THICKENED	1	0	0	0	0
URINARY BLADDER: CALCULUS(I)	1	0	0	0	0
KIDNEYS: MISSHAPEN	1	0	0	0	0
KIDNEYS: AREA(S), WHITE	1	0	0	0	0
KIDNEYS: DILATED PELVIS	1	0	0	0	0
URETERS: DILATED	1	0	0	0	0
UTERUS: CONTENTS, DARK RED	0	2	0	0	0
SKIN: HAIR LOSS	0	0	1	0	0
PLACENTAE: ENLARGED	0	0	0	1	0

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PMGSIv4.04
11/15/2011

TABLE S11
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF ORGAN WTS. AND ORGAN WTS. RELATIVE TO BRAIN WTS.

		FEMALES				
GROUP:		0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
BRAIN (G)	MEAN	1.90	1.88	1.93	1.93	1.90
	S.D.	0.063	0.093	0.091	0.092	0.096
	S.E.	0.013	0.020	0.018	0.020	0.019
	N	22	21	25	22	25
LIVER (G)	MEAN	16.27	16.39	16.80	16.70	17.05
	S.D.	1.082	1.420	1.068	1.655	1.785
	S.E.	0.231	0.310	0.214	0.353	0.357
	N	22	21	25	22	25
LIVER (G/100 G BRAIN)	MEAN	858.850	871.386	872.133	863.810	898.054
	S.D.	67.4103	68.2739	60.6532	73.1112	83.8993
	S.E.	14.3719	14.8986	12.1306	15.5874	16.7799
	N	22	21	25	22	25
THYMUS (G)	MEAN	0.2510	0.2130a	0.2211	0.2188	0.2257
	S.D.	0.05547	0.06147	0.05289	0.04911	0.07630
	S.E.	0.01183	0.01341	0.01058	0.01047	0.01526
	N	22	21	25	22	25
THYMUS (G/100 G BRAIN)	MEAN	13.276	11.321	11.498	11.331	11.869
	S.D.	3.1283	3.2636	2.8436	2.5396	3.7837
	S.E.	0.6670	0.7122	0.5687	0.5415	0.7567
	N	22	21	25	22	25

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

a = Significantly different from control group 1 at 0.05 using two-sample t-test

NONGRAVID WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

POFBSTv5.26
11/15/2011
R:11/15/2011

TABLE S12
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FETAL DATA AT SCHEDULED NECROPSY

GROUP	SEX M F	VIABLE FETUSES	DEAD FETUSES	RESORPTIONS EARLY LATE	POST IMPLANTATION LOSS	IMPLANTATION SITES	CORPORA LUTEA	PRE IMPLANTATION LOSS	FETAL WEIGHTS IN GRAMS	NO. OF GRAVID FEMALES
1 TOTAL	172 162	334	0	12 0	12	346	356	10	NA	22
MEAN	7.8 7.4	15.2	0.0	0.5 0.0	0.5	15.7	16.2	0.5	3.8	
S.D.	2.15 2.15	1.65	0.00	0.67 0.00	0.67	1.86	2.04	1.10	0.29	
S.E.	0.46 0.46	0.35	0.00	0.14 0.00	0.14	0.40	0.43	0.23	0.06	
2 TOTAL	158 144	302	0	14 1	15	317	337	20	NA	21
MEAN	7.5 6.9	14.4	0.0	0.7 0.0	0.7	15.1	16.0	1.0	3.8	
S.D.	2.64 2.01	2.42	0.00	0.73 0.22	0.78	2.47	1.83	1.94	0.21	
S.E.	0.58 0.44	0.53	0.00	0.16 0.05	0.17	0.54	0.40	0.42	0.05	
3 TOTAL	177 191	368	0	33 0	33	401	432	31	NA	25
MEAN	7.1 7.6	14.7	0.0	1.3 0.0	1.3	16.0	17.3	1.2	3.7	
S.D.	2.20 2.29	1.93	0.00	1.18 0.00	1.18	1.49	2.67	2.20	0.23	
S.E.	0.44 0.46	0.39	0.00	0.24 0.00	0.24	0.30	0.53	0.44	0.05	
4 TOTAL	162 168	330	0	22 1	23	353	382	29	NA	22
MEAN	7.4 7.6	15.0	0.0	1.0 0.0	1.0	16.0	17.4	1.3	3.7	
S.D.	2.17 2.04	2.94	0.00	1.72 0.21	1.70	2.21	2.79	1.52	0.28	
S.E.	0.46 0.43	0.63	0.00	0.37 0.05	0.36	0.47	0.59	0.32	0.06	
5 TOTAL	195 179	374	0	17 0	17	391	419	28	NA	25
MEAN	7.8 7.2	15.0	0.0	0.7 0.0	0.7	15.6	16.8	1.1	3.7	
S.D.	2.06 1.84	2.28	0.00	1.07 0.00	1.07	2.18	2.50	1.64	0.28	
S.E.	0.41 0.37	0.46	0.00	0.21 0.00	0.21	0.44	0.50	0.33	0.06	

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

None significantly different from control group

NA = NOT APPLICABLE

MEAN NUMBER OF VIABLE FETUSES, MEAN NUMBER OF IMPLANTATION SITES, MEAN NUMBER OF CORPORA LUTEA,
FETAL WEIGHTS COMPARED USING DUNNETT'S TEST OR TWO-SAMPLE T-TEST

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

TABLE S13
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

GROUP:	0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
CORPORA LUTEA					
MEAN	16.2	16.0	17.3	17.4	16.8
S.D.	2.04	1.83	2.67	2.79	2.50
S.E.	0.43	0.40	0.53	0.59	0.50
N	22	21	25	22	25
IMPLANTATION SITES					
MEAN	15.7	15.1	16.0	16.0	15.6
S.D.	1.86	2.47	1.49	2.21	2.18
S.E.	0.40	0.54	0.30	0.47	0.44
N	22	21	25	22	25
VIABLE FETUSES (%)					
MEAN	96.7	95.3	91.7	93.3	95.7
S.D.	3.97	5.11	7.38	10.62	6.81
S.E.	0.85	1.12	1.48	2.26	1.36
N	22	21	25	22	25
DEAD FETUSES (%)					
MEAN	0.0	0.0	0.0	0.0	0.0
S.D.	0.00	0.00	0.00	0.00	0.00
S.E.	0.00	0.00	0.00	0.00	0.00
N	22	21	25	22	25
EARLY RESORPTIONS (%)					
MEAN	3.3	4.4	8.3	6.5	4.3
S.D.	3.98	4.86	7.39	10.72	6.81
S.E.	0.85	1.06	1.48	2.29	1.36
N	22	21	25	22	25

PROPORTIONAL (%) DATA COMPARED USING DUNN'S TEST

CORPORA LUTEA AND IMPLANTATION SITES COMPARED USING DUNNETT'S TEST OR TWO-SAMPLE T-TEST

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

None significantly different from control group

TABLE S13
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

GROUP:	0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
LATE RESORPTIONS (%)					
MEAN	0.0	0.3	0.0	0.3	0.0
S.D.	0.00	1.29	0.00	1.26	0.00
S.E.	0.00	0.28	0.00	0.27	0.00
N	22	21	25	22	25
TOTAL RESORPTIONS (%)					
MEAN	3.3	4.7	8.3	6.7	4.3
S.D.	3.98	5.11	7.39	10.62	6.81
S.E.	0.85	1.12	1.48	2.26	1.36
N	22	21	25	22	25
PRE-IMPLANTATION LOSS (%)					
MEAN	2.5	5.9	6.1	7.0	6.3
S.D.	5.90	11.85	9.33	7.91	9.05
S.E.	1.26	2.59	1.87	1.69	1.81
N	22	21	25	22	25
POST-IMPLANTATION LOSS (%)					
MEAN	3.3	4.7	8.3	6.7	4.3
S.D.	3.98	5.11	7.39	10.62	6.81
S.E.	0.85	1.12	1.48	2.26	1.36
N	22	21	25	22	25
MALES (%)					
MEAN	51.5	51.4	48.1	49.1	51.9
S.D.	13.49	15.43	13.90	10.17	12.28
S.E.	2.88	3.37	2.78	2.17	2.46
N	22	21	25	22	25

PROPORTIONAL (%) DATA COMPARED USING DUNN'S TEST

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

None significantly different from control group

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S13
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

PAGE 3

GROUP:	0 MG/KG/DAY SHAM	0 MG/KG/DAY VEH.	100 MG/KG/DAY	300 MG/KG/DAY	600 MG/KG/DAY
FEMALES (%)					
MEAN	48.5	48.6	51.9	50.9	48.1
S.D.	13.49	15.43	13.90	10.17	12.28
S.E.	2.88	3.37	2.78	2.17	2.46
N	22	21	25	22	25
MALE FETAL WEIGHTS (g)					
MEAN	3.9	3.8	3.8	3.8	3.8
S.D.	0.28	0.23	0.25	0.30	0.31
S.E.	0.06	0.05	0.05	0.06	0.06
N	22	21	25	22	25
FEMALE FETAL WEIGHTS (g)					
MEAN	3.7	3.7	3.6	3.6	3.6
S.D.	0.30	0.25	0.25	0.27	0.26
S.E.	0.07	0.05	0.05	0.06	0.05
N	22	21	25	22	25
COMBINED FETAL WEIGHTS (g)					
MEAN	3.8	3.8	3.7	3.7	3.7
S.D.	0.29	0.21	0.23	0.28	0.28
S.E.	0.06	0.05	0.05	0.06	0.06
N	22	21	25	22	25

PROPORTIONAL (%) DATA COMPARED USING DUNN'S TEST
FETAL WEIGHTS COMPARED USING DUNNETT'S TEST OR TWO-SAMPLE T-TEST
MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group

PLPSuv5.10
11/15/2011
R:11/28/2011

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S14
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FETUSES AND LITTERS WITH MALFORMATIONS [ABSOLUTE NO.]

PAGE 1

DAY 20

DOSE GROUP:	F E T U S E S					L I T T E R S				
	1	2	3	4	5	1	2	3	4	5
NUMBER EXAMINED EXTERNALLY	334	302	368	330	374	22	21	25	22	25
CARPAL AND/OR TARSAL FLEXURE	0	0	1	0	0	0	0	1	0	0
NUMBER EXAMINED VISCERALLY	334	302	368	330	374	22	21	25	22	25
RIGHT-SIDED AORTIC ARCH	1	0	0	0	0	1	0	0	0	0
LUNGS- LOBULAR DYSGENESIS	0	2	0	0	0	0	2	0	0	0
SITUS INVERSUS	0	2	0	0	0	0	2	0	0	0
NUMBER EXAMINED SKELETALLY	334	302	368	330	374	22	21	25	22	25
VERTEBRAL ANOMALY WITH OR WITHOUT ASSOCIATED RIB ANOMALY	0	1	0	0	0	0	1	0	0	0
TOTAL NUMBER WITH MALFORMATIONS										
EXTERNAL :	0	0	1	0	0	0	0	1	0	0
SOFT TISSUE :	1	2	0	0	0	1	2	0	0	0
SKELETAL :	0	1	0	0	0	0	1	0	0	0
COMBINED :	1	2	1	0	0	1	2	1	0	0
1-0 MG/KG/DAY SHAM	2-0 MG/KG/DAY VEH.	3- 100 MG/KG/DAY	4- 300 MG/KG/DAY	5- 600 MG/KG/DAY						

PMALv5.08
01/04/2012

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S15
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF LITTER PROPORTIONS OF MALFORMATIONS
% PER LITTER

PAGE 1

DAY 20

DOSE GROUP:	1	2	3	4	5
NUMBER OF LITTERS EXAMINED EXTERNALLY	22	21	25	22	25
CARPAL AND/OR TARSAL FLEXURE	MEAN 0.0	0.0	0.3	0.0	0.0
	S.D. 0.00	0.00	1.25	0.00	0.00
	S.E. 0.00	0.00	0.25	0.00	0.00

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY
MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S15
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF LITTER PROPORTIONS OF MALFORMATIONS
% PER LITTER

PAGE 2

DAY 20

DOSE GROUP:		1	2	3	4	5
NUMBER OF LITTERS EXAMINED VISCERALLY		22	21	25	22	25
RIGHT-SIDED AORTIC ARCH	MEAN	0.3	0.0	0.0	0.0	0.0
	S.D.	1.33	0.00	0.00	0.00	0.00
	S.E.	0.28	0.00	0.00	0.00	0.00
LUNGS- LOBULAR DYSGENESIS	MEAN	0.0	0.7	0.0	0.0	0.0
	S.D.	0.00	2.08	0.00	0.00	0.00
	S.E.	0.00	0.45	0.00	0.00	0.00
SITUS INVERSUS	MEAN	0.0	0.7	0.0	0.0	0.0
	S.D.	0.00	2.08	0.00	0.00	0.00
	S.E.	0.00	0.45	0.00	0.00	0.00

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group

DOSE GROUP:		1	2	3	4	5
NUMBER OF LITTERS EXAMINED SKELETALLY		22	21	25	22	25
VERTEBRAL ANOMALY WITH OR WITHOUT ASSOCIATED RIB ANOMALY	MEAN	0.0	0.3	0.0	0.0	0.0
	S.D.	0.00	1.56	0.00	0.00	0.00
	S.E.	0.00	0.34	0.00	0.00	0.00

1-0 MG/KG/DAY SHAM
2-0 MG/KG/DAY VEH.
3- 100 MG/KG/DAY
4- 300 MG/KG/DAY
5- 600 MG/KG/DAY

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

None significantly different from control group

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S15
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF LITTER PROPORTIONS OF MALFORMATIONS
% PER LITTER

PAGE 4

DAY 20

DOSE GROUP:	1	2	3	4	5
NUMBER OF LITTERS EXAMINED	22	21	25	22	25
TOTAL MALFORMATIONS					
PERCENT PER LITTER WITH EXTERNAL MALFORMATIONS	MEAN 0.0	0.0	0.3	0.0	0.0
	S.D. 0.00	0.00	1.25	0.00	0.00
	S.E. 0.00	0.00	0.25	0.00	0.00
PERCENT PER LITTER WITH SOFT TISSUE MALFORMATIONS	MEAN 0.3	0.7	0.0	0.0	0.0
	S.D. 1.33	2.08	0.00	0.00	0.00
	S.E. 0.28	0.45	0.00	0.00	0.00
PERCENT PER LITTER WITH SKELETAL MALFORMATIONS	MEAN 0.0	0.3	0.0	0.0	0.0
	S.D. 0.00	1.56	0.00	0.00	0.00
	S.E. 0.00	0.34	0.00	0.00	0.00
TOTAL PERCENT PER LITTER WITH MALFORMATIONS	MEAN 0.3	0.7	0.3	0.0	0.0
	S.D. 1.33	2.08	1.25	0.00	0.00
	S.E. 0.28	0.45	0.25	0.00	0.00

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group

PMALKv5.07
01/04/2012

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF FETUSES AND LITTERS WITH VARIATIONS [ABSOLUTE NO.]

PAGE 1

DAY 20

DOSE GROUP:	F E T U S E S					L I T T E R S				
	1	2	3	4	5	1	2	3	4	5
NUMBER EXAMINED EXTERNALLY	334	302	368	330	374	22	21	25	22	25
NUMBER WITH FINDINGS	0	0	0	0	0	0	0	0	0	0
NUMBER EXAMINED VISCERALLY	334	302	368	330	374	22	21	25	22	25
MAJOR BLOOD VESSEL VARIATION	1	0	1	1	0	1	0	1	1	0
RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S)	1	0	0	3	4	1	0	0	1	1
NUMBER EXAMINED SKELETALLY	334	302	368	330	374	22	21	25	22	25
HYOID UNOSSIFIED	1	4	8	3	6	1	4	6	2	5
STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	51	42	56	47	64	14	15	20	17	18
CERVICAL CENTRUM #1 OSSIFIED	66	42	49	48	70	16	12	15	18	16
STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	6	3	4	1	5	6	3	3	1	4
REDUCED OSSIFICATION OF THE 13TH RIB(S)	0	4	2	3	4	0	2	1	3	2
REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES	4	0	1	3	1	3	0	1	2	1
14TH RUDIMENTARY RIB(S)	24	27	30	14	17	12	11	16	8	10
7TH CERVICAL RIB(S)	4	4	3	5	12	3	3	3	4	6
27 PRESACRAL VERTEBRAE	1	1	0	1	0	1	1	0	1	0
UNCO-OSSIFIED VERTEBRAL CENTRA	1	1	0	1	0	1	1	0	1	0
25 PRESACRAL VERTEBRAE	0	0	0	0	1	0	0	0	0	1
STERNEBRA(E) #1,#2,#3 AND/OR #4 UNOSSIFIED	1	2	1	0	1	1	1	1	0	1
REDUCED OSSIFICATION OF THE SKULL	1	1	1	0	0	1	1	1	0	0
BENT RIB(S)	0	0	0	2	2	0	0	0	2	1

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PMALv5.08
01/04/2012

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S17
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF LITTER PROPORTIONS OF VARIATIONS
% PER LITTER

PAGE 1
DAY 20

DOSE GROUP:	1	2	3	4	5
NUMBER OF LITTERS EXAMINED EXTERNALLY	22	21	25	22	25
NUMBER OF LITTERS WITH FINDINGS	0	0	0	0	0

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY
MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S17
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF LITTER PROPORTIONS OF VARIATIONS
% PER LITTER

PAGE 2

DAY 20

DOSE GROUP:	1	2	3	4	5
NUMBER OF LITTERS EXAMINED VISCERALLY	22	21	25	22	25
MAJOR BLOOD VESSEL VARIATION	MEAN 0.3	0.0	0.3	0.3	0.0
	S.D. 1.33	0.00	1.33	1.52	0.00
	S.E. 0.28	0.00	0.27	0.32	0.00
RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S)	MEAN 0.3	0.0	0.0	1.4	1.1
	S.D. 1.33	0.00	0.00	6.40	5.33
	S.E. 0.28	0.00	0.00	1.36	1.07

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S17
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF LITTER PROPORTIONS OF VARIATIONS
% PER LITTER

PAGE 3

DAY 20

DOSE GROUP:	1	2	3	4	5
NUMBER OF LITTERS EXAMINED SKELETALLY	22	21	25	22	25
HYOID UNOSSIFIED	MEAN 0.3 S.D. 1.33 S.E. 0.28	MEAN 1.3 S.D. 2.90 S.E. 0.63	MEAN 2.0 S.D. 3.96 S.E. 0.79	MEAN 1.1 S.D. 3.84 S.E. 0.82	MEAN 1.5 S.D. 3.31 S.E. 0.66
STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	MEAN 15.2 S.D. 21.71 S.E. 4.63	MEAN 14.0 S.D. 14.90 S.E. 3.25	MEAN 14.1 S.D. 15.06 S.E. 3.01	MEAN 14.4 S.D. 17.36 S.E. 3.70	MEAN 16.7 S.D. 17.28 S.E. 3.46
CERVICAL CENTRUM #1 OSSIFIED	MEAN 19.8 S.D. 23.63 S.E. 5.04	MEAN 14.2 S.D. 17.51 S.E. 3.82	MEAN 13.3 S.D. 16.77 S.E. 3.35	MEAN 15.7 S.D. 13.96 S.E. 2.98	MEAN 18.6 S.D. 21.97 S.E. 4.39
STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	MEAN 1.8 S.D. 2.96 S.E. 0.63	MEAN 0.9 S.D. 2.36 S.E. 0.52	MEAN 1.2 S.D. 3.94 S.E. 0.79	MEAN 0.5 S.D. 2.13 S.E. 0.45	MEAN 1.2 S.D. 3.04 S.E. 0.61
REDUCED OSSIFICATION OF THE 13TH RIB(S)	MEAN 0.0 S.D. 0.00 S.E. 0.00	MEAN 1.2 S.D. 3.78 S.E. 0.83	MEAN 0.5 S.D. 2.67 S.E. 0.53	MEAN 1.0 S.D. 2.45 S.E. 0.52	MEAN 1.0 S.D. 4.12 S.E. 0.82
REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES	MEAN 1.2 S.D. 3.20 S.E. 0.68	MEAN 0.0 S.D. 0.00 S.E. 0.00	MEAN 0.4 S.D. 1.82 S.E. 0.36	MEAN 1.0 S.D. 3.43 S.E. 0.73	MEAN 0.3 S.D. 1.43 S.E. 0.29
14TH RUDIMENTARY RIB(S)	MEAN 7.3 S.D. 9.06 S.E. 1.93	MEAN 9.3 S.D. 14.38 S.E. 3.14	MEAN 8.2 S.D. 8.78 S.E. 1.76	MEAN 3.9 S.D. 6.79 S.E. 1.45	MEAN 4.6 S.D. 6.48 S.E. 1.30
7TH CERVICAL RIB(S)	MEAN 1.2 S.D. 3.24 S.E. 0.69	MEAN 1.3 S.D. 3.53 S.E. 0.77	MEAN 0.9 S.D. 2.57 S.E. 0.51	MEAN 1.6 S.D. 3.66 S.E. 0.78	MEAN 3.3 S.D. 7.12 S.E. 1.42

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S17
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF LITTER PROPORTIONS OF VARIATIONS
% PER LITTER

PAGE 4

DAY 20

DOSE GROUP:		1	2	3	4	5
NUMBER OF LITTERS EXAMINED SKELETALLY		22	21	25	22	25
27 PRESACRAL VERTEBRAE	MEAN	0.3	0.3	0.0	0.3	0.0
	S.D.	1.42	1.56	0.00	1.33	0.00
	S.E.	0.30	0.34	0.00	0.28	0.00
UNCO-OSSIFIED VERTEBRAL CENTRA	MEAN	0.3	0.3	0.0	0.2	0.0
	S.D.	1.33	1.56	0.00	1.02	0.00
	S.E.	0.28	0.34	0.00	0.22	0.00
25 PRESACRAL VERTEBRAE	MEAN	0.0	0.0	0.0	0.0	0.3
	S.D.	0.00	0.00	0.00	0.00	1.33
	S.E.	0.00	0.00	0.00	0.00	0.27
STERNEBRA(E) #1,#2,#3 AND/OR #4 UNOSSIFIED	MEAN	0.3	0.6	0.3	0.0	0.3
	S.D.	1.42	2.91	1.43	0.00	1.43
	S.E.	0.30	0.63	0.29	0.00	0.29
REDUCED OSSIFICATION OF THE SKULL	MEAN	0.4	0.3	0.3	0.0	0.0
	S.D.	1.78	1.45	1.67	0.00	0.00
	S.E.	0.38	0.32	0.33	0.00	0.00
BENT RIB(S)	MEAN	0.0	0.0	0.0	0.8	0.6
	S.D.	0.00	0.00	0.00	2.56	2.86
	S.E.	0.00	0.00	0.00	0.55	0.57

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.

None significantly different from control group

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE S17
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
SUMMARY OF LITTER PROPORTIONS OF VARIATIONS
% PER LITTER

PAGE 5

DAY 20

DOSE GROUP:	1	2	3	4	5
NUMBER OF LITTERS EXAMINED	22	21	25	22	25
TOTAL VARIATIONS					
PERCENT PER LITTER WITH EXTERNAL VARIATIONS	MEAN 0.0	0.0	0.0	0.0	0.0
	S.D. 0.00	0.00	0.00	0.00	0.00
	S.E. 0.00	0.00	0.00	0.00	0.00
PERCENT PER LITTER WITH SOFT TISSUE VARIATIONS	MEAN 0.6	0.0	0.3	1.7	1.1
	S.D. 1.84	0.00	1.33	6.50	5.33
	S.E. 0.39	0.00	0.27	1.39	1.07
PERCENT PER LITTER WITH SKELETAL VARIATIONS	MEAN 39.1	38.5	36.2	35.2	40.1
	S.D. 24.72	20.80	18.42	20.30	21.10
	S.E. 5.27	4.54	3.68	4.33	4.22
TOTAL PERCENT PER LITTER WITH VARIATIONS	MEAN 39.3	38.5	36.5	36.4	40.9
	S.D. 24.58	20.80	18.23	21.46	21.47
	S.E. 5.24	4.54	3.65	4.57	4.29

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

MODIFIED STATISTICS USED

For statistical analyses, control group 1 was compared to group 2; control group 2 was compared to groups 3, 4 and 5.
None significantly different from control group

PMALKv5.07
01/04/2012

APPENDIX A

Study Protocol and Deviations

DEVIATIONS FROM THE PROTOCOL

This study was conducted in accordance with the protocol and protocol amendments, except for the following.

- **Protocol Section 7.2** states that controls would be set to maintain temperature at $71 \pm 5^{\circ}\text{F}$ ($22 \pm 3^{\circ}\text{C}$). Temperature controls were not set to maintain the protocol-specified conditions when animals were received on 15 September 2011; therefore, the mean daily temperature ranged from 74.2°F to 77.2°F on 15-29 September 2011 (pretest through gestation day 0, 1, or 2).

Reason for Deviation: Technician error. This room was previously set to maintain temperature at 77°F (25°C). Also, although an inadvertently high number of females were nongravid on this study, there was no impact on the study as an appropriate number of pregnant females were obtained to meet guideline requirements.

- **Protocol Section 7.2** states that fluorescent lighting controlled by light timers would provide illumination for a 12-hour light/dark photoperiod. On 1-2 October 2011 (gestation days 1, 2, 3, 4, and/or 5) the light timer was not functioning correctly and resulted in an approximately 1 hour dark photoperiod instead of a 12-hour dark photoperiod.

Reason for Deviation: Mechanical malfunction.

- **Protocol Section 8.1** states that the animals would be acclimated to the Elizabethan-style collars prior to the mating period. The collars would be affixed to each rat for approximately 1, 4, 8, and at least 24 hours on consecutive days during the quarantine period. On 20 September 2011, animal nos. 27569 and 27571 (not assigned to study) and animal nos. 27572, 27570, and 27568 in the 100, 300, and 600 mg/kg/day groups, respectively, were acclimated to the Elizabethan-style collars for 3 hours 19 minutes to 3 hrs 21 minutes instead of approximately 4 hours.

Reason for Deviation: Technician error.

- **Protocol Section 8.4** states that a different set of clippers would be used for control and treated animals to avoid potential for cross-contamination. From 5-7 October 2011 and on 14 October 2011 the control and test substance animals were shaved but documentation of using separate clippers for the control animals was omitted at the time of shaving.

Reason for Deviation: Technician error.

- **Protocol Section 8.5.4** states that all animals would be dosed at approximately the same time each day. On 2-9 October 2011 and on 11-19 October 2011, all animals in the sham control, vehicle control, 100, 300, and 600 mg/kg/day groups were dosed up to 4 hours and 2 minutes earlier than the initial dose on the first day of dose administration.

Reason for Deviation: Following the breeding phase of the study, the dose time was moved earlier gradually to accommodate the 6 hour exposure period.

- **Protocol Section 8.5.4** states that following the 6 hour exposure period the test site would be gently patted using a disposable paper towel in an effort to remove the residual test substance. On 16 October 2011 (gestation days 16 to 19), the sham control group (Group 1) was exposed for only 5 hours and 59 minutes instead of 6 hours. On 17 October 2011 (gestation days 17 to 20), the 100 mg/kg/day group (Group 3) was exposed for only 5 hours and 59 minutes instead of 6 hours. On 18 October 2011 (gestation days 18 to 20), the 600 mg/kg/day group (Group 5) was exposed for only 5 hours and 56 minutes instead of 6 hours.

Reason for Deviation: Technician error.

- **Protocol Section 8.8.3.1** states that each viable fetus would be examined in detail, sexed, weighed, euthanized by a subcutaneous injection of sodium pentobarbital in the scapular region and tagged. At the skeletal examination it was noticed that the following fetuses (27435-02, 27435-13, 27545-13, 27545-15, 27507-10, 27507-14, and 27507-16 in the control group and 27469-08, 27469-12, 27465-02, and 27465-15 in the 100 mg/kg/day group) had been separated from their tags and were then arbitrarily assigned a fetus number prior to examination.

Reason for Deviation: Accidental separation during processing.

GLP DEVIATIONS

- A GLP deviation from sections 792.130 of 40 CFR Part 792 and 8.3.5 of OECD [C(97) 186/Final] occurred where hand-recorded body weights and food weights were not directly recorded as viewed on the scale used for weight measurement (the last digit was omitted in the course of transcription during data collection and editing).

These deviations did not negatively impact the quality or integrity of the data nor the outcome of the study.



Study Number: WIL-402014

PROTOCOL AMENDMENT 3

Sponsor: American Petroleum Institute

Title of Study:

A Dermal Prenatal Developmental Toxicity Study of Ultra-Low Sulfur Diesel Fuel in Rats

Protocol Modifications:

The following revision to Amendment 2 is added:

1) 10 Statistical Methods:

For all statistical analysis, the treated groups (Groups 3, 4, and 5) will be compared to the vehicle group (Group 2), and the vehicle group (Group 2) will be compared to the sham group (Group 1). ~~All analysis~~ **The analysis between Groups 1 and 2** will be conducted using a two sample t-test (Snedecor and Cochran, 1980).

Reasons for Protocol Modification:

- 1) This modification clarifies the statistics to be performed.

Approval:

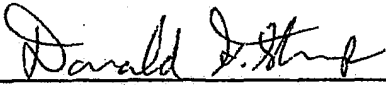
Sponsor's approval was obtained via email on 09 Nov 2011.
Date

WIL Research Laboratories, LLC



Jeffrey H. Charlap, MS
Study Director

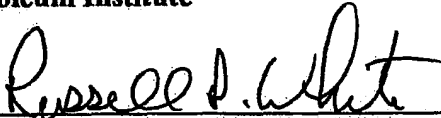
09 Nov 2011
Date



Donald G. Stump, PhD, DABT
Senior Director, Developmental and
Reproductive Toxicology

9 Nov 2011
Date

American Petroleum Institute



Russell White, PhD
Sponsor Representative

10 Nov 2011
Date



Study Number: WIL-402014

PROTOCOL AMENDMENT 2

Sponsor: American Petroleum Institute

Title of Study:

A Dermal Prenatal Developmental Toxicity Study of Ultra-Low Sulfur Diesel Fuel in Rats

Protocol Modifications:

The following paragraph is added:

1) 10 Statistical Methods:

For all statistical analysis, the treated groups (Groups 3, 4 and 5) will be compared to the vehicle group (Group 2), and the vehicle group (Group 2) will be compared to the sham group (Group 1). All analysis will be conducted using a two sample t-test (Snedecor and Cochran, 1980).

The following section is added:

2) 10.4 Organ Weight Data:

Organ weights (relative to brain weights) will be subjected to a parametric ANOVA test (Snedecor and Cochran, 1980) and Dunnett's test (1964) as described above.

Reasons for Protocol Modification:

- 1) This modification clarifies the statistics to be performed.
- 2) This modification adds information on the statistics to be performed on the organ weight data.

Approval:

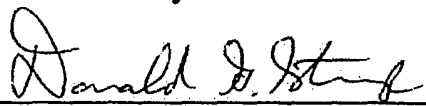
Sponsor's approval was obtained via email on 04 Nov 2011.
Date

WIL Research Laboratories, LLC



Jeffrey H. Charlap, MS
Study Director

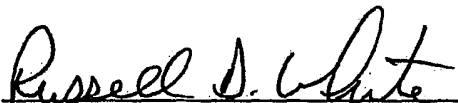
04 Nov 2011
Date



Donald G. Stump, PhD, DABT
Senior Director, Developmental and
Reproductive Toxicology

4 Nov 2011
Date

American Petroleum Institute



Russell White, PhD
Sponsor Representative

10 Nov 2011
Date



Study Number: WIL-402014

PROTOCOL AMENDMENT 1

Sponsor: American Petroleum Institute

Title of Study:

A Dermal Prenatal Developmental Toxicity Study of Ultra-Low Sulfur Diesel Fuel In Rats

Protocol Modifications:

1) 8.6.3 Concentration and Homogeneity Analysis

The first and second sentences in the first paragraph of the following section are revised as follows:

Two sets of duplicate samples will be collected from the top, middle, and bottom stratum of each ~~test-substance~~ **dosing** formulation on the first and last days of preparation. Each sample will be collected using a **syringe and cannula** ~~positive displacement pipette~~ from the middle of each stratum of each formulation.

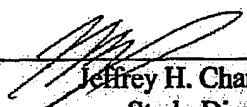
Reasons for Protocol Modification:

- 1) This modification clarifies that samples will be collected for each dosing formulation and corrects the method of collection.

Approval:

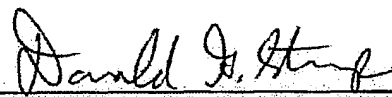
Sponsor's approval was obtained via email on 19 Sep 2011.
Date

WIL Research Laboratories, LLC



Jeffrey H. Charlap, MS
Study Director

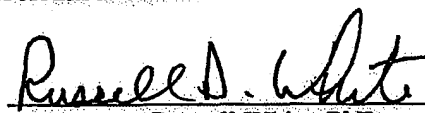
20 Sep 2011
Date



Donald G. Stump, PhD, DABT
Senior Director, Developmental and
Reproductive Toxicology

20 Sept 2011
Date

American Petroleum Institute



Russell White, PhD
Sponsor Representative

19 Oct. 2011
Date



PROTOCOL

A DERMAL PRENATAL DEVELOPMENTAL TOXICITY STUDY OF ULTRA-LOW SULFUR DIESEL FUEL IN RATS

(U.S. EPA OCSPP and OECD Guidelines)

WIL Study Number: WIL-402014

Submitted To:

American Petroleum Institute
1220 L Street, NW
Washington, DC 20005

WIL Research Laboratories, LLC
1407 George Road
Ashland, OH 44805-8946

1 OBJECTIVE:

The objectives of this study are to 1) To determine the effects of prenatal, dermal exposure to test material on pregnant rats and developing offspring. 2) To provide data to verify/expand the domain of the PAC (polycyclic aromatic compounds) prenatal models for predicting the toxicity of high-boiling petroleum substances from their PAC content. 3) To provide data to assist in selection of test substance(s) and design(s) of two-generation reproduction study(s) to be conducted on similar substance(s). 4) To further test the hypothesis that developmental toxicity endpoints are more sensitive to effects of high-boiling petroleum substances than other reproductive endpoints, such as fertility or reproductive organ weight and histopathology.

This study will be conducted in accordance with the United States Environmental Protection Agency (EPA) Health Effects Test Guidelines OCSPP 870.3700, Prenatal Developmental Toxicity Study, August, 1998 and the Organisation of Economic Co-operation and Development Guidelines (OECD) for Testing of Chemicals Guideline 414, Prenatal Developmental Toxicity Study, January 2001. This study will be conducted in compliance with the EPA/TSCA and OECD [C(97) 186/Final] Principles of Good Laboratory Practice.

2 PERSONNEL INVOLVED IN THE STUDY:

2.1 Sponsor's Representative:

Russell White, PhD
American Petroleum Institute
1220 L Street, NW
Washington, DC 20005
Tel: (202) 682-8344
Email: whiter@api.org

2.2 Sponsor's Technical Monitor:

Katy O. Goyak, PhD
Senior Toxicologist
ExxonMobil Biomedical Sciences, Inc.
1545 Route 22 East
Annandale, New Jersey 08801
Tel: (908) 730-1017
Email: kathy.o.goyak@exxonmobil.com

2.3 WIL Study Director:

Jeffrey H. Charlap, M.S.
Staff Toxicologist, Developmental
and Reproductive Toxicology
Tel: (419) 289-8700
Fax: (419) 289-3650
Email: jcharlap@wilresearch.com

2.4 WIL Departmental Responsibilities:

Prägati Sawhney Coder, PhD, DABT
Senior Toxicologist, Developmental
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Emergency Contact
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Mark D. Nemec, BS, DABT
President and Chief Operating Officer

Donald G. Stump, PhD, DABT
Senior Director, Developmental
and Reproductive Toxicology

Eddie D. Slotter, PhD
Assistant Director, Developmental
and Reproductive Toxicology

Melissa J. Beck, PhD
Assistant Director, Neurosciences
and Head of Juvenile Toxicology

Bennett J. Varsho, MPH, DABT
Director, Operations

Gwendalyn M. Maginnis, DVM
Clinical Veterinarian

Carol A. Kopp, BS, LAT
Manager, Gross Pathology and
Developmental Toxicology Laboratory

George A. Parker, DVM, PhD, DACVP, DABT
Vice President, Pathology

Eric S. Bodle, PhD
Assistant Director, Analytical Chemistry

Ronald E. Wilson, BS
Director, Informational Systems

Heather L. Johnson, BS RQAP-GLP
Manager, Quality Assurance

Robert A. Wally, BS
Operations Manager, Reporting and
Technical Support Services

3 STUDY SCHEDULE:

Proposed Experimental Starting (Animal Receipt) Date:	September 15, 2011
Proposed Experimental Start (First Day of Dosing) Date:	September 27, 2011
Proposed Experimental Completion/Termination Date:	October 21, 2011
Proposed Audited Report Date:	January 09, 2011

4 TEST SUBSTANCE DATA:

4.1 Test Substance Shipment:

Test Substance is stored with applicable documentation of characterization at the Testing Facility.

If additional Test substance is required, applicable documentation of characterization will be shipped under Sponsor's responsibility to:

Formulations Laboratory (WIL-402014; Jeffrey H. Charlap, MS)
Attn: Larry Blessing
WIL Research Laboratories, LLC
1407 George Road
Ashland, Ohio 44805-8946
Tel: (419) 289-8700
Fax: (419) 289-3650
Email: lblessing@wilresearch.com

4.2 Identification:

Petroleum products, diesel oil (CAS# 68334-30-5) also known as ultra-low sulfur diesel fuel

4.3 Lot Number:

Site 1-7 ULSD Blend

4.4 Expiration/Retest Date:

Retest in 5 years

4.5 Purity:

100%

4.6 Stability:

The test substance is considered to be stable under the storage conditions provided by the Sponsor.

4.7 Physical Description:

To be documented by WIL Research Laboratories, LLC.

4.8 Storage Conditions:

Room temperature, protected from light.

4.9 Reserve Samples:

Reserve samples of the test substance will be taken in accordance with WIL Standard Operating Procedures and stored in the Archives at WIL Research Laboratories, LLC indefinitely, unless otherwise specified.

4.10 Personnel Safety:

Routine safety precautions apply. It is the responsibility of the Sponsor to notify the testing facility of any special handling requirements for the test substance. A Material Safety Data Sheet (MSDS) will be provided.

4.11 Test Substance Disposition:

Unless otherwise indicated, all unused test substance will be retained for subsequent studies or returned to the Sponsor's contact listed below:

EPL Archives, Inc.
45610 Terminal Drive
Sterling, VA 20166
Attn: Joseph Ludi (703) 435-8780 x212

5 VEHICLE CONTROL DATA:**5.1 Identification:**

Mineral Oil, USP (Spectrum Chemicals and Laboratory Products).

5.2 Lot Number:

To be documented by WIL Research Laboratories, LLC.

5.3 Expiration/Retest Date:

To be documented by WIL Research Laboratories, LLC.

5.4 Stability:

The test substance is considered to be stable under the storage conditions provided by the Supplier.

5.5 Storage Conditions:

Room temperature, protected from light.

6 TEST SYSTEM:**6.1 Species:**

Rat

6.2 Strain:

Sprague Dawley Crl:CD(SD)

6.3 Source:

Charles River Laboratories, Inc.
(Facility to be documented in the study records)

6.4 Number of Study:

125 females (maximum of 155 purchased). A sufficient number of sexually mature untreated resident males of the same strain and source will be used to induce pregnancies. Animals not assigned to the study will be transferred to the stock animal colony or will be euthanized by carbon dioxide inhalation and the carcasses discarded.

The number of animals selected for this study is based on the US EPA Health Effects Test Guidelines OCSPP 870.3700, Prenatal Development Toxicity Study, August 1998 and the OECD Guidelines for Testing of Chemicals Guideline 414, Prenatal Developmental Toxicity Study, January 2001.

6.5 Body Weight Range:

A minimum of 220g at initiation of breeding.

6.6 Approximate Age:

80 to 120 days at the initiation of breeding.

6.7 Identification System:

The animals will be uniquely identified by a Monel[®] metal ear tag displaying the animal number. Individual cage cards will be affixed to each cage and will display the animal number, group number, study number, dosage level and sex of the animal.

6.8 Justification for Selection:

This species and strain of rat has been recognized as appropriate for developmental toxicity studies. WIL Research Laboratories, LLC has historical data on the background incidence of fetal malformations and developmental variations in the Crl:CD(SD) rat. This animal model has been proven to be susceptible to the effects of developmental toxicants.

7 SPECIFIC MAINTENANCE SCHEDULE:

7.1 Animal Housing:

Female rats will be individually housed (except during mating) in clean suspended wire-mesh cages in an environmentally controlled room during the study. The cages will be elevated above cage-board or other suitable material, which will be changed at least three times each week. Nesting material will not be provided, as euthanasia is scheduled prior to anticipated parturition. The cages will be subjected to routine cleaning at a frequency consistent with maintaining good animal health and WIL Standard Operating Procedures. The facilities at WIL Research Laboratories, LLC are accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International).

7.2 Environmental Conditions:

Controls will be set to maintain temperature at $71 \pm 5^{\circ}\text{F}$ ($22 \pm 3^{\circ}\text{C}$) and relative humidity at $50 \pm 20\%$. Temperature and relative humidity will be monitored continuously. Data for these two parameters will be scheduled for automatic collection on an hourly basis. Fluorescent lighting controlled by light timers will provide illumination for a 12-hour light/dark photoperiod. The ventilation rate will be set at a minimum of 10 room air changes per hour, 100% fresh air.

7.3 Drinking Water:

Reverse osmosis-purified water will be available *ad libitum*. Filters servicing the automatic watering system are changed regularly according to WIL Standard Operating Procedures. The municipal water supplying the laboratory is analyzed according to WIL Standard Operating Procedures on a routine basis to ensure that contaminants are not present in concentrations that would be expected to affect the outcome of the study.

7.4 Basal Diet:

PMI Nutrition International, LLC Certified Rodent LabDiet® 5002 will be offered *ad libitum* during the study **and provided without savers and lids to accommodate feeding with collars**. Periodic analyses of the certified feed are performed by the manufacturer to ensure that heavy metals and pesticides are not present at concentrations that would be expected to affect the outcome of the study. Results of the analyses are provided to WIL Research Laboratories, LLC by the manufacturer. Feeders will be changed and sanitized once per week.

8 EXPERIMENTAL DESIGN:

8.1 Animal Receipt and Quarantine:

Each rat will be inspected by a qualified technician upon receipt. Rats judged to be in good health and suitable as test animals will be immediately placed in quarantine for a minimum of 10 days. All rats will be initially weighed, permanently identified with a metal ear tag and receive a clinical observation. During the quarantine period, each rat will be observed twice daily for changes in general appearance and behavior. Body weights may be recorded prior to the initiation of breeding. Prior to the start of the in-life phase, those rats judged to be suitable test subjects will be identified. The animals will be acclimated to the Elizabethan-style collars prior to the mating period. The collars will be affixed to each rat for approximately 1, 4, 8 and at least 24 hours on consecutive days during the quarantine period.

8.2 Breeding Procedure:

At the conclusion of the quarantine period, female rats judged to be suitable test subjects and meeting acceptable body weight requirements will be cohabitated with untreated resident male rats (1:1) of the same strain and source in suspended wire-mesh cages for mating (home cage of the male). Detection of mating will be confirmed by evidence of a copulatory plug in the vagina or by a vaginal lavage for sperm. After confirmation of mating, the female will be returned to an individual suspended wire-mesh cage (assigned to a group), and the day will be designated as day 0 of gestation.

8.3 Randomization:

Mated females will be assigned to groups using a WIL Toxicology Data Management System (WTDMS™) computer program which assigns animals based on stratification of gestation day 0 body weights into a block design to one vehicle control group, one sham control group and three test substance groups of 25 rats each.

Any animal assigned to the study that is found dead, euthanized *in extremis* or exhibits abnormal clinical signs, reduced food consumption or body weight losses prior to the start of dosing may be replaced by an animal of appropriate gestation age when possible. Replacement animals will be arbitrarily assigned (not computer randomized) to the study based on comparable body weights (if possible) with respect to the animal that was replaced.

8.4 Route and Rationale of Test Substance Administration:

The route of administration will be dermal as this is a potential route of exposure for humans.

All animals will be clipped in the dorsal scapular area (covering approximately 10% of the body surface) prior to the start of dose administration and, as needed, thereafter during the administration period (repeated clippings will be performed prior to or at least 2-4 hours after dose administration). A different set of clippers will be used for control and treated animals to avoid potential for cross-contamination. Care will be taken not to abrade the skin. The test article and vehicle will be applied approximately in the center of the clipped area and distributed to avoid running.

Elizabethan-style collars will be used to minimize ingestion of the test material. Collars will be worn continuously during the dosing period. Collars will be fitted on the rats several days prior to the initiation of dosing and replaced as necessary during the dosing period.

8.5 Organization of Test Groups, Dosage Levels and Treatment Regimen:

8.5.1 Organization of Test Groups:

The dosage levels will be determined from results of previous studies and will be provided by the Sponsor Representative after consultation with the WIL Study Director.

The following table presents the study group arrangement.

Group Number	Test Substance	Dosage Level (mg/kg/day)	Dosage Concentration (mg/mL)	Dosage Volume (mL/kg)	Number of Females
1	Sham Control	0	0	0	25
2	Vehicle Control	0	0	1.5	25
3	Test substance ^a	100	66.7	1.5	25
4	Test substance ^a	300	200	1.5	25
5	Test substance ^a	600	400	1.5	25

a- The test substance used for Groups 3-5 is Petroleum products, diesel oil (CAS 68334-30-5) also known as ultra-low sulfur diesel fuel.

8.5.2 Sham Control:

The Group 1 sham control animals will be subject to the same procedures (i.e. shaving, collaring, sham dosing with glass rod and removal of residual test substance) as animals in Groups 2-5. However, no vehicle or test substance will be applied to the sham control animals.

8.5.3 Vehicle Control Substance:

Mineral Oil, USP (Spectrum Chemicals and Laboratory Products).

8.5.4 Treatment Regimen:

The test article will be administered as a single daily dose, applied over as much of the the clipped dorsal scapular area (approximately 10% of total body surface area) as possible and distributed to avoid running, from implantation through the period of major organogenesis, gestation days 0 through 19. The four corners of the application site will be delineated on each presumed pregnant rat with indelible ink to allow proper identification of the treated and untreated skin. If the test substance does not cover at least 10% of the total body surface, the actual body surface area covered by the test substance will be documented for 2 representative rats/sex/group once weekly.

All animals will be dosed at approximately the same time each day. Following the 6-hour exposure period the test site will be gently patted using a disposable paper towel in an effort to remove the residual test substance. If needed, the test site can be gently patted with gauze moistened with the vehicle and then again with dry gauze or dry disposable paper towel.

8.5.5 Adjustment of Doses:

Individual dosages will be calculated on the most recent body weight to provide the proper mg/kg/day dosage.

8.6 Preparation and Analysis of Test Substance Formulations:

8.6.1 Method and Frequency of Preparation:

The test substance will be prepared for dosing as a weight-to-volume mixture in mineral oil. The dosing formulations will be prepared approximately weekly. A complete and detailed description of the methods of test substance preparation will be included in the study records and described in the final report.

8.6.2 Homogeneity, Resuspension Homogeneity, and Stability of Test Substance Formulations

Analyses to demonstrate homogeneity and resuspension homogeneity as well as 8-day room temperature stability for the range of concentrations to be used on this study will be conducted by the Analytical Chemistry Department at WIL Research Laboratories, LLC (WIL-402028, Bodle, Draft) prior to the initiation of dosing (if possible).

8.6.3 Concentration and Homogeneity Analysis

Two sets of duplicate samples will be collected from the top, middle, and bottom stratum of each test substance formulation on the first and last days of preparation. Each sample will be collected using a positive displacement pipette from the middle of each stratum of each formulation. One set of duplicate samples will be stored at room temperature as reserve samples and will be discarded upon the Study Director's approval of results. The other set of samples will be analyzed using a method validated by WIL Research Laboratories, LLC to confirm concentration and homogeneity of the bulk test substance formulations.

An analytical chemistry report will be included as an appendix to the main report.

8.7 Maternal Observations During Gestation:

8.7.1 Appearance and Behavior:

Each rat will be observed twice daily for moribundity and mortality, once in the morning and once in the afternoon from gestation day 0 until euthanasia. Clinical observations will be recorded daily. Mortality and all signs of overt toxicity will be recorded on the day observed. The observations shall include, but are not limited to, evaluation for changes in appearance of skin and fur, eyes, mucous membranes, respiratory and circulatory system, autonomic and central nervous systems, somatomotor activity and behavior. All animals will also be observed on the day of necropsy and any findings will be recorded.

During the treatment period, each animal will be observed at the time of dosing and approximately 1 - 2 hours following each sham and dose administration for findings that are potentially related to treatment or that might change before the next scheduled observation. Additional post-dosing observations may be necessary and will be documented in the study records.

8.7.2 Dermal Observations:

Application sites will be examined for erythema, edema and other dermal findings daily (prior to dose administration) using a four-step grading system in accordance with the method of Draize (Appendix A), and inspected for remarkable changes. Other dermal findings, if present, will be noted.

8.7.3 Body Weights:

Individual body weights will be recorded once prior to breeding and on gestation days 0, 3, 6, 9, 12, 15, 18, and 20. Collars will be removed during collection of body weights.

8.7.4 Food Consumption:

Individual food consumption will be recorded on gestation days 0, 3, 6, 9, 12, 15, 18, and 20. Food intake will be reported as g/animal/day and g/kg/day for each corresponding body weight interval of gestation.

8.7.5 Deaths and Animals Euthanized *in Extremis*:

Females not surviving until the scheduled euthanasia will be necropsied and cause of death recorded, if possible. Rats not expected to survive to the next observation period (moribund) will be euthanized by carbon dioxide inhalation. The cranial, thoracic, abdominal and pelvic cavities will be opened and the organs examined. The number and location of implantation sites and viable fetuses will be recorded. Corpora lutea will also be counted and recorded. Uteri which appear nongravid by macroscopic examination will be opened and placed in a 10% ammonium sulfide solution (Salewski, 1964) for detection of early implantation loss. Carcasses from adult animals will be discarded. Viable fetuses will be euthanized by a subcutaneous injection of sodium pentobarbital in the scapular region. Recognizable fetuses will be examined externally and preserved in 10% neutral-buffered formalin for possible future analysis. Maternal tissues will be collected and preserved as described in Section 8.8.2.1 and organ weights will be collected for animals euthanized *in extremis* only as described in Section 8.8.2.2.

8.7.6 Premature Deliveries:

Females that deliver prematurely will be euthanized by carbon dioxide inhalation that day. The cranial, thoracic, abdominal and pelvic cavities will be opened and the organs examined. The number and location of former implantation sites and viable fetuses will be recorded. Corpora lutea will also be counted and recorded. Carcasses from adult animals will be discarded. Viable fetuses or pups will be euthanized by a subcutaneous (scapular region) or intraperitoneal injection of sodium pentobarbital (as appropriate). Recognizable fetuses or pups will be examined externally and preserved in 10% neural buffered formalin. Recognizable fetuses or pups aborted on GD 20 will be examined according to Section 8.8.3, if possible. Maternal tissues will be collected

and preserved as described in Section 8.8.2.1 and organ weights will be collected as described in Section 8.8.2.2.

8.8 Scheduled Necropsy – Gestation Day 20:

8.8.1 Laparohysterectomy and Macroscopic Examination:

Laparohysterectomy and macroscopic examinations will be performed blind to treatment group. All surviving rats will be euthanized by carbon dioxide inhalation on gestation day 20. The cranial, thoracic, abdominal and pelvic cavities will be opened and the organs examined. The uterus of each dam will be excised and its adnexa trimmed. Corpora lutea will be counted and recorded. Gravid uterine weights will be obtained and recorded. The uterus of each dam will be opened and the number of viable and nonviable fetuses, early and late resorptions and total number of implantation sites will be recorded, and the placentae will be examined. The individual uterine distribution will be documented using the following procedure: all implantation sites, including early and late resorptions, will be numbered in consecutive fashion beginning with the left distal uterine horn, noting the position of the cervix and continuing from the proximal to the distal right uterine horn. Uteri which appear nongravid by macroscopic examination will be opened and placed in a 10% ammonium sulfide solution as described by Salewski (Salewski, 1964) for detection of early implantation loss. Maternal tissues listed in section 8.8.2.1 will be preserved for future histopathologic examination in 10% neutral buffered formalin. Representative sections of corresponding organs from a sufficient number of controls will be retained for comparison, if possible from all gross lesions. The carcasses will be discarded.

8.8.2 Anatomic Pathology:

8.8.2.1 Macroscopic Examination:

At the time of necropsy, the following maternal tissues and organs will be collected and placed in 10% neutral-buffered formalin for possible future analysis:

Treated skin
Untreated skin (right hindlimb)
Liver (2 sections)
Brain
Thymus
All gross lesions^a

a Representative sections of corresponding organs from a sufficient number of controls will be retained for comparison, if possible.

8.8.2.2 Organ Weights:

The following organs will be weighed from all animals euthanized at scheduled termination, *in extremis*, or delivered prematurely. Organ-to-brain-weight ratios will be calculated.

Liver
Brain
Thymus gland

8.8.3 Fetal Examination:

Fetal examinations will be conducted without knowledge of treatment group. External, internal and skeletal fetal findings will be recorded as developmental variations or malformations. Representative photographs of all malformations, as appropriate, will be included in the study records. Corresponding low magnification photographs, depicting both the malformed fetus and a comparison control fetus, or normal littermate, will also be included in the study records as needed and as appropriate for comparison, when possible. Prenatal data (viable and nonviable fetuses, early and late resorptions, pre- and post-implantation loss and the fetal sex distribution) will be presented on a group mean basis and additionally as proportional data (% per litter).

8.8.3.1 External:

Each viable fetus will be examined in detail, sexed, weighed, euthanized by a subcutaneous injection of sodium pentobarbital in the scapular region and tagged. Nonviable fetuses (the degree of autolysis is minimal or absent) will be examined, crown-rump length measured, weighed, sexed and tagged individually. The crown-rump length of late resorptions (advanced degree of autolysis) will be measured, the degree of autolysis recorded, a gross external examination performed (if possible) and the tissue will be discarded.

8.8.3.2 Visceral (Internal):

Fetuses will be examined for visceral anomalies by dissection in the fresh (non-fixed) state. The thoracic and abdominal cavities will be opened and dissected using a technique described by Stuckhardt and Poppe (1984). Fetal kidneys will be examined and graded for renal papillae development (Woo and Hoar, 1972). This examination will include the heart and major

vessels. The sex of all fetuses will be confirmed by internal examination.

The heads will be removed from approximately one-half of the fetuses in each litter and placed in Bouin's solution for subsequent processing and soft-tissue examination using the Wilson sectioning technique (Wilson, 1965).

The heads from the remaining one-half of the fetuses in each litter will be examined by a mid-coronal slice.

All carcasses, including the carcasses without heads, will be eviscerated, skinned and fixed in 100% ethyl alcohol for subsequent examination of skeletons.

8.8.3.3 Skeletal:

Each eviscerated fetus, following fixation in alcohol, will be mascerated in potassium and hydroxide stained with Alizarin Red S and Alcian Blue by a method similar to that described by Dawson (1926) and Inouye (1976). The skeletal examination will be made following this procedure.

9 DURATION OF STUDY:

The quarantine, breeding and gestation phases of the study will require approximately two months. The laparohysterectomy phase of the study and processing and evaluation of the fetal specimens will require approximately four weeks.

10 STATISTICAL METHODS:

All analyses will be two-tailed for significance levels of 5% and 1%. All statistical tests will be performed using a computer with appropriate programming as referenced below. Data from nongravid females will be excluded from calculation of means and from comparative statistics. The litter, rather than the fetus, will be considered as the experimental unit.

10.1 Maternal In-Life Data:

Continuous data variables [mean body weights (absolute and net), body weight gains (absolute and net) and food consumption of each interval] will be subjected to a parametric one-way analysis of variance (ANOVA) (Snedecor and Cochran, 1980) to determine intergroup difference. If the results of the ANOVA are significant ($p < 0.05$), Dunnett's test (Dunnett, 1964) will be applied to the data.

10.2 Laparohysterectomy Data:

The group mean numbers of corpora lutea, implantation sites, viable fetuses, maternal gravid uterine weights and mean fetal weight (separately by sex, and combined) will be subjected to a parametric one-way analysis of variance (ANOVA) (Snedecor and Cochran, 1980) and Dunnett's test (1964) as described above. The mean litter proportions of prenatal data (% per litter of viable and nonviable fetuses, early and late resorptions, total resorptions, pre- and post implantation loss and the fetal sex distribution) will be subjected to the Kruskal-Wallis nonparametric ANOVA test (Kruskal and Wallis, 1952) to determine intergroup difference. If the results of the ANOVA are significant ($p < 0.05$), the Dunn's Test (Dunn, 1964) will be applied to the data.

10.3 Fetal Morphology Data:

The mean litter proportion (% per litter) of total fetal malformations and developmental variations (external, visceral, skeletal and combined) and of each particular external, visceral and skeletal malformation or variation will be tabulated. The mean litter proportions of fetal malformations and developmental variations will be subjected to the Kruskal-Wallis nonparametric ANOVA test (1952) followed by the Dunn's Test (1964) (if appropriate) as described above

11 QUALITY ASSURANCE:

The study will be audited by the WIL Quality Assurance Department while in progress to assure compliance with Good Laboratory Practice Regulations, adherence to the protocol and to WIL Standard Operating Procedures. The protocol, protocol amendments, raw data, draft report and final report will be audited by the WIL Quality Assurance Department prior to submission to the Sponsor to assure that the final report accurately describes the conduct and the findings of the study. This study will be conducted in compliance with the EPA/TSCA and OECD [C(97) 186/Final] Principles of Good Laboratory Practice.

This study will be included on the WIL master list of regulated studies.

12 RECORDS TO BE MAINTAINED:

All original raw data records, as defined by WIL SOPs and the applicable GLPs, will be stored as described in Section 12 in the Archives at WIL Research Laboratories, LLC.

13 WORK PRODUCT:

The Sponsor will have title to all documentation records, raw data, specimens and other work product generated during the performance of the study. Any remaining

samples (e.g. formulation) will be discarded after issuance of the Final Report. All work product, including raw paper data, pertinent electronic storage media and specimens, will be retained at no charge for six months following issuance of the final report in the Archives at WIL Research Laboratories, LLC. Thereafter, WIL Research Laboratories, LLC will charge a monthly archiving fee for retention of all work product. All work product will be stored in compliance with regulatory requirements.

Any work product, including documents, specimens, and samples, that are required by this protocol, its amendments, or other written instructions of the Sponsor, to be shipped by WIL Research Laboratories, LLC to another location will be appropriately packaged and labeled as defined by WIL's SOPs and delivered to a common carrier for shipment. WIL Research Laboratories, LLC will not be responsible for shipment following delivery to the common carrier.

All work product generated at a performing laboratory will be retained at an appropriate archive facility as designated by the SOPs of the performing laboratory.

14 REPORTS:

The final report will contain a summary, test article information, methods and procedures, appropriate individual animal and summary data tables, WIL Historical Control Data, supporting sub-reports (e.g. analytical chemistry report etc.), a copy of the protocol and amendment(s), if any, and an interpretation and discussion of the study results. The final report will be comprehensive and shall define level(s) inducing toxic effects as well as no-effect level(s) under the conditions of this investigation. The report will contain all information necessary to conform with current EPA OCSPP and OECD specifications.

WIL Research Laboratories, LLC will submit an electronic copy (PDF and MS Word copy of the report text for editing and comments) of the audited draft report in a timely manner upon completion of data collection prior to issuance of the final report. It is expected that the Sponsor will review the draft report and provide comments to WIL Research Laboratories, LLC within a two-month time frame following submission. WIL Research Laboratories, LLC shall provide a revised draft report that incorporates the Sponsor's reasonable revisions and suggestions. One revision will be permitted as part of the cost of the study; additional changes or revisions may be made, at extra cost. WIL Research Laboratories, LLC shall submit the final report within two weeks of receiving authorization to finalize the report from the Sponsor. If the Sponsor's comments and/or authorization to finalize the report have not been received at WIL Research Laboratories, LLC within one year following submission of the draft report, WIL Research Laboratories, LLC may elect to finalize the report following appropriate written notification to the Sponsor. Two electronic copies (PDF) of the final report on CD-R will be provided; requests for paper copies of the final report may result in additional charges.

15 ANIMAL WELFARE ACT COMPLIANCE:

This study will comply with all applicable sections of the Final Rules of the Animal Welfare Act (AWA) regulations (9 CFR Parts 1, 2 and 3). The Sponsor should make particular note of the following:

- The Sponsor Representative's signature on this protocol documents for the Study Director the Sponsor's assurance that the study described in this protocol does not unnecessarily duplicate previous experiments.
- Whenever possible, procedures used in this study have been designed to avoid or minimize discomfort, distress or pain to animals. All methods are described in this study protocol or in written laboratory Standard Operating Procedures.
- Animals that experience severe or chronic pain or distress that cannot be relieved will be painlessly euthanized as deemed appropriate by the veterinary staff and Study Director. The Sponsor will be advised by the Study Director of all circumstances which could lead to this action in as timely a manner as possible.
- Methods of euthanasia used during this study are in conformance with the above-referenced regulation.
- The Sponsor/Study Director has considered alternatives to procedures that may cause more than momentary or slight pain or distress to the animals and has provided a written narrative description (AWA covered species only) of the methods and sources used to determine that alternatives are not available.

16 PROTOCOL MODIFICATION:

Modification of the protocol may be accomplished during the course of this investigation. However, no changes will be made in the study design without the verbal or written permission of the Sponsor. In the event that the Sponsor verbally requests or approves a change in the protocol, such changes will be made by appropriate documentation in the form of a protocol amendment. All alterations of the protocol and reasons for the modification(s) will be signed by the Study Director and the Sponsor Representative.

17 REFERENCES:

Bodle, E.S. Analytical Validation and Stability Study of Ultra-Low Sulfur Diesel in Mineral Oil Formulations (Study No. WIL-402028), WIL Research Laboratories, LLC, Ashland, OH, Draft.

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- Dunnett, C.W. New tables for multiple comparisons with a control. *Biometrics* **1964**, *20*, pp. 482-491.
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- Salewski, E. Färbemethode zum makroskopischen Nachweis von Implantationsstellen am Uterus der Ratte. [Staining method for a macroscopic test for implantation sites in the uterus of the rat]. *Naunyn - Schmiedebergs Archiv für Experimentelle Pathologie und Pharmakologie* **1964**, *247*, 367.
- Snedecor, G.W.; Cochran, W.G. One Way Classifications; Analysis of Variance. In *Statistical Methods*, 7th ed.; The Iowa State University Press: Ames, IA, **1980**; pp. 215-237.
- Stuckhardt, J.L.; Poppe, S.M. Fresh visceral examination of rat and rabbit fetuses used in teratogenicity testing. *Teratogenesis, Carcinogenesis and Mutagenesis* **1984**, *4*, 181-188.
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- Woo, D.C.; Hoar, R.M. Apparent hydronephrosis as a normal aspect of renal development in late gestation of rats: the effect of methyl salicylate. *Teratology* **1972**; *6*, 191-196.

18 PROTOCOL APPROVAL:

Sponsor approval received via Email on 08 Sep 2011.
Date

American Petroleum Institute

Russell D. White
Russell White
Sponsor Representative

03 Oct 2011
Date

WIL Research Laboratories, LLC

Jeffrey H. Charlap
Jeffrey H. Charlap, MS
Study Director

09 Sep 2011
Date

Donald G. Stump
Donald G. Stump, PhD, DABT
FOR: Senior Director, Developmental and
Reproductive Toxicology

09 Sept. 2011
Date

APPENDIX A**SCORING CRITERIA FOR DERMAL REACTIONS****Evaluation of Dermal Reactions***

<u>Value</u>	<u>Erythema and Eschar Formation</u>	<u>Computer Designation</u>
0	No erythema	No erythema
1	Very slight erythema (barely perceptible, edges of area not well defined)	Very slight erythema
2	Slight erythema (pale red in color and edges definable)	Slight erythema
3	Moderate to severe erythema (definite red in color and area well defined)	Moderate erythema
4	Severe erythema (beet or crimson red) to slight eschar formation (injuries in depth)	Severe erythema

	<u>Edema Formation</u>	<u>Computer Designation</u>
0	No edema	No edema
1	Very slight edema (barely perceptible, edges of area not well defined)	Very slight edema
2	Slight edema (edges of area well defined by definite raising)	Slight edema
3	Moderate edema (raised approximately 1 mm)	Moderate edema
4	Severe edema (raised more than 1 mm and extending beyond area of exposure)	Severe edema

*Draize, J. H., 1965. The Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics. Dermal Toxicity, pp. 46-59. Assoc. of Food and Drug Officials of the U.S., Topeka, Kansas.

APPENDIX B

Test Substance Characterization (Sponsor-Provided Data)



Deer Park Technical Center Laboratory
1114 Seaco Avenue
Deer Park, Texas 77536
USA
Tel: (713) 844-3200

Report of Analysis

Job Reference: US785-0015767 Job Location: Deer Park, TX, USA	Date Job Created: 12-Nov-2008 Job Description: Handblend & Analysis of ULSD at Deer Park, TX, USA on 12 November, 2008
Client: American Petroleum Institute (API) Contact: Paula Podhasky Address: 1220 L Street NW Washington, DC 20005-4070 United States of America	Customer Reference: CONTRACT: 2008103518

Sample Summary

Sample Number	Date Completed	Description
2008-DRPK-007144-008	12-Nov-2008	Site 1-7 Blend
2008-DRPK-007144-014	14-Nov-2008	Site 1-7 Blend

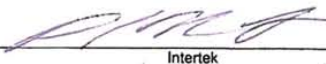
Report of Analysis

Sample ID:2008-DRPK-007144-008	Date Taken:12-November-2008
Drawn By:Client	Date Submitted:12-November-2008
Sample Designated As:ULSD	Date Tested:12-November-2008
Representing:Site 1-7 Blend	

Method	Test	Result	Units
ASTM D4052	Density of Liquids by Digital Density Meter		
	Density @ 15°C/59°F	0.8469	g/mL
	Relative Density @ 60/60°F	0.8465	
	API Gravity @ 60°F	35.5	°API

Sample ID:2008-DRPK-007144-014	Date Taken:12-November-2008
Drawn By:Client	Date Submitted:12-November-2008
Sample Designated As:ULSD	Date Tested:14-November-2008
Representing:Site 1-7 Blend	

Method	Test	Result	Units
ASTM D2887	Boiling Range Distribution of Petroleum Fractions by GC (Simulated Distillation)		
	Boiling Point Distribution	See Attached Report	
ASTM D4052	Density of Liquids by Digital Density Meter		
	Density @ 15°C/59°F	0.8469	g/mL
	Relative Density @ 60/60°F	0.8465	
	API Gravity @ 60°F	35.5	°API
ASTM D445	Kinematic / Dynamic Viscosity		
	Test Temperature	104 °F	
	Kinematic Viscosity @ 104 degF / 40 degC	2.646	cSt
ASTM D1319	Hydrocarbon Types (Aromatics, Olefins, Saturates) by FIA		
	Aromatics	23.7	Vol %
	Olefins	1.7	Vol %
	Saturates	74.6	Vol %
ASTM D5453	Sulfur Content by UV Fluorescence		
	Sulfur Content	5.2	mg/kg
ASTM D5186	Determination of Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels by Supercritical Fluid Chromatography		
	Monoaromatics by SFC	21.8	Wt %
	Polynuclear Aromatics by SFC	4.6	Wt %
	Total Aromatics	26.4	Wt %

Signed:  Intertek

Date: 12/16/08

Simdist-2000
ITS Caleb Brett - Houston

SAMPLE:	SM-08-7144-14	Injection Date:	0081112180124-0600
	HPV Diesel Composite	Report Date:	11/13/08 4:22
FILE:	C:\CP32 Instruments\D2887 & D3710\Data\2008\NOV-08\SM-08-7144-14.0007.CDF		
PROCEDURE:	C:\CP32 Instruments\D2887 & D3710\PROCEDURES\102108-D2887.prc		
EXCEL FILE:	C:\CP32 Instruments\D2887 & D3710\Reports\2008\NOV-08\SM-08-7144-14_0007_CDF.xls		

Boiling Point Distribution Report
ASTM D2887 Simulated Distillation

%Off	BP °F	BP °C	%Off	BP °F	BP °C	%Off	BP °F	BP °C
IBP	267.1	130.6	40%	478.0	247.8	80%	597.6	314.2
1%	282.3	139.1	41%	481.3	249.6	81%	601.7	316.5
2%	307.5	153.1	42%	483.9	251.0	82%	603.9	317.7
3%	321.9	161.1	43%	487.1	252.8	83%	606.8	319.4
4%	332.4	166.9	44%	489.5	254.2	84%	611.7	322.1
5%	340.9	171.6	45%	491.1	255.1	85%	616.4	324.7
6%	346.8	174.9	46%	493.7	256.5	86%	621.7	327.6
7%	355.0	179.4	47%	497.0	258.3	87%	627.1	330.6
8%	359.5	182.0	48%	500.7	260.4	88%	630.1	332.3
9%	363.7	184.3	49%	503.6	262.0	89%	636.6	335.9
10%	369.9	187.7	50%	506.8	263.8	90%	643.2	339.6
11%	375.5	190.8	51%	509.8	265.4	91%	650.7	343.7
12%	380.1	193.4	52%	512.1	266.7	92%	655.5	346.4
13%	384.2	195.6	53%	515.5	268.6	93%	664.9	351.6
14%	387.0	197.2	54%	518.9	270.5	94%	674.5	356.9
15%	391.7	199.8	55%	521.2	271.8	95%	683.5	362.0
16%	395.5	201.9	56%	522.6	272.6	96%	696.7	369.3
17%	398.9	203.8	57%	525.4	274.1	97%	711.1	377.3
18%	403.3	206.3	58%	528.7	275.9	98%	731.8	388.8
19%	407.7	208.7	59%	532.3	277.9	99%	764.7	407.0
20%	411.2	210.7	60%	535.6	279.8	FBP	796.5	424.7
21%	415.3	212.9	61%	538.7	281.5			
22%	419.0	215.0	62%	541.8	283.2			
23%	422.3	216.8	63%	545.4	285.2			
24%	425.5	218.6	64%	549.0	287.2			
25%	428.8	220.5	65%	550.9	288.3			
26%	432.4	222.4	66%	552.8	289.3			
27%	435.3	224.1	67%	556.5	291.4			
28%	439.4	226.3	68%	560.3	293.5			
29%	442.4	228.0	69%	563.6	295.3			
30%	445.8	229.9	70%	566.0	296.7			
31%	449.3	231.8	71%	569.0	298.3			
32%	452.2	233.4	72%	572.9	300.5			
33%	455.1	235.0	73%	576.4	302.4			
34%	457.2	236.2	74%	578.1	303.4			
35%	460.4	238.0	75%	579.7	304.3			
36%	464.0	240.0	76%	582.2	305.6			
37%	468.0	242.2	77%	586.1	307.9			
38%	471.9	244.4	78%	590.0	310.0			
39%	475.2	246.2	79%	593.5	311.9			

Start Elution Time (mins):	0.137	Sample Wt:	0 g
End Elution Time (mins):	17.091	Solvent Wt:	0 g
		Material Balance:	100.0 wt%
Blank File:	C:\CP32 Instruments\D2887 & D3710\Data\2008\NOV-08\CS2-BLK2-111208.0002.CDF		
Calib File:	D:\CP32 Instruments\D2887 & D3710\DATA\RTMIX-060905.0006.CDF		
Resp Factor:	1.000E+00		

PORT ROYAL RESEARCH, LLC

Final Report
PTI Study No. 2008-1201
December 12, 2008

CHARACTERIZATION AND QUANTITATION OF
POLYNUCLEAR AROMATIC COMPOUNDS (PAC) IN AN
HPV CBI BLENDED ULSD (BARCODE # 187840) BY PRR
("MOBIL" METHOD 2) PAC

Sponsor: American Petroleum Institute

CHARACTERIZATION AND QUANTITATION OF POLYNUCLEAR AROMATIC
COMPOUNDS (PAC) IN AN HPV CBI BLENDED ULSD (BARCODE # 187840) BY
PRR ("MOBIL" METHOD 2) PAC

STUDY NO.: 2008-1201

MATERIAL TESTED: HPV CBI Blended ULSD (Barcode # 187840)

CRU SAMPLE NO.: 120801

REQUESTER: American Petroleum Institute
1220 L Street, NW
Washington, DC 2005-4070

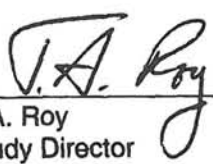
LIAISON: T. A. Roy

STUDY PERFORMED BY: Port Royal Research, LLC¹
61 S. Port Royal Drive
Hilton Head, SC 29928

EXPERIMENTAL START DATE: December 11, 2008

EXPERIMENTAL TERMINATION DATE: December 11, 2008

¹ Doing business as (dba) PRR

 12/12/08
T.A. Roy Date
Study Director

DISTRIBUTION

Study Director
API Liaison (original)

T.A. Roy
P. Podhasky

RESULTS**PRR ("MOBIL" METHOD 2) PAC**

The polynuclear aromatics (PAC) were isolated by following PRR Standard Operating Procedure No. A.3.1. The total weight percent PAC and the group percentages of the total Wt.% are as follows:

TABLE I

sample identification	total Wt. %	Group Percentages of total Wt. % ^a						
		I	II	III	IV	V	VI	≥VII
HPV CBI Blended ULSD (barcode # 187840)	2.8	3	80	20	1	0	0	0

^a Group percentages are reported to one significant figure where groups I through VII represent benzenes and two-through seven-fused ring aromatics, respectively.

Table II below reports these same results as the weight percent of the total in each ring group:

TABLE II

sample identification	total Wt. %	Group Wt%						
		I	II	III	IV	V	VI	≥VII
HPV CBI Blended ULSD (barcode # 187840)	2.8	0.084	2.24	0.56	0.03	0.00	0.00	0.00

APPENDIX C

Analyses of Dosing Formulations (WIL Research Laboratories, LLC)

A Dermal Prenatal Developmental Toxicity
Study of Ultra-Low Sulfur Diesel Fuel in Rats

Analyses of Dosing Formulations

Analytical Chemistry Department

WIL Research Laboratories, LLC



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1. SUMMARY

A gas chromatography method using mass spectrometric detection with electron impact ionization for the determination of ultra-low sulfur diesel (ULSD) concentration in formulations containing mineral oil and test substance ranging in concentration from 49.4 to 502 mg/mL was validated in a previous study (Bodle, 2012, WIL-402028). In the present study, test substance homogeneity/concentration acceptability was assessed in formulations prepared at target concentrations of 66.7, 200, and 400 mg ULSD/mL.

The results of the test substance homogeneity/concentration acceptability assessment in formulations prepared at target concentrations of 66.7, 200, and 400 mg ULSD/mL met the WIL Research SOP acceptance criteria, *i.e.*, the RSD for the mean concentration was $\leq 10\%$ at a concentration within the acceptable limits (85% to 115% of target) with the following exception. The results of the initial assessment of the 26 September 2011 Group 3 (66.7 mg/mL) formulation failed to meet the acceptance criteria. A processing error was suspected to have occurred. The back-up samples were analyzed and the overall mean concentration percent of target was reported as 89.2%, which met the previously stated WIL Research SOP requirements for test substance homogeneity. No test substance was detected in the analyzed vehicle administered to the control group.

2. INTRODUCTION

This report provides a detailed description of a gas chromatography (GC) method using mass spectrometric (MS) detection with electron impact (EI) ionization for the determination of ultra-low sulfur diesel (ULSD) concentration in formulations containing mineral oil and test substance ranging in concentration from 49.4 to 502 mg/mL. The method was validated in a previous study (Bodle, 2012, WIL-402028) where assay specificity/selectivity, calibration reproducibility, precision, accuracy, ruggedness, and test substance stability in calibration standards and processed quality control (QC) samples stored at room temperature for 8-days were assessed. Also in the previous study, test substance homogeneity and, following 8 and 15 days of room temperature storage,

resuspension homogeneity and stability were assessed and verified in formulations ranging in concentration from 50 to 500 mg ULSD/mL. In the present study, formulations prepared at target concentrations of 66.7, 200, and 400 mg ULSD/mL were analyzed to assess test substance homogeneity/concentration acceptability.

A list of abbreviations potentially used in this report is presented in Section 8. (Abbreviations).

2.1. KEY STUDY DATES

<u>Date(s)</u>	<u>Event(s)</u>
26 September 2011	First date of analysis
13 October 2011	Last date of analysis

2.2. WIL RESEARCH KEY STUDY PERSONNEL

Robert E. Boes, MS	Associate Research Chemist, Analytical Chemistry
Stephen F. Farris, Jr., BS	Chemist III, Analytical Chemistry
Gregory A. Hawks, AS	Group Supervisor, Reporting & Technical Support Services
Melissa A. Hull, BS	Group Manager, Reporting & Technical Support Services

3. EXPERIMENTAL PROCEDURES - MATERIALS AND METHODS

3.1. GAS CHROMATOGRAPHY

Column:	Zebron ZB-1HT Inferno, 15 m × 0.32 mm, 0.25-μm film-thickness
Temperature Program:	Initial temperature 50°C, hold for 1.0 minute Ramp 40°C/minute to 300°C, hold for 5.0 minutes
Column Pressure:	5.0 psi
Carrier Gas:	Helium
Injector Temperature:	280°C
Sample Introduction:	Solid phase micro-extraction 100-μm PDMS fiber
Retention Time:	Approximately 2.0 to 4.0 minutes for ULSD peak group
Run Time:	12.25 minutes

3.2. SAMPLE INCUBATION, EXTRACTION, AND DESORPTION PARAMETERS

Agitator Temperature:	60.0°C
Incubation Time:	10 minutes
Agitator Speed:	750 rpm
Agitation Cycle:	2 Seconds on, 4 seconds off
Extraction Time:	2 minutes
Desorption Time:	1 minute

3.3. MASS SPECTROMETRY

Acquisition Parameters

Mode:	Scan (140 amu to 165 amu)
Solvent Delay:	1 minute
Ion Source:	Electron impact
Transfer Line Temperature:	280°C
Ion Trap:	210°C
Manifold Temperature:	60°C

Analyte	Quantitation Mass (amu)
ULSD	145.7

3.4. PREPARATION OF CALIBRATION STANDARDS

Calibration standards with a concentration range of 25.1 to 100 mg ULSD/mL were prepared by diluting aliquots of the ULSD (WIL log no. 8472A, density of 837 mg ULSD/mL) with mineral oil in headspace vials. Each headspace vial had a total sample volume of 1 mL. At least single calibration standards at each concentration were prepared for routine analysis.

3.5. PREPARATION OF QUALITY CONTROL SAMPLES

As detailed in the following table, QC samples were prepared to simulate the processing of formulations at concentrations of 49.4, 100, and 502 mg ULSD/mL (nominal QC concentrations) by combining aliquots of ULSD (WIL log no 8472A, density of 837 mg ULSD/mL) and vehicle (mineral oil) in headspace vials or polypropylene tubes. The processed samples were mixed with vortex action. The samples were further diluted as necessary with mineral oil. The samples were transferred to a headspace vial for analysis. Each headspace vial had a total sample volume of 1 mL. The QC samples were prepared in triplicate at each concentration; a single vehicle blank sample was prepared.

QC Level	Nominal QC Concentration (mg/mL)	Vehicle Volume (mL)	ULSD Density (mg/mL)	ULSD Volume (mL)	Dilution	Theoretical Final Concentration (mg/mL)
Blank	0	1.00	837	0	NA	0
QC1	49.4	0.941	837	0.059	NA	49.4
QC2	100	0.880	837	0.120	2-fold	50.2
QC3	502	0.400	837	0.600	10-fold	50.2

NA = Not applicable

3.6. FORMULATION SAMPLE COLLECTION AND PROCESSING

Quadruplicate samples were collected using a syringe and dosing cannula and transferred to headspace vials or polypropylene tubes. Two samples from each quadruplicate set were processed for analysis, and the remaining 2 samples (back-up samples) were stored at room temperature, protected from light and, if not needed for analysis, discarded after receipt of the Study Director's approval of analytical results. As indicated in the following table, formulation samples were processed by diluting as necessary with mineral oil and mixing with vortex action. The samples were transferred to a headspace vial for analysis. Each headspace vial had a total sample volume of 1 mL.

Dose Group	Target Test Substance Concentration (mg/mL)	Sample Volume (mL)	Dilution	Theoretical Final Concentration (mg/mL)
2	0	1.0	NA	0
3	66.7	1.0	NA	66.7
4	200	1.0	4-fold	50.0
5	400	1.0	8-fold	50.0

NA = Not applicable

3.7. CALIBRATION AND QUANTITATION

Single injections were made of each calibration standard, processed QC, and formulation sample. A calibration curve was constructed for each set of analyses. The ULSD peak areas (y) and the theoretical concentrations (x) of the calibration standards were fit with least-squares regression analysis to the quadratic function:

$$y=ax^2 + bx + c$$

Concentrations were calculated from the results of the regression analysis using Microsoft Excel[®]. The concentration data were transferred to another Excel[®] spreadsheet, where appropriate summary statistics, *i.e.*, mean, standard deviation (SD), relative standard deviation (RSD), and concentration as a percent of target concentration, were calculated and presented in tabular form. The concentrations of QC and formulation samples were calculated by applying any necessary factors to correct for sample dilution or unit conversion.

4. RESULTS AND DISCUSSION

Under the described chromatographic conditions, the retention time of the test substance peak group was approximately 2.0 to 4.0 minutes. Figure 1, Figure 2, Figure 3, and Figure 4 are typical chromatograms of a calibration standard, a processed QC sample, a processed formulation sample, and a processed control group formulation sample, respectively. The total analysis time required for each run was 12.25 minutes.

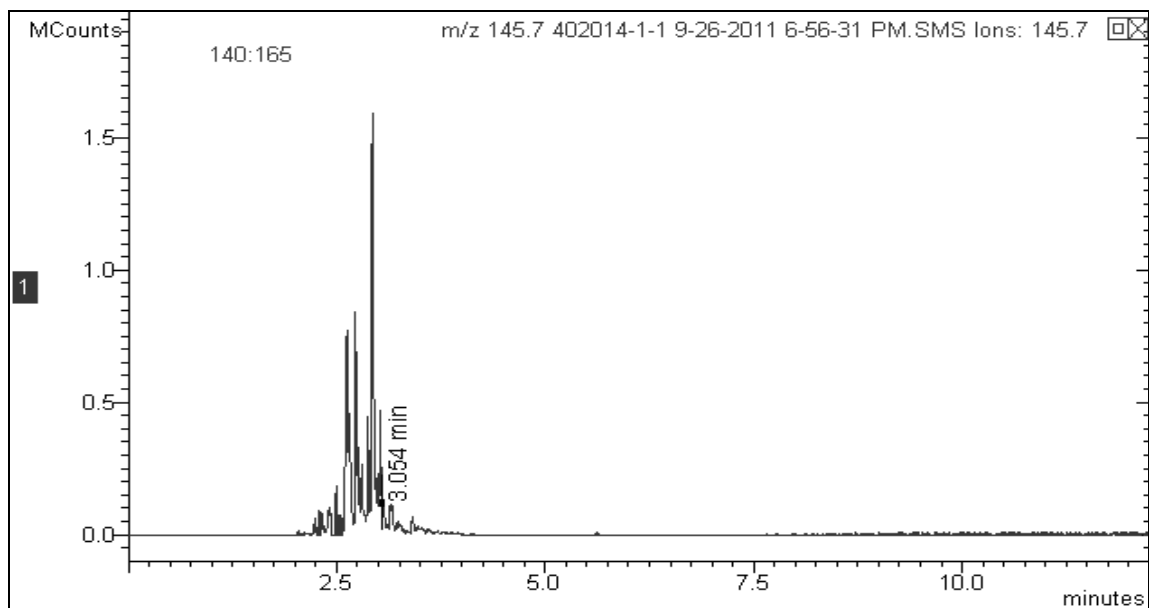


Figure 1: Representative Chromatogram of a 25.1 mg ULSD/mL Calibration Standard

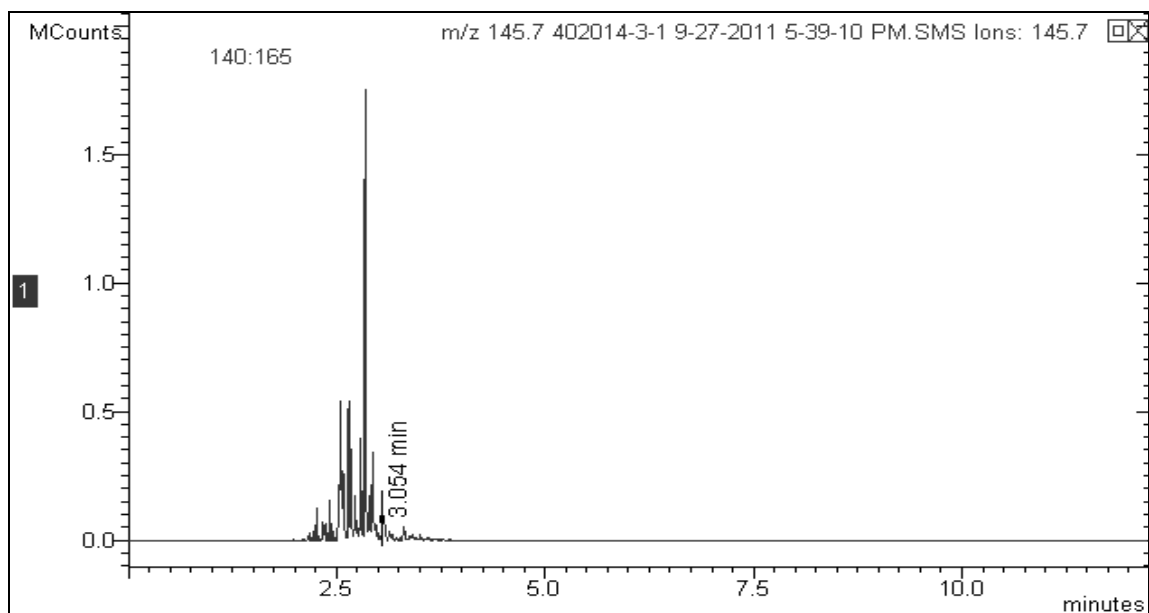


Figure 2: Representative Chromatogram of a Processed 100 mg ULSD/mL Quality Control Sample

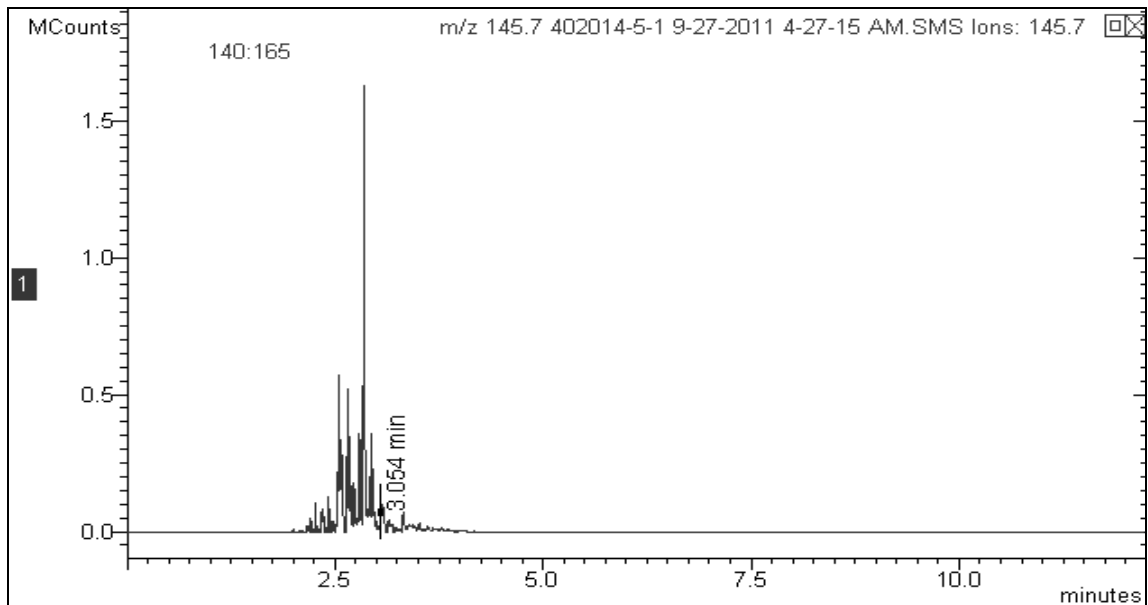


Figure 3: Representative Chromatogram of a Processed 200 mg ULSD/mL Formulation Sample

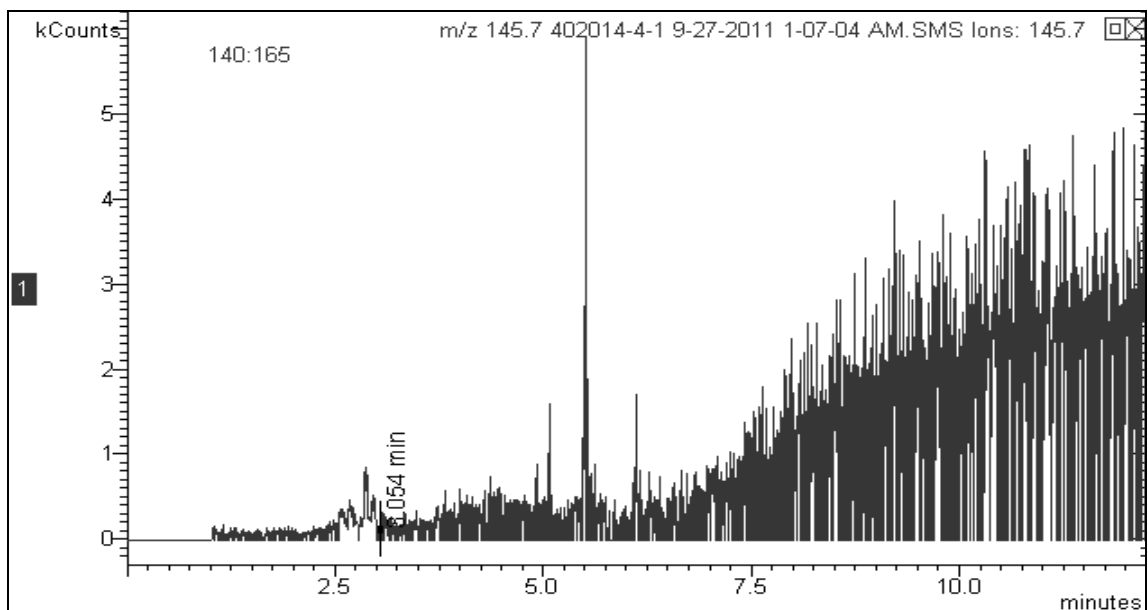


Figure 4: Chromatogram of a Processed Control Group Formulation Sample

4.1. SPECIFICITY/SELECTIVITY

As shown in Figure 4 (and in contrast to the chromatograms shown in Figure 1, Figure 2, and Figure 3), assay specificity/selectivity was confirmed when GC/MS analysis of processed vehicle sample revealed that there were no significant peaks at or near the retention time for the test substance peak group (approximately 2.0 to 4.0 minutes).

4.2. ASSAY ACCEPTABILITY

In addition to the experimental samples, each analytical session consisted of (but was not limited to) calibration standards at 5 concentrations and triplicate QC samples prepared at each of 3 concentrations. In this study, the formulations were prepared at target concentrations of 66.7, 200, and 400 mg ULSD/mL, and the QC samples were prepared at nominal concentrations of 49.4, 100, and 502 mg ULSD/mL. For an analytical session to be considered valid, at least two-thirds of the calculated QC concentrations with at least 1 sample at each concentration had to be 85% to 115% of the nominal QC concentration. All reported results were from analytical sessions that met the acceptance criteria.

4.3. TEST SUBSTANCE HOMOGENEITY/CONCENTRATION ASSESSMENT OF FORMULATIONS

Duplicate samples from the top, middle, and bottom strata of the formulations prepared on 26 September 2011 and 12 October 2011 at target test substance concentrations of 66.7, 200, and 400 mg/mL were analyzed to assess test substance homogeneity/concentration acceptability. Duplicate samples from the blank vehicle were also collected and analyzed. The results of the homogeneity/concentration analysis are presented in Table 1 and Table 2, with the overall statistics summarized as follows:

Homogeneity/Concentration Assessment of the 26 September 2011 Formulations				
	Group 2 (0.0 mg/mL)	Group 3 (66.7 mg/mL)	Group 4 (200 mg/mL)	Group 5 (400 mg/mL)
Mean Concentration (mg/mL)	ND	59.5	173	359
SD	NA	7.0	8.9	15
RSD (%)	NA	12*	5.1	4.2
Mean Concentration % of Target	NA	89.2	86.6	89.7

ND = No test substance chromatographic peak detected

NA = Not applicable

* = Original and backup sample sets had mean RSD <10%

Homogeneity/Concentration Assessment of the 12 October 2011 Formulations				
	Group 2 (0.0 mg/mL)	Group 3 (66.7 mg/mL)	Group 4 (200 mg/mL)	Group 5 (400 mg/mL)
Mean Concentration (mg/mL)	ND	67.4	206	413
SD	NA	2.7	11	18
RSD (%)	NA	4.0	5.1	4.3
Mean Concentration % of Target	NA	101	103	103

ND = No test substance chromatographic peak detected

NA = Not applicable

The homogeneity/concentration acceptability assessments of the 26 September 2011 and 12 October 2011 formulations met the WIL Research SOP requirement, *i.e.*, the RSD for the mean concentration was $\leq 10\%$ at a concentration within the acceptable limits (within 85% to 115% of target concentration) with the following exception. The results of the initial assessment of the 26 September 2011 Group 3 (66.7 mg/mL) formulation failed to meet the acceptance criteria. A processing error was suspected to have occurred.

The back-up samples were analyzed, and the overall mean concentration percent of target was reported as 89.2%, which met the previously stated WIL Research SOP requirements for test substance homogeneity. No test substance was detected in the analyzed vehicle administered to the control group (Group 2).

5. CONCLUSION

A validated GC/MS method was used for the determination of ULSD concentration in suspension formulations. The analytical results met the applicable WIL Research SOP acceptance criteria for test substance homogeneity/concentration acceptability with the following exception. The results of the initial assessment of the 26 September 2011 Group 3 (66.7 mg/mL) formulation failed to meet the acceptance criteria. A processing error was suspected to have occurred. The back-up samples were analyzed, and the overall mean concentration percent of target was reported as 89.2%, which met the previously stated WIL Research SOP requirements for test substance homogeneity. No test article was detected in the analyzed vehicle administered to the control group.

6. REPORT REVIEW AND APPROVAL

WIL-402014 Analytical Chemistry Report

Report Approved by:

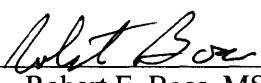


Jeffrey H. Charlap, MS
Staff Toxicologist, Developmental and
Reproductive Toxicology
Study Director

11 July 2012

Date

Report Prepared by:



Robert E. Boes, MS
Associate Research Chemist,
Analytical Chemistry

11 July 2012

Date

Report Reviewed by:



Eric S. Bodle, PhD
Assistant Director, Analytical Chemistry

11 Jul 2012

Date

7. REFERENCES

Bodle, E.S. Analytical Validation and Stability Study of Ultra-Low Sulfur Diesel in Mineral Oil Formulations (Study No. WIL-402028). WIL Research Laboratories, LLC, Ashland, OH, **2012**.

8. ABBREVIATIONS

The following abbreviations may apply to this report:

μ	-	micro
μL	-	microliter
ACN	-	acetonitrile
btm	-	bottom
cm	-	centimeter
DI	-	deionized
DMSO	-	dimethylsulfoxide
ESI+	-	positive electrospray ionization
FA	-	formic acid
g	-	gram
HPLC	-	high performance liquid chromatography
hr	-	hour(s)
IS	-	internal standard
kg	-	kilogram
L	-	liter
LLOQ	-	lower limit of quantitation
MC	-	methylcellulose
MeOH	-	methanol
mg	-	milligram
mL	-	milliliter
mm	-	millimeter
msec	-	milliseconds
MS	-	mass spectrometry
mM	-	millimolar
NA	-	not applicable
ND	-	not detected
ng	-	nanogram
QC	-	quality control
%RE	-	percent relative error
RSD	-	relative standard deviation
SD	-	standard deviation
SOP	-	standard operating procedure
SPE	-	solid phase extraction
UV	-	ultraviolet
v	-	volume
w	-	weight
WIL Research	-	WIL Research Laboratories, LLC

TABLES 1 - 2

Table 1. Homogeneity/Concentration Assessment of the 26 September 2011 Formulations
(Analyzed 26 and 27 September 2011)

<u>Group/ Strata</u>	<u>Dose Conc.</u> (mg/mL)	<u>Ref #</u> 0	<u>Line #</u>	<u>Analyzed Conc.</u> (mg/mL)	<u>Percent of Target</u> (%)	<u>Mean Conc.</u> (mg/mL)	<u>SD</u>	<u>RSD</u> (%)	<u>Mean Conc % of Target</u> (%)
2/Top	0	4 -1*	30*			-----Not Detected-----			
		4 -2*	31*			-----Not Detected-----			
2/Mid		4 -3*	32*			-----Not Detected-----			
		4 -4*	33*			-----Not Detected-----			
2/Btm		4 -5*	34*			-----Not Detected-----			
		4 -6*	35*			-----Not Detected-----			
3/Top	66.7	4 -7*	36*	55.2	82.8	59.5	7.0	12	89.2
		4 -8*	37*	53.2	79.8				
		6 -7^	5^	69.7	104				
		6 -8^	6^	66.0	99.0				
3/Mid		4 -9*	38*	54.1	81.1				
		4 -10*	39*	52.9	79.4				
		6 -9^	7^	67.8	102				
		6 -10^	8^	64.9	97.3				
3/Btm		4 -11*	40*	50.4	75.6				
		4 -12*	41*	52.4	78.5				
		6 -11^	9^	63.1	94.5				
		6 -12^	10^	64.4	96.6				

* Samples analyzed on 26 September 2011 and analyzed under sequence 402014a

^Back-up samples analyzed on 27 September 2011 and analyzed under sequence 402014a1

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Table 1. Homogeneity/Concentration Assessment of the 26 September 2011 Formulations (continued)
(Analyzed 26 and 27 September 2011)

Group/ Strata	Dose Conc. (mg/mL)	Ref # 0	Line # (402014a-)	Analyzed Conc. (mg/mL)	Percent of Target (%)	Mean Conc. (mg/mL)	SD	RSD (%)	Mean Conc % of Target (%)
4/Top	200	5 - 1	43	184	91.8	173	8.9	5.1	86.6
		5 - 2	44	165	82.6				
4/Mid		5 - 3	45	181	90.6				
		5 - 4	46	171	85.7				
4/Btm		5 - 5	47	177	88.3				
		5 - 6	48	161	80.6				
5/Top	400	5 - 7	49	347	86.8	359	15	4.2	89.7
		5 - 8	50	369	92.3				
5/Mid		5 - 9	51	343	85.7				
		5 - 10	52	357	89.2				
5/Btm		5 - 11	53	353	88.3				
		5 - 12	54	383	95.7				

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Table 2. Homogeneity/Concentration Assessment of the 12 October 2011 Formulations
(Analyzed 12 October 2011)

Group/ Strata	Dose Conc. (mg/mL)	Ref # 0	Line # (402014b-)	Analyzed Conc. (mg/mL)	Percent of Target (%)	Mean Conc. (mg/mL)	SD	RSD (%)	Mean Conc % of Target (%)
2/Top	0	23 - 1	30			-----Not Detected-----			
		23 - 2	31			-----Not Detected-----			
2/Mid		23 - 3	32			-----Not Detected-----			
		23 - 4	33			-----Not Detected-----			
2/Btm		23 - 5	34			-----Not Detected-----			
		23 - 6	35			-----Not Detected-----			
3/Top	66.7	23 - 7	36	65.2	97.8	67.4	2.7	4.0	101
		23 - 8	37	65.4	98.1				
3/Mid		23 - 9	38	68.2	102				
		23 - 10	39	64.6	96.8				
3/Btm		23 - 11	40	70.9	106				
		23 - 12	41	69.9	105				

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Table 2. Homogeneity/Concentration Assessment of the 12 October 2011 Formulations (continued)
(Analyzed 12 October 2011)

Group/ Strata	Dose Conc. (mg/mL)	Ref # 0	Line # (402014b-)	Analyzed Conc. (mg/mL)	Percent of Target (%)	Mean Conc. (mg/mL)	SD	RSD (%)	Mean Conc % of Target (%)
4/Top	200	24 - 1	42	195	97.4	206	11	5.1	103
		24 - 2	43	214	107				
4/Mid		24 - 3	44	204	102				
		24 - 4	45	194	96.8				
4/Btm		24 - 5	46	207	103				
		24 - 6	47	220	110				
5/Top	400	24 - 7	48	403	101	413	18	4.3	103
		24 - 8	49	417	104				
5/Mid		24 - 9	50	444	111				
		24 - 10	51	395	98.7				
5/Btm		24 - 11	52	400	100				
		24 - 12	53	419	105				

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APPENDIX D

Animal Room Environmental Conditions

DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL

PROJECT NO.:WIL- 402014

TEMPERATURE/HUMIDITY - STUDY SUMMARY REPORT

SPONSOR: 402 - AMERICAN PETROLEUM

Page 1 of 5

STUDY SPECIFICATIONS: 402014

DATE IN 09/15/11 TIME IN 12:00

DATE OUT 10/20/11 TIME OUT 08:00

ROOM SPECIFICATIONS: B ROOM 04

LOW TEMPERATURE °F: 66.0 HIGH TEMPERATURE °F: 76.0 LOW HUMIDITY %RH: 30.0

TEST SYSTEM: Rat

LOW TEMPERATURE °C: 18.9 HIGH TEMPERATURE °C: 24.4 HIGH HUMIDITY %RH: 70.0

DATE	PRIMARY TEMP				SECONDARY TEMP				PRIMARY HUM	SECONDARY HUM
	MEAN (°F)		MEAN (°C)		MEAN (°F)		MEAN (°C)		MEAN (%RH)	MEAN (%RH)
09/15/11	76.5	+0.5	24.7	+0.3	76.2	+0.2	24.6	+0.2	38.5	36.8
09/16/11	76.5	+0.5	24.7	+0.3	76.1	+0.1	24.5	+0.1	38.3	36.5
09/17/11	76.4	+0.4	24.7	+0.3	76.0	+0.0	24.4	+0.0	38.0	36.3
09/18/11	76.7	+0.7	24.8	+0.4	76.3	+0.3	24.6	+0.2	41.5	39.8
09/19/11	76.4	+0.4	24.7	+0.3	76.0	+0.0	24.4	+0.0	47.5	45.7
09/20/11	76.6	+0.6	24.8	+0.4	76.2	+0.2	24.6	+0.2	48.8	47.0
09/21/11	76.5	+0.5	24.7	+0.3	76.1	+0.1	24.5	+0.1	49.4	47.6
09/22/11	76.8	+0.8	24.9	+0.5	76.4	+0.4	24.7	+0.3	45.9	44.1
09/23/11	76.7	+0.7	24.8	+0.4	76.3	+0.3	24.6	+0.2	47.3	45.5
09/24/11	76.7	+0.7	24.8	+0.4	76.3	+0.3	24.6	+0.2	41.8	40.1
09/25/11	76.8	+0.8	24.9	+0.5	76.4	+0.4	24.7	+0.3	45.6	43.8
09/26/11	77.2	+1.2	25.1	+0.7	76.7	+0.7	24.8	+0.4	50.4	48.5
09/27/11	76.8	+0.8	24.9	+0.5	76.4	+0.4	24.7	+0.3	46.1	44.4
09/28/11	77.0	+1.0	25.0	+0.6	76.6	+0.6	24.8	+0.4	45.0	43.2
09/29/11	74.2		23.4		73.7		23.2		46.0	44.2
09/30/11	71.5		21.9		71.0		21.7		44.7	43.0
10/01/11	71.7		22.1		71.3		21.8		41.3	39.6
10/02/11	71.5		21.9		71.1		21.7		38.9	37.3
10/03/11	71.4		21.9		71.0		21.7		44.2	42.5

NOTE: + = VALUE WAS GREATER THAN HIGH RANGE

DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL

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DATE	PRIMARY TEMP		SECONDARY TEMP		PRIMARY HUM	SECONDARY HUM
	MEAN (°F)	MEAN (°C)	MEAN (°F)	MEAN (°C)	MEAN (%RH)	MEAN (%RH)
10/04/11	71.3	21.8	70.9	21.6	46.5	45.0
10/05/11	71.3	21.8	70.8	21.6	46.1	44.3
10/06/11	71.6	22.0	71.2	21.8	47.1	45.5
10/07/11	71.1	21.7	70.8	21.6	48.9	47.4
10/08/11	70.9	21.6	70.5	21.4	48.3	46.7
10/09/11	71.3	21.8	71.0	21.7	48.1	46.4
10/10/11	71.0	21.7	70.6	21.4	48.7	47.0
10/11/11	71.6	22.0	71.2	21.8	47.1	45.4
10/12/11	71.2	21.8	70.8	21.6	49.5	47.7
10/13/11	71.2	21.8	70.8	21.6	49.1	47.3
10/14/11	71.2	21.8	70.9	21.6	44.9	43.3
10/15/11	71.3	21.8	70.9	21.6	39.9	38.3
10/16/11	71.2	21.8	70.8	21.6	41.8	40.2
10/17/11	71.2	21.8	70.8	21.6	39.2	37.4
10/18/11	71.3	21.8	70.9	21.6	39.9	38.3
10/19/11	71.1	21.7	70.7	21.5	47.8	46.1
10/20/11	71.5	21.9	71.0	21.7	43.7	41.8

DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL

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DATE	PRIMARY TEMP			SECONDARY TEMP		PRIMARY HUM	SECONDARY HUM
	MEAN (°F)	MEAN (°C)		MEAN (°F)	MEAN (°C)	MEAN (%RH)	MEAN (%RH)
SUMMARY OF DAILY MEANS	MEAN	MIN	MAX				
PRIMARY TEMP °F:	73.5	70.9	77.2				
PRIMARY TEMP °C:	23.1	21.6	25.1				
SECONDARY TEMP °F:	73.1	70.5	76.7				
SECONDARY TEMP °C:	22.8	21.4	24.8				
PRIMARY HUM %RH:	45.0	38.0	50.4				
SECONDARY HUM %RH:	43.3	36.3	48.5				
N DAYS	36						

DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL

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B ROOM 04 SUMMARY OF HOURLY VALUES

	PRIMARY TEMP				SECONDARY TEMP				PRIMARY HUM		SECONDARY HUM	
MEAN	73.5	°F	23.1	°C	73.1	°F	22.8	°C	45.0	%RH	43.3	%RH
MIN	68.8	°F	20.4	°C	68.5	°F	20.3	°C	36.1	%RH	34.5	%RH
MAX	77.9	°F	25.5	°C	77.3	°F	25.2	°C	58.6	%RH	56.2	%RH
SD	2.82		1.57		2.81		1.56		4.52		4.51	
SE	0.10		0.05		0.10		0.05		0.16		0.16	
N SAMPLES	831				831				831		831	
FIRST DAY	09/15/11											
LAST DAY	10/20/11											
N DAYS	36											

DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL

PROJECT NO.:WIL- 402014

TEMPERATURE/HUMIDITY - STUDY SUMMARY REPORT

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STUDY 402014 SUMMARY OF HOURLY VALUES

	PRIMARY TEMP				SECONDARY TEMP				PRIMARY HUM		SECONDARY HUM	
MEAN	73.5	°F	23.1	°C	73.1	°F	22.8	°C	45.0	%RH	43.3	%RH
MIN	68.8	°F	20.4	°C	68.5	°F	20.3	°C	36.1	%RH	34.5	%RH
MAX	77.9	°F	25.5	°C	77.3	°F	25.2	°C	58.6	%RH	56.2	%RH
SD	2.82		1.57		2.81		1.56		4.52		4.51	
SE	0.10		0.05		0.10		0.05		0.16		0.16	
N SAMPLES	831				831				831		831	
FIRST DAY	09/15/11											
LAST DAY	10/20/11											
N DAYS	36											

APPENDIX E

Scoring Criteria for Dermal Reactions

SCORING CRITERIA FOR DERMAL REACTIONS

Evaluation of Dermal Reactions*

<u>Value</u>	<u>Erythema and Eschar Formation</u>	<u>Computer Designation</u>
0	No erythema	No erythema
1	Very slight erythema (barely perceptible, edges of area not well defined)	Very slight erythema
2	Slight erythema (pale red in color and edges definable)	Slight erythema
3	Moderate to severe erythema (definite red in color and area well defined)	Moderate erythema
4	Severe erythema (beet or crimson red) to slight eschar formation (injuries in depth)	Severe erythema

<u>Value</u>	<u>Edema Formation</u>	<u>Computer Designation</u>
0	No edema	No edema
1	Very slight edema (barely perceptible, edges of area not well defined)	Very slight edema
2	Slight edema (edges of area well defined by definite raising)	Slight edema
3	Moderate edema (raised approximately 1 mm)	Moderate edema
4	Severe edema (raised more than 1 mm and extending beyond area of exposure)	Severe edema

* Draize, J.H. The appraisal of the safety of chemicals in foods, drugs and cosmetics. *Dermal Toxicity* **1965**, 46-59. Assoc. of Food and Drug Officials of the U.S., Topeka, Kansas and the EPA-OPPTS Health Effects Test Guidelines **1998**.

APPENDIX F

WIL Developmental Historical Control Data Version 3.10 [CrI:CD(SD) Rats]

Study Date Range: 4/21/1998-8/27/2010

Endpoint	Mean of Study Means								
	Total	Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
NO. OF DATASETS	168								
Total No. of Animals in the Control Group	4166								
No. of Animals That Died	6								
No. of Animals That Aborted	0								
No. of Animals That Delivered	0								
Percent Pregnant		96.6	4.55	0.35	100.0	76.0	100.0	96.0	100.0
No. Gravid	4026								
No. With Only Resorptions	6								
No. of Dams With Live Fetuses	4015								
No. Nongravid	253								
No. of Animals Examined at Laparohysterectomy	4160								
Mean Gravid Uterine Weight (g)		85.4	3.70	0.29	85.7	72.2	95.4	82.8	88.1
Mean No. Viable Fetuses/Dam		15.1	0.69	0.05	15.1	12.2	17.1	14.7	15.5
Total No. Viable Fetuses	60839								
Viable Fetuses (%/Litter)		95.1	1.57	0.12	95.4	90.1	98.0	94.0	96.2
Mean No. Postimplantation Loss/Dam		0.7	0.22	0.02	0.7	0.3	1.4	0.6	0.9
Total No. of Postimplantation Losses	3025								
Postimplantation Loss (%/Litter)		4.9	1.57	0.12	4.6	2.0	9.9	3.8	6.0
Early Resorptions (%/Litter)		4.8	1.59	0.12	4.5	1.5	9.9	3.6	5.8
Late Resorptions (%/Litter)		0.1	0.19	0.01	0.0	0.0	0.8	0.0	0.2
Dead Fetuses (%/Litter)		0.0	0.05	0.00	0.0	0.0	0.5	0.0	0.0
Mean No. Implantations/Dam		15.9	0.68	0.05	15.9	13.0	17.6	15.4	16.3
Mean No. Corpora Lutea/Dam		17.2	0.83	0.06	17.2	14.5	19.4	16.6	17.7
Mean No. Preimplantation Loss/Dam		1.4	0.59	0.05	1.3	0.3	3.1	0.9	1.7
Total No. Preimplantation Losses	5427								
Preimplantation Loss (%/Litter)		7.3	2.97	0.23	7.1	1.5	15.7	5.2	9.1
Total No. Male Fetuses	30376								
Total No. Female Fetuses	30463								
% Males/Litter1		49.9	2.70	0.21	49.8	43.1	56.7	47.9	51.8
% Females/Litter		50.1	2.70	0.21	50.2	43.3	56.9	48.2	52.1
Mean Fetal Body Weight (g)		3.7	0.11	0.01	3.6	3.4	3.9	3.6	3.7
Mean Male Body Weight (g)		3.8	0.12	0.01	3.7	3.5	4.0	3.7	3.8
Mean Female Body Weight (g)		3.6	0.11	0.01	3.6	3.4	3.8	3.5	3.6

		Mean of Study Means							
NO. OF DATASETS		165							
Total No. of Fetuses/Litters Examined Externally		59744	3942						
Total No. of Fetuses/Litters Examined Viscerally		59550	3942						
Total No. of Fetuses/Litters Examined Skeletally		59537	3941						
MALFORMATIONS (% Per Litter)		Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
TOTAL EXTERNAL MALFORMATIONS		0.1	0.21	0.02	0.0	0.0	1.3	0.0	0.2
TOTAL VISCERAL MALFORMATIONS		0.1	0.17	0.01	0.0	0.0	0.9	0.0	0.0
TOTAL SKELETAL MALFORMATIONS		0.1	0.23	0.02	0.0	0.0	1.1	0.0	0.3
TOTAL MALFORMATIONS		0.3	0.35	0.02	0.2	0.0	1.6	0.0	0.5
EXTERNAL									
Aglossia		0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Anal Atresia		0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Apodia		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Astomia		0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Carpal and/or Tarsal Flexure		0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Cleft Face		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Cleft Lip		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Cleft Palate		0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Craniorachischisis		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Cyclopia		0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Ectromelia		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Exencephaly with or without Open Eyelid(s)		0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Fetal Anasarca		0.0	0.12	0.01	0.0	0.0	1.3	0.0	0.0
Filamentous Tail		0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Gastroschisis		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Hydrocephaly with or without Dome Head		0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Mandibular Agnathia		0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Mandibular Micrognathia		0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Maxillary Agnathia		0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Meningoencephalocele		0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0

		Mean of Study Means						
NO. OF DATASETS	165							
Total No. of Fetuses/Litters Examined Externally	59744	3942						
Total No. of Fetuses/Litters Examined Viscerally	59550	3942						
Total No. of Fetuses/Litters Examined Skeletally	59537	3941						
MALFORMATIONS (% Per Litter)	Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
EXTERNAL								
Micromelia	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Microphthalmia and/or Anophthalmia	0.0	0.09	0.01	0.0	0.0	0.5	0.0	0.0
Omphalocele	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Open Eyelid(s)	0.0	0.03	0.00	0.0	0.0	0.2	0.0	0.0
Proboscis-Like Nose	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Spina Bifida	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Tail- Short	0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Umbilical Herniation of the Intestine	0.0	0.07	0.01	0.0	0.0	0.8	0.0	0.0
VISCERAL								
Aorta- Narrowed	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Epididymis- Absent	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Heart and/or Great Vessel Anomaly	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Hydrocephaly	0.0	0.08	0.01	0.0	0.0	0.8	0.0	0.0
Interrupted Aortic Arch	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Kidney(s)- Absent	0.0	0.03	0.00	0.0	0.0	0.4	0.0	0.0
Kidney(s) and/or Ureter(s) Absent	0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Lung(s)- Lobular Agenesis	0.0	0.04	0.00	0.0	0.0	0.6	0.0	0.0
Lung(s)- Lobular Dysgenesis	0.0	0.06	0.00	0.0	0.0	0.5	0.0	0.0
Retroesophageal Aortic Arch	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Situs Inversus	0.0	0.08	0.01	0.0	0.0	0.4	0.0	0.0
Testis- Absent	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Thyroid Gland(s)- Absent	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Transposition of the Great Vessels	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Vessel(s)- Malpositioned	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Vessel(s)- Malpositioned	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0

		Mean of Study Means							
NO. OF DATASETS		165							
Total No. of Fetuses/Litters Examined Externally		59744	3942						
Total No. of Fetuses/Litters Examined Viscerally		59550	3942						
Total No. of Fetuses/Litters Examined Skeletally		59537	3941						
MALFORMATIONS (% Per Litter)		Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
SKELETAL									
14th Full Rib(s)		0.1	0.16	0.01	0.0	0.0	0.9	0.0	0.0
Bent Limb Bone(s)		0.0	0.08	0.01	0.0	0.0	1.0	0.0	0.0
Bent Scapula		0.0	0.08	0.01	0.0	0.0	1.0	0.0	0.0
Costal Cartilage Anomaly		0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Limb Bone(s)- Small		0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Rib Anomaly		0.0	0.08	0.01	0.0	0.0	0.4	0.0	0.0
Rib(s)- Only 11 Pairs Present		0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Rib(s)- Only 12 Pairs Present		0.0	0.07	0.01	0.0	0.0	0.5	0.0	0.0
Scapula- Misshapen		0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Skull Anomaly		0.0	0.03	0.00	0.0	0.0	0.4	0.0	0.0
Sternebra(e)- Fused		0.0	0.08	0.01	0.0	0.0	1.0	0.0	0.0
Sternebra(e)- Malaligned (Severe)		0.0	0.05	0.00	0.0	0.0	0.4	0.0	0.0
Sternoschisis		0.0	0.07	0.01	0.0	0.0	0.6	0.0	0.0
Vertebral Agenesis		0.0	0.07	0.01	0.0	0.0	0.3	0.0	0.0
Vertebral Anomaly with or without Associated Rib Anomaly		0.0	0.11	0.01	0.0	0.0	0.7	0.0	0.0
Vertebral Centra Anomaly		0.0	0.06	0.00	0.0	0.0	0.5	0.0	0.0

		Mean of Study Means							
NO. OF DATASETS		165							
Total No. of Fetuses/Litters Examined Externally		59744	3942						
Total No. of Fetuses/Litters Examined Viscerally		59550	3942						
Total No. of Fetuses/Litters Examined Skeletally		59537	3941						
VARIATIONS (% Per Litter)		Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
TOTAL EXTERNAL VARIATIONS		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
TOTAL VISCERAL VARIATIONS		0.5	0.74	0.06	0.3	0.0	4.0	0.0	0.6
TOTAL SKELETAL VARIATIONS		33.7	6.68	0.52	33.6	18.0	50.4	29.7	37.3
TOTAL VARIATIONS		33.9	6.80	0.38	33.7	17.1	51.1	29.7	37.8
EXTERNAL									
Twinning		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
VISCERAL									
Adrenal Gland(s)- Accessory		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Adrenal Gland(s)- Enlarged		0.0	0.11	0.01	0.0	0.0	1.4	0.0	0.0
Adrenal Gland(s)- Pale		0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Diaphragm- Thin		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Heart- Small		0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Hemorrhagic Iris		0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Hemorrhagic Ring Around the Iris		0.0	0.07	0.01	0.0	0.0	0.3	0.0	0.0
Kidney(s)- Small		0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Liver- Accessory Lobule(s)		0.0	0.16	0.01	0.0	0.0	1.6	0.0	0.0
Liver- Pale		0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Liver- Swollen		0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Major Blood Vessel Variation		0.1	0.16	0.01	0.0	0.0	0.8	0.0	0.0
Renal Papilla(e) not Developed and/or Distended Ureter(s)		0.3	0.64	0.05	0.0	0.0	4.0	0.0	0.3
Retrocaval Ureter(s)		0.0	0.06	0.00	0.0	0.0	0.8	0.0	0.0
Spleen- Accessory		0.0	0.09	0.01	0.0	0.0	1.0	0.0	0.0
Spleen- Pale		0.0	0.07	0.01	0.0	0.0	0.3	0.0	0.0
Spleen- Small		0.0	0.13	0.01	0.0	0.0	1.4	0.0	0.0

		Mean of Study Means						
NO. OF DATASETS	165							
Total No. of Fetuses/Litters Examined Externally	59744	3942						
Total No. of Fetuses/Litters Examined Viscerally	59550	3942						
Total No. of Fetuses/Litters Examined Skeletally	59537	3941						
VARIATIONS (% Per Litter)	Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
VISCERAL								
Testis- Small	0.0	0.03	0.00	0.0	0.0	0.2	0.0	0.0
SKELETAL								
14th Rudimentary Rib(s)	7.0	3.15	0.25	6.4	0.0	18.9	4.8	8.7
25 Presacral Vertebrae	0.1	0.30	0.02	0.0	0.0	2.0	0.0	0.0
27 Presacral Vertebrae	0.2	0.27	0.02	0.0	0.0	1.8	0.0	0.3
7th Cervical Rib(s)	0.8	0.80	0.06	0.7	0.0	3.7	0.3	1.1
7th Sternebra	0.0	0.24	0.02	0.0	0.0	2.5	0.0	0.0
Bent Rib(s)	0.2	0.47	0.04	0.0	0.0	4.0	0.0	0.3
Cervical Centrum #1 Ossified	20.4	5.80	0.45	19.7	6.6	35.8	16.5	24.6
Entire Sternum Unossified	0.0	0.07	0.01	0.0	0.0	0.4	0.0	0.0
Extra Site of Ossification Anterior to Cervical Centrum #2	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Extra Site of Ossification Anterior to Rib #5	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Extra Site of Ossification Anterior to Sternebra #1	0.0	0.04	0.00	0.0	0.0	0.4	0.0	0.0
Extra Site of Ossification Anterior to Sternebra #2	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Extra Site of Ossification Ventral to Cervical Centrum #2	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Hyoid Unossified	1.3	0.99	0.08	1.2	0.0	4.4	0.4	1.9
Ischium Unossified	0.0	0.06	0.00	0.0	0.0	0.6	0.0	0.0
Pubis Unossified	0.1	0.22	0.02	0.0	0.0	2.3	0.0	0.0
Reduced Ossification of the 13th Rib(s)	0.6	0.67	0.05	0.5	0.0	3.6	0.2	0.8
Reduced Ossification of the Limb Bone(s)	0.0	0.03	0.00	0.0	0.0	0.2	0.0	0.0
Reduced Ossification of the Rib(s)	0.0	0.12	0.01	0.0	0.0	1.2	0.0	0.0
Reduced Ossification of the Skull	0.1	0.19	0.02	0.0	0.0	1.0	0.0	0.0
Reduced Ossification of the Vertebral Arches	0.1	0.19	0.02	0.0	0.0	1.1	0.0	0.2
Skull Bone(s)- Accessory	0.0	0.08	0.01	0.0	0.0	0.7	0.0	0.0
Sternebra(e) #1, #2, #3 and/or #4 Unossified	0.2	0.26	0.02	0.0	0.0	1.3	0.0	0.3

		Mean of Study Means							
NO. OF DATASETS		165							
Total No. of Fetuses/Litters Examined Externally		59744	3942						
Total No. of Fetuses/Litters Examined Viscerally		59550	3942						
Total No. of Fetuses/Litters Examined Skeletally		59537	3941						
VARIATIONS (% Per Litter)		Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
SKELETAL									
Sternebra(e) #5 and/or #6 Unossified		6.4	5.87	0.46	4.1	0.0	26.1	2.5	8.8
Sternebra(e)- Malaligned (Slight or Moderate)		0.4	0.49	0.04	0.3	0.0	3.0	0.0	0.6
Sternebrae with Thread-Like Attachment		0.0	0.06	0.00	0.0	0.0	0.6	0.0	0.0
Unco-Ossified Vertebral Centra		0.0	0.06	0.01	0.0	0.0	0.5	0.0	0.0
Vertebral Centra Unossified		0.0	0.05	0.00	0.0	0.0	0.4	0.0	0.0

Modal Distribution of Fetal Body Weights**No. of Datasets in Historical Control****167**

Range of Study Dates

4/21/1998 - 8/27/2010

No. of Dams in Historical Control

4279

No. of Dams with Live Fetuses

4015

Mean Fetal Body Weight Range (g)

3.4 - 3.9

Mean Fetal Body Weight (g)

	3.4	3.5	3.6	3.7	3.8	3.9
Total No. Datasets	2	29	55	47	24	10
Mean Litter Size	15.1	15.4	15.2	15.2	14.6	14.5
Litter Size Range	15.0 - 15.1	14.4 - 17.1	13.7 - 16.7	13.7 - 16.6	12.2 - 15.8	13.8 - 15.3

Summary Incidence Malformations and Variations

(Total Number Fetuses/Litters Affected)

Ranked Uppermost to Nethermost

NO. OF DATASETS	165	
Total No. of Fetuses/Litters Examined Externally	59744	3942
Total No. of Fetuses/Litters Examined Viscerally	59550	3942
Total No. of Fetuses/Litters Examined Skeletally	59537	3941

MALFORMATIONS	Number	
	Fetuses	Litters
EXTERNAL		
Microphthalmia and/or Anophthalmia	18	18
Mandibular Micrognathia	7	7
Omphalocele	7	7
Fetal Anasarca	7	5
Umbilical Herniation of the Intestine	6	6
Anal Atresia	5	5
Filamentous Tail	5	5
Cleft Palate	4	4
Exencephaly with or without Open Eyelid(s)	3	3
Tail- Short	3	3
Aglossia	2	2
Carpal and/or Tarsal Flexure	2	2
Cyclopia	2	2
Mandibular Agnathia	2	2
Open Eyelid(s)	2	2
Apodia	1	1
Astomia	1	1
Cleft Face	1	1
Cleft Lip	1	1
Craniorachischisis	1	1
Ectromelia	1	1
Gastroschisis	1	1
Hydrocephaly with or without Dome Head	1	1

Summary Incidence Malformations and Variations

(Total Number Fetuses/Litters Affected)

Ranked Uppermost to Nethermost

NO. OF DATASETS	165	
Total No. of Fetuses/Litters Examined Externally	59744	3942
Total No. of Fetuses/Litters Examined Viscerally	59550	3942
Total No. of Fetuses/Litters Examined Skeletally	59537	3941

MALFORMATIONS	Number	
	Fetuses	Litters
EXTERNAL		
Maxillary Agnathia	1	1
Meningoencephalocele	1	1
Micromelia	1	1
Proboscis-Like Nose	1	1
Spina Bifida	1	1
VISCERAL		
Situs Inversus	14	14
Hydrocephaly	9	9
Lung(s)- Lobular Dysgenesis	7	6
Retrosophageal Aortic Arch	5	5
Kidney(s) and/or Ureter(s) Absent	4	4
Interrupted Aortic Arch	2	2
Thyroid Gland(s)- Absent	2	2
Transposition of the Great Vessels	2	2
Aorta- Narrowed	1	1
Epididymis- Absent	1	1
Heart and/or Great Vessel Anomaly	1	1
Kidney(s)- Absent	1	1
Lung(s)- Lobular Agenesis	1	1
Testis- Absent	1	1
Vessel(s)- Malpositioned	1	1
SKELETAL		
14th Full Rib(s)	45	39

Summary Incidence Malformations and Variations

(Total Number Fetuses/Litters Affected)

Ranked Uppermost to Nethermost

NO. OF DATASETS	165	
Total No. of Fetuses/Litters Examined Externally	59744	3942
Total No. of Fetuses/Litters Examined Viscerally	59550	3942
Total No. of Fetuses/Litters Examined Skeletally	59537	3941

MALFORMATIONS	Number	
	Fetuses	Litters
SKELETAL		
Vertebral Anomaly with or without Associated Rib Anomaly	23	20
Rib Anomaly	11	11
Vertebral Agenesis	10	10
Sternoschisis	10	9
Rib(s)- Only 12 Pairs Present	7	7
Vertebral Centra Anomaly	7	7
Costal Cartilage Anomaly	6	6
Sternebra(e)- Malaligned (Severe)	5	5
Bent Limb Bone(s)	5	3
Bent Scapula	5	3
Sternebra(e)- Fused	2	2
Limb Bone(s)- Small	1	1
Rib(s)- Only 11 Pairs Present	1	1
Scapula- Misshapen	1	1
Skull Anomaly	1	1

Summary Incidence Malformations and Variations

(Total Number Fetuses/Litters Affected)

Ranked Uppermost to Nethermost

NO. OF DATASETS	165	
Total No. of Fetuses/Litters Examined Externally	59744	3942
Total No. of Fetuses/Litters Examined Viscerally	59550	3942
Total No. of Fetuses/Litters Examined Skeletally	59537	3941

VARIATIONS	Number	
	Fetuses	Litters
EXTERNAL		
Twining	1	1
VISCERAL		
Renal Papilla(e) not Developed and/or Distended Ureter(s)	156	97
Major Blood Vessel Variation	47	45
Liver- Accessory Lobule(s)	16	10
Hemorrhagic Ring Around the Iris	12	12
Spleen- Pale	9	9
Spleen- Accessory	8	5
Spleen- Small	6	6
Adrenal Gland(s)- Enlarged	5	1
Liver- Pale	4	4
Hemorrhagic Iris	2	2
Kidney(s)- Small	2	2
Testis- Small	2	2
Retrocaval Ureter(s)	2	1
Adrenal Gland(s)- Accessory	1	1
Adrenal Gland(s)- Pale	1	1
Diaphragm- Thin	1	1
Heart- Small	1	1
Liver- Swollen	1	1
SKELETAL		
Cervical Centrum #1 Ossified	11969	3004
14th Rudimentary Rib(s)	4154	1710

Summary Incidence Malformations and Variations

(Total Number Fetuses/Litters Affected)

Ranked Uppermost to Nethermost

NO. OF DATASETS	165	
Total No. of Fetuses/Litters Examined Externally	59744	3942
Total No. of Fetuses/Litters Examined Viscerally	59550	3942
Total No. of Fetuses/Litters Examined Skeletally	59537	3941

VARIATIONS	Number	
	Fetuses	Litters
SKELETAL		
Sternebra(e) #5 and/or #6 Unossified	3908	1415
Hyoid Unossified	767	492
7th Cervical Rib(s)	492	372
Reduced Ossification of the 13th Rib(s)	366	249
Sternebra(e)- Malaligned (Slight or Moderate)	229	204
Sternebra(e) #1, #2, #3 and/or #4 Unossified	114	106
Bent Rib(s)	99	77
27 Presacral Vertebrae	89	71
Reduced Ossification of the Vertebral Arches	67	62
25 Presacral Vertebrae	62	37
Reduced Ossification of the Skull	52	45
Pubis Unossified	42	36
7th Sternebra	24	10
Reduced Ossification of the Rib(s)	20	17
Entire Sternum Unossified	9	9
Skull Bone(s)- Accessory	8	8
Unco-Ossified Vertebral Centra	6	6
Vertebral Centra Unossified	5	5
Ischium Unossified	4	3
Extra Site of Ossification Anterior to Sternebra #1	3	3
Sternebrae with Thread-Like Attachment	3	2
Reduced Ossification of the Limb Bone(s)	2	2
Extra Site of Ossification Anterior to Cervical Centrum #2	1	1

FINAL REPORT



Contents: Volume 2 of 2
Appendix G

Study Title: A Dermal Prenatal Developmental Toxicity Study of
Ultra-Low Sulfur Diesel Fuel in Rats

Laboratory Project ID: WIL-402014

Author: Jeffrey H. Charlap, MS

Test Guidelines: OPPTS 870.3700
OECD Guideline 414

Study Completion Date: 11 July 2012

Performing Laboratory: WIL Research Laboratories, LLC
1407 George Road
Ashland, OH 44805-8946

Sponsor: American Petroleum Institute
1220 L Street, NW
Washington, DC 20005

Total Number of Pages: 375

APPENDIX G

Individual Animal Data

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 3

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	2			
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
NO SIGNIFICANT CLINICAL OBSERVATIONS	27463	3	P										P			P			P					
	27505	3	P																					
	27474	3	P				P	P					P	P				P					P	
	27486	3	P																					
	27543	3	P					P	P			P	P	P	P	P	P						P	
	27478	3	P																					
	27425	3	P																					
	27548	3	P				P	P	P					P	P									
	27466	3	P				P	P			P								P			P	P	
	27538	3	P	P	P						P	P		P		P	P	P			P	P	P	
	27525	3	P				P						P	P	P	P	P				P	P	P	
	27465	3	P																					
	27430	3	P										P											
	27470	3	P																					
	27524	3	P				P																	
	27420	3	P	P	P																			
	27509	3	P								P	P												
	27469	3	P	P																				
	27572	3	P										P											
	27502	3	P																					
	27495	3	P																					
	27452	4	P	P																				
	27443	4	P							P	P				P		P							
	27447	4	P							P														
	27506	4	P	P																				
	27448	4	P	P				P	P				P		P				P	P				P
	27427	4	P	P																				

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 6

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
SCHEDULED EUTHANASIA; GESTATION DAY 20	27497	1																						P
	27451	1																						P
	27523	1																						P
	27493	1																						P
	27468	1																						P
	27437	1																						P
	27561	1																						P
	27564	1																						P
	27544	1																						P
	27510	1																						P
	27528	1																						P
	27500	1																						P
	27558	1																						P
	27459	1																						P
	27552	1																						P
	27508	1																						P
	27516	2																						P
	27473	2																						P
	27498	2																						P
	27515	2																						P
	27504	2																						P
	27477	2																						P
	27419	2																						P
	27429	2																						P
	27531	2																						P
	27482	2																						P
	27475	2																						P

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 7

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
SCHEDULED EUTHANASIA; GESTATION DAY 20	27450	2																						P
	27519	2																						P
	27432	2																						P
	27547	2																						P
	27560	2																						P
	27536	2																						P
	27431	2																						P
	27458	2																						P
	27521	2																						P
	27479	2																						P
	27563	2																						P
	27422	2																						P
	27467	2																						P
	27527	2																						P
	27494	3																						P
	27517	3																						P
	27454	3																						P
	27460	3																						P
	27463	3																						P
	27505	3																						P
	27474	3																						P
	27486	3																						P
	27543	3																						P
	27478	3																						P
	27425	3																						P
	27548	3																						P
	27466	3																						P

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 8

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
SCHEDULED EUTHANASIA; GESTATION DAY 20	27538	3																						P
	27525	3																						P
	27465	3																						P
	27430	3																						P
	27470	3																						P
	27524	3																						P
	27420	3																						P
	27509	3																						P
	27469	3																						P
	27572	3																						P
	27502	3																						P
	27495	3																						P
	27452	4																						P
	27443	4																						P
	27447	4																						P
	27506	4																						P
	27448	4																						P
	27427	4																						P
	27530	4																						P
	27532	4																						P
	27503	4																						P
	27444	4																						P
	27499	4																						P
	27545	4																						P
	27522	4																						P
	27489	4																						P
	27550	4																						P

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
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TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 9

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																	
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7
SCHEDULED EUTHANASIA; GESTATION DAY 20	27446	4																		P
	27501	4																		P
	27441	4																		P
	27487	4																		P
	27491	4																		P
	27541	4																		P
	27570	4																		P
	27449	4																		P
	27553	4																		P
	27426	4																		P
	27514	5																		P
	27439	5																		P
	27488	5																		P
	27511	5																		P
	27496	5																		P
	27440	5																		P
	27423	5																		P
	27535	5																		P
	27485	5																		P
	27539	5																		P
	27476	5																		P
	27461	5																		P
	27457	5																		P
	27518	5																		P
	27484	5																		P
	27551	5																		P
	27568	5																		P

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 10

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
SCHEDULED EUTHANASIA; GESTATION DAY 20	27472	5																						P
	27534	5																						P
	27442	5																						P
	27455	5																						P
	27557	5																						P
	27483	5																						P
	27480	5																						P
	27438	5																						P
WET YELLOW MATERIAL UROGENITAL AREA	27451	1						1																
	27493	1	1		1	1	3	2	2		2													
	27544	1				1	1		1															
	27558	1			1	3																		
	27498	2									1	3											1	
	27477	2																					1	
	27419	2																				1		
	27429	2	1					1														1		
	27531	2																	1	1				
	27482	2			1																			
	27450	2																		1				
	27432	2																		1				
	27547	2																		2				
	27560	2																		1	1			
	27431	2																		1				
	27458	2																		1				
	27521	2																		1	1			
	27479	2																		1				

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
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TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 11

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY											1	1	1	1	1	1	1	1	2	
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
WET YELLOW MATERIAL UROGENITAL AREA	27563	2																					
	27422	2																		1			
	27467	2																		1	1		
	27527	2																		1	1		
	27463	3																					
	27505	3					1			1		1										1	
	27486	3							1			1									1		
	27543	3			1	1																	
	27425	3								1	2	1					1						
	27548	3																				1	
	27525	3		1																	1		
	27430	3						2															
	27524	3																		1			
	27572	3				2																	
	27443	4										1	1										
	27506	4								1	1	1	1	2				2					1
	27448	4									1												
	27427	4			1	1																	
	27545	4							1														
	27522	4		1																			
	27446	4					1	1															
	27501	4					2	3															
	27491	4							1														
	27541	4				3	2	2	3	3													
	27553	4				2	1	1	1	1													
	27514	5							1	1													
	27511	5				1		1	1	1	1	1											

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 12

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
WET YELLOW MATERIAL UROGENITAL AREA	27535	5						3	2	2														
	27518	5						1	1															
	27551	5		1																				
	27472	5					2																	
	27557	5					1		1															
WET RED MATERIAL UROGENITAL AREA	27425	3																		1				
	27522	4					1																	
DRIED RED MATERIAL UROGENITAL AREA	27507	1						1																
	27435	1						1																
	27546	1																					1	
	27475	2																					1	
	27458	2																						
	27505	3																						
	27486	3		1		1																		
	27425	3																						
	27443	4																						
	27506	4																						
	27444	4																						
	27545	4																						
	27550	4																						
	27511	5																						
	27496	5																						
	27423	5																						
	27535	5																						
	27461	5																						

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY														1	1	1	1	1	1	1	1	2
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0		
DRIED RED MATERIAL UROGENITAL AREA	27518	5																			1	1			
	27472	5													1										
	27557	5																	1	1					
WET YELLOW MATERIAL VENTRAL ABDOMINAL AREA	27558	1			2	3																			
	27516	2							3																
	27498	2							3				2												
	27505	3							2																
	27543	3		1																					
	27525	3		1																					
	27522	4		1																					
DRIED YELLOW MATERIAL VENTRAL ABDOMINAL AREA	27515	2							3																
	27504	2							3																
	27506	4																	1						
HAIR LOSS RIGHT FORELIMB	27471	1																		1					
	27493	1																			1				
	27459	1																1							
	27508	1													1										
	27473	2																			1				
	27477	2																			1				
	27531	2																			1				
	27482	2																			1				
	27475	2																			1				
	27450	2												1				1			1				
	27519	2															1		1						

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	2		
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
HAIR LOSS RIGHT FORELIMB	27432	2																					1
	27536	2																					1
	27458	2																					
	27521	2																					
	27422	2																					
	27467	2																					
	27494	3																					
	27517	3																					
	27460	3																					
	27463	3																					
	27486	3																					
	27543	3																					
	27478	3																					
	27425	3																					
	27548	3																					
	27538	3																					
	27525	3																					
	27430	3																					
	27470	3																					
	27524	3																					
	27420	3																					
	27495	3																					
	27452	4																					
	27447	4																					
	27506	4																					
	27427	4																					
	27530	4																					

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 15

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
HAIR LOSS RIGHT FORELIMB	27532	4																					1	
	27503	4																				1	1	
	27444	4																				1		
	27489	4																						
	27501	4																				1		
	27441	4																						
	27487	4																						
	27491	4																						
	27541	4																						
	27570	4																						
	27449	4																						
	27553	4																						
	27514	5																						
	27439	5																						
	27440	5																						
	27423	5																						
	27476	5																						
	27461	5																						
	27457	5																						
	27518	5																						
	27551	5																						
	27568	5																						
	27534	5																						
	27442	5																						
	27455	5																						
	27483	5																						
	27480	5																						

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
HAIR LOSS LEFT FORELIMB	27471	1													1						1			
	27528	1														1								
	27504	2																			1			
	27477	2																				1		
	27531	2																			1			
	27482	2																			1			
	27475	2																			1			
	27450	2																1		1				
	27519	2																	1					
	27458	2														1								
	27521	2														1	1							
	27467	2															1							
	27517	3																	1					
	27463	3																			1	1		
	27505	3																				1		
	27486	3																		1	1			
	27543	3																			1			
	27425	3																			1			
	27548	3																			1			
	27538	3																	1	1				
	27525	3																	1	1	1			
	27470	3																	1		1			
	27524	3																	1	1	1			
	27420	3																	1	1	1			
	27495	3																	1	1	1			
	27452	4																				1		
	27443	4																				1		

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																						
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0		
HAIR LOSS LEFT FORELIMB	27447	4																				1	2	2	
	27427	4																						1	
	27530	4																				1	1	1	
	27503	4																				1	1		
	27444	4																					1		
	27501	4																				1			
	27441	4																							
	27487	4																							
	27491	4																							
	27541	4																							
	27449	4																							
	27553	4																							
	27439	5																							
	27440	5																							
	27423	5																							
	27476	5																							
	27461	5																							
	27457	5																							
	27518	5																							
	27551	5																							
	27568	5																							
	27534	5																							
	27442	5																							
	27483	5																							
	27480	5																							
	DRIED BROWN MATERIAL VENTRAL ABDOMINAL AREA	27558	1																						

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1- 0 MG/KG/DAY SHAM	2- 0 MG/KG/DAY VEH.	3- 100 MG/KG/DAY	4- 300 MG/KG/DAY	5- 600 MG/KG/DAY
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PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL GROUP	GESTATIONAL DAY																		
		0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8
DRIED BROWN MATERIAL VENTRAL ABDOMINAL AREA	27572	3						1	1	1										
	27501	4						2	1											
	27535	5								1										
HAIR LOSS VENTRAL ABDOMINAL AREA	27558	1						2	2	2	2	3	3	3	2	2		3	3	
DRIED YELLOW MATERIAL UROGENITAL AREA	27493	1										2								
	27506	4																1		1
HAIR LOSS UROGENITAL AREA	27493	1											1							
	27516	2																1		
	27486	3																1		
	27441	4																1		
WET CLEAR MATERIAL UROGENITAL AREA	27498	2																	1	
	27531	2																1		
HAIR LOSS DORSAL HEAD	27523	1																		2
	27558	1																	2	
	27531	2																1		
	27522	4																1		
	27449	4																1		
	27557	5																1		
UNKEMPT APPEARANCE	27498	2																		P
	27419	2																	P	
	27475	2																	P	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
UNKEMPT APPEARANCE	27560	2																						
	27479	2																						
	27422	2																						
	27527	2																						
	27505	3																						
	27425	3																						
	27443	4																						
	27506	4																						
27442	5																							
DRIED RED MATERIAL AROUND RIGHT EYE	27507	1			1	2		1	1	1	1	1	1	1	1	2	1	1	2	1	1			
	27435	1			1	1		1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1
	27512	1			1																1			
	27428	1			1	2	2	1	2	2	2	2	3	2	3		2	2	3	2	1		1	1
	27424	1			1				1	1	1													
	27546	1			1	1			1		1				1	1	1	1	1	1	1	1		
	27481	1									1													
	27497	1																		1	1	1		
	27451	1								1	1	1				1	1	1	1	1				
	27523	1			2	3	2	2	1	3	3	3	3	3	3	3	3	3	3	1	3	3	3	1
	27493	1			2	2	1	2	1	2	2	2	1	1			1				1			
	27437	1								1									1					
	27561	1																	1		1			
	27564	1																		1				
	27510	1							1	1		1	1	1	1	1	1	1	1	1	1	1	1	
	27528	1				1	1	1	1	1	1	1					1		1					
	27500	1					1		1															

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PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	2		
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRIED RED MATERIAL AROUND RIGHT EYE	27558	1		1	1	1	1					1	1	1	1	1	1	1		1			
	27459	1										1		1			1	1	1	1	1	1	
	27508	1												1									
	27516	2		1	1				1	1	1				1	1	1	2		1	1		
	27498	2													1	1	1	1	1	1			
	27515	2	1	2	1	1	1	1	1	1	1	1	1			1	1	1					
	27504	2	1	1	1	1	1	1	1	1	1					1	1	1		1	1	1	
	27477	2	1																				
	27429	2					1	1															
	27531	2									1				1		1	1				1	
	27482	2	2	2	1	1	1	1	1				1	1		1	1						
	27475	2		1			1												1	1	1	1	
	27450	2		1				1		1										1			
	27519	2														1				1			
	27432	2																		1			
	27547	2									1				1		1		1			1	1
	27560	2	1			1	1	1	1	1	1	1	1	1	1	2		1		1	1		
	27536	2	1																	1	1		
	27431	2														1	1		1				
	27458	2				1	1		1		1	1	1	1	1					1			
	27521	2				1	1	1													1	1	
	27479	2																1					
	27467	2			1	1	1	1	1	1	1					1		1		1	1		
	27527	2			1	1	1	1	1	1	1	1	1	1	2	1	2	2					
	27494	3						1															
	27517	3		1	1			1	1		1								1	1	1		
	27460	3										1	1					1		1		1	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
DRIED RED MATERIAL AROUND RIGHT EYE	27463	3	1	1	2	1		1	1	1	2		1	1										
	27505	3	1	2	2	1	1	2	2	2	2	2	2	2	3	2	2	2	1	2	1	1		
	27486	3													1	1	1	1	1	1	1	1		
	27478	3	1	2	1	1	1	1	2	2	1	1	1	1		1	1	1	1	1				
	27425	3	1	1				1	1								1	1	1	1	1			
	27466	3	1	1							1													
	27538	3				1	1	1	1															
	27465	3	1	1			1	1	1	1			1	1	1	1		1				1		
	27430	3	1													1				1	1	1		
	27470	3	2	1	1	1	1	1	1	1	1	1	1	1				1		1	1	1		
	27524	3							1								1						1	
	27420	3										1	1	1	1	1						1		
	27509	3										1	1	1	1	1	1	1	1					
	27469	3			1	1	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
	27572	3			1	1	1	1						1						1		1		
	27502	3		1	1	1	1	1	1	2	1					1	1		1	1	1	1		
	27495	3		1	1	1	1	1	1	1														
	27452	4	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	27443	4																	1	1	1	1	1	
	27447	4	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	27506	4	1	1				1	1	1			1	1	1	1	1	1	1				1	
	27530	4		1			2	2	2	2	2	2	1	1										
	27532	4		1		1	1	1	1	1	1													
	27503	4		1												1								
	27444	4																1						
	27499	4		1	1			1	1	1														
	27545	4																				1	1	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	1	2
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
DRIED RED MATERIAL AROUND RIGHT EYE	27522	4	1	1	1	1	1	1														
	27489	4	1	1										1			1					1
	27550	4	2		1	1	1	1	1	1	1						1					1
	27446	4	1		1		1	1	1		1											
	27501	4	1	1	1	1	1	1	1	1	1						1					
	27441	4	2	1	1	1	1	1				1	1	1	1	1	1	1				1
	27487	4			1	1	1	1	1	1		1					1					
	27491	4			1	1	1	1	1	1	1	1	1	1			1	1	1	1		
	27541	4			1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
	27449	4				1	1						1	1	1	1	2	1	1	1	1	1
	27553	4											1				1	1				
	27426	4															1					
	27514	5														1	1	1	1			1
	27439	5								1	1				1	1					1	1
	27488	5																		1		
	27511	5														1	1	1	1	1	1	1
	27496	5			1	1	1		1	1	1	1					1	1	1			
	27423	5		1	2	1	1	1	1	2	1	1	1	1	1	1						
	27535	5			1		1												1			
	27485	5							1								1	1		1	1	1
	27539	5			1		1	1														
	27476	5						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	27461	5		1		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	27457	5										1	1						1	1		
	27518	5		2	1	1	2	2	2	2	1	1	1	2	1	1	2	2	1	1		1
	27484	5					1	1	1			1	1	1	1		1					
	27551	5									1	1	1	1								

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																				
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRIED RED MATERIAL AROUND RIGHT EYE	27568	5			1				1	1	1	1	1		1	1	1	1	1	1	1	1	2
	27472	5		1			1					1			1					1	1	1	
	27534	5									1	1	1			1							
	27442	5			1	1	1	1	1	1	1	1	1							1			
	27455	5		1		1	1	1	1	1	1	1	1	1	1		1				1		
	27557	5			1	1	1					1	1			1			1	1	1		
	27483	5		1	1		1	1	1	1	1	1	1	1	1		1						
	27480	5																1					
	27438	5			1	2	2	2	2	2		1	1	1		1		1					
DRIED RED MATERIAL AROUND LEFT EYE	27507	1			1	2		1	3	3	2	2	3	3	3	3	1	2	2	1	2		
	27435	1			1					1	2	1	1	1	1	1		1	1			1	
	27512	1			1																		
	27428	1		1	2	2	1	2	1	2	2	3	1	2		2	1	2	2	1			1
	27424	1			1	1			1	1	1												
	27490	1													1								
	27546	1		1	1			1								1	1	1	1	1	1		
	27451	1									1					1	1	1	1	1			
	27523	1								1	1	1	1	1			1	1	1	1		1	
	27493	1		2	2	2	2	2	2	2	2	2	2	1				1					
	27561	1															1	1			1	1	
	27528	1			1	1		1	1	1	1	1								1			
	27500	1																		1			
	27558	1			1	1	1	1	1			1	1	1	1	1	2	1	1				
	27459	1																			1	1	
	27552	1																		1			1
	27516	2			1	1				1	1						1	1	1	2		1	2

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 24

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	1	2
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
DRIED RED MATERIAL AROUND LEFT EYE	27498	2								1										1	1	
	27515	2		1	1	1	1	1	1			1				1		1				
	27504	2		1	2	2	1	1	1	2	2	1	1	1	1	1						
	27477	2		1																		1
	27419	2											1									
	27429	2								1												
	27531	2							1			1			1	1						1
	27482	2		1	2	1	1	1	1	1	1			1	1	1	1	1				
	27475	2											1	1		1	1	1		1		1
	27450	2																		1		
	27519	2																			1	
	27432	2																		1	1	
	27547	2								1				1	1	1	1	1	1			1
	27560	2		1			1	1	1	1		1	1	1	1	2		2		1	1	1
	27536	2		1			1															
	27431	2														1						
	27458	2					1	1	1			1	1	1	1					1	1	
	27521	2																1			1	
	27479	2					1	1	1						1	1					1	
	27422	2					1	1										1				
	27467	2													1	1		1				
	27527	2				1	1	1	1	1	1	1	1	2	1	2	2					
	27517	3				1			1	1		1	1	1	1			1	1	1	1	1
	27460	3			1	1			1	1	1	1	1			1		1		1		1
	27463	3		1	1	2	1			1	1											
	27505	3		1	2	3	1	1	2	2	2	1	2	2	2	3	2	2	2	2	3	3
	27474	3							1	1	1	1										

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 25

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	2		
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRIED RED MATERIAL AROUND LEFT EYE	27486	3														1	1	1	1	1	1	1	1
	27478	3	1	1	1	1	1	2	1	1	1	1	2		1	1	1	1	1	1	1	1	
	27425	3	1	1				1	1									1				1	
	27548	3	1	1				1	1		1			1		1	1						
	27466	3	1	1				1		1	1												
	27538	3				1	1		1														
	27465	3	1	1				1	1	1			1	1	1	1		1			1		
	27430	3	1			1				1			1		1	1					1		
	27470	3	2	1	1	1	1		1	1	1	1	1	1	1	1		1		1	1	1	
	27524	3				1	1	1	1	1	1					1		1					
	27420	3												1	1	1	1			1	1	1	
	27509	3												1	1	1	1	1	1		1		
	27469	3						2	3	3	3	3	3	3	3	3	3		3	2	1	2	2
	27572	3				1	1	1	1														
	27502	3		1	1	1	1	1	1	2	1	2	1	1	1		1	1	1	1	1	1	1
	27452	4		1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
	27443	4										1					1	1	1	1	1	1	1
	27447	4	1	1	2	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	27506	4		1	1						1	1	1	1	1	1	1	1	1				1
	27530	4							1	1	1	1	1	1	1								
	27532	4			1		1	1	1	1	1	1	1										
	27503	4													1		1						
	27444	4			2			1	1	1	1						1	1	1		1		
	27499	4		1																			
	27522	4		1	1	1	1	1	1					1									
27489	4		1	1							1	1	1	1	1			1		1	1		
27550	4		2		1	1	1	1	1	1	1	1	1				1					1	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 26

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																				
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRIED RED MATERIAL AROUND LEFT EYE	27446	4										1			1	1							
	27501	4		1	1	1	1	1	1									1				1	
	27441	4		1	1	1	1	1	1				1	1	1			1	1				
	27487	4				1	1	1	1	1	1							1					
	27491	4					1	1			1	1	1	1	1								
	27541	4			1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1
	27449	4											1	1	1	1	1	1	1		1	1	1
	27553	4																1					
	27514	5																1	1	1			
	27439	5								2	1	2				1	1	1				1	1
	27488	5			1	2	1			1	1												
	27511	5														1	1	1	1	1	1	1	1
	27496	5			1	1	1					1					1	1	1				1
	27440	5			1	2	1	1	1	1	1	2			1	1	2	1	1				1
	27423	5		1	2	1	1	1	1	1	1	1	1	1	1	1	1						
	27535	5			1															1			
	27485	5																			1	1	
	27539	5		1	1	1	1	1		1					1	2							
	27476	5								1	1	1			1	1	1	1	1	1	1	1	1
	27461	5		1	1	1		1	1	1	2	2	2	1	1	1	2	1		1	1	1	1
	27457	5				1						1	1							1			
	27518	5		1	1	1	2	2	2	2	2	1	1	1	2	1	1	2	2	1	1	1	1
	27484	5																		1			
	27551	5																	1				
	27568	5				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	27472	5		1	1				1	1	1	1						1					
	27534	5				1	1					1	2	1	1	1	1	1				1	1

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 27

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																				
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRIED RED MATERIAL AROUND LEFT EYE	27442	5	1	1	1	1	1	2	1	1	1	1											
	27455	5							1	1			1										
	27557	5			1	1	1	1	1	1	1				1			1	1	1		1	
	27483	5	1	1		1	1	1	1	1						1							
	27480	5														1							
	27438	5		1	1	1	1	1	1			1	1	1	1		1		1	1	1		
DRIED RED MATERIAL AROUND NOSE	27507	1		2	2		1	3	3	3	3	2	2	2	3	2	3	2	1	2	1		
	27435	1		1	2	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	
	27512	1		1		1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	
	27428	1			1														1		1		
	27471	1	1	2	1	1	1	1	1	1		1	1		1				1	1	1	1	
	27424	1		1	1	1	1	2	1						1	1	1	1	1	1	1		
	27490	1	1	2	2	1	1	2	2	1	2	1	2	1	1	1	1	2	1	1	1	1	
	27546	1	1	2	1	1	2	2	1	2	2	2	2	2	1	1	1	2	1	1	2	2	
	27481	1	1	1	1	1	1	1	1	1	1		1	1	1	1	2	2	1	1	1	1	
	27497	1	1	2	1	1	3	2	2	2	1	1	1	1	1	1	2	1	1	1	1	1	
	27451	1	1	1				1	1	1					1	1		2	1		1		
	27523	1	2	2	2	2	1	1	1	1	1	1			1	1	1	1		1			
	27493	1	1	2	1	2	2	2	2	2	2	2	1	1	1	1	1	2	1	2	1	1	
	27468	1	1			1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	
	27437	1	1			1		1		1	1	1	1	1	2	2	2	1	1	1	1	1	
	27561	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	27564	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	
	27544	1	2	1	1	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	
	27510	1			1											1	2	1	1	1		1	
	27528	1	1	1	1	1	1	1	1	1	1					1	1						

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 28

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	1	2
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
DRIED RED MATERIAL AROUND NOSE	27500	1	1	1	2	1	1					1	1		1	1	1	1	1	1	1	1
	27558	1		1	1	2	1	2	2	2	2	1	1	1	2	2	1	1		1	1	1
	27459	1		1	1	2	2	1	1	2	1	1		1	1	1	1	1	1	1	1	1
	27552	1			1	1	1	1	1				1	1		1	1	1	1	1	1	1
	27508	1	1	1	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	1
	27516	2		1	1	1		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
	27473	2	1	1	1			1	1	1		1	1	1	1	1	1	1	1	1	1	1
	27498	2		1	2	2	1	1	2	2	2	2	1	1	1	1	1	1	2	1	1	1
	27515	2	1	1	1				1	1	1		1	1	1	1	1	1	1	1	1	1
	27504	2	1	1	2	1	1	1	1	1	1	1	2	1	1	1		1	1		1	
	27477	2	1	1	2	1		1							1				1			
	27419	2	1	2	1	1	2	1		1	1	1	2	2	2	2	2	2	1	1	2	2
	27429	2	2	2	1	1	1	1	1	1	2	2	2	1	1	1		1	1			1
	27531	2	1	2			1	1	1	2	2	2		1	1	1	1	1	1		1	1
	27482	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	27475	2	1	1	1	1	1	2	2	2	2	2	2	1	1	2	2	2	1	1	1	1
	27450	2	1		1			1	1	1		1	1	1	1	1	2	1	1	1	1	1
	27519	2	2	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
	27432	2	2					1		1			1	1	1	1	2	1	1	1	1	1
	27547	2	2	1	1	2	1	1	1	1			1	1	1	1	1	1	1	1	1	1
	27560	2	1	1	1	1	1	2	2	1	1	1	1	1	2	2	2	2	1	1	2	1
	27536	2	1	1	1	1	1	1					1	1	1	1	2	1	1			1
	27431	2			2					1							1	1	1		1	1
	27458	2	1	1	2	2	3	3	3	2	2	1	1	1	1	1					1	
	27521	2			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1
	27479	2			1	1	1	1					1	1	1					1	1	
	27563	2			1	1	1					1	1	1	1	1	1					

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

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PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 29

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																				
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRIED RED MATERIAL AROUND NOSE	27422	2					1	1	1	1	1	2	2	1	2	2	2	1	1	1	1	1	1
	27467	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1			1
	27527	2			2	1	1	1	2	2	2	1	1	1	1	2	2				2	1	1
	27494	3		1	1						1										1	1	
	27517	3		1	1	1	1	1	1		1	1	1	1			1	1	2	1		1	
	27454	3		1	1				1			1			1		1			1	1	1	
	27460	3	1	2	2	1	1	2	2	2	2	2	2	2	1	1	2	2	1	1	1	1	1
	27463	3	1	1	1	1	1				1						1		1	1	1	1	1
	27505	3		2	2	1	1	2	2	1	1	1	2	2	2	1	2	2	2	1	1	1	1
	27474	3	1	1	1			1		1	1			1	1	1			1	1	1	1	1
	27486	3	2	2	1	1	2	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	1
	27543	3	1	2	1	1			1								1	1	1				1
	27478	3	1	1	1	1	1	1	1	1				1	1								
	27425	3	1	2	2	1	2	2	2	2	2	1	2	2	1	2	2	2	1	1	1	2	
	27548	3	1	1							1						1			1		1	2
	27466	3	1	1			1	1		1	1		1	1	1	1		1	1	1			
	27538	3					1	1															
	27525	3	1	1		2	2	1	1	1	1						1					1	
	27465	3	1	1	1	2	2	2	2	1	2	2	2	2	1	1	1		1	1		1	1
	27430	3	1	2	1	2	3	2	1	1		1	1	1	1	1	1				1	1	
	27470	3	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	27524	3	1	1		1	1	1			1	1	1	2	2	2	2	1	1	1	1	1	1
	27420	3		1	1	1	1	1	1	2	1	1	1	1	1	1		1		1	1	1	1
	27509	3	1	1	1	2	3	2			1	2	2	2	2	2	2	1	1	1	1	1	1
	27469	3		1		1	1	1	2	2	2	2	2	2	2	2		1	1	1	1	1	1
	27572	3	1	1	1	1	1	1	1	1		2	1	1	1	1		1	1	1	1	1	1
	27502	3	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1		1	1	1	1	1

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 30

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	1	2	
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRIED RED MATERIAL AROUND NOSE	27495	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	27452	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	27443	4	1	2	2	1	1			1	1	1	1	1	1	1	1	1	2	1	1	1	
	27447	4	1	1			1	1	1	1	1	1	1			1	1	1	1	1	1	1	
	27506	4	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2		2		
	27448	4	1	2			1		1		1		1	1	1	1							
	27427	4	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	1	
	27530	4	1	1	1	1	1	1	1	1	1								1	1	1		
	27532	4	1	2	2	1	1	1	1	1	1	1		1		1		1	1	1	1		
	27503	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	27444	4	1	2	1		1		1	1	1	1	1	2		1	1	1	1				
	27499	4	2	2	2	1	1	1	1	1	1	1		1				1	1	1	1	1	
	27545	4	1	2	1	1	2	2	2	2	2	2	2	2	2	1	2	2	2	1	1	2	1
	27522	4	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	27489	4	2		1	1	1	1		1		1	1	1	1	1	1	1	1	1	1	1	1
	27550	4	2	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1
	27446	4	1	2	2	2	2	1	1	1		1	1	1	1	1	1	1		1			
	27501	4	2	1	2	2	1	1		1	1	1	1			1	2	1	1	1	1	1	1
	27441	4	1		1				1	1	1		1	1		1	1	1	1	1	1	1	1
	27487	4	1	1	1	1	1	1		1					1	1	1	1	1	1	1	1	1
	27491	4		2	2	2	2	2	2	2	2	2	2	2	2		1	1	1	1	1		
	27541	4	1	2	3	2	2	2	2	2	2	2	2	1	1	2	2	1	1	1	1	1	1
	27570	4	1	2	1	1	1	1	1	1		1	1	2	1	1		1	1	1	1		
	27449	4	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
	27553	4	1	1	3	1	1	1	1	1	1	1	1		1	1	2	1	1	1		1	1
27426	4	1	1	1	1	1	1	1	1					1	1	2	1	1	1	1	1	1	
27514	5	1	2	2	2	1	3	3	3	3	3	3	3	3	3	2	2	2		2	1	3	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 31

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
DRIED RED MATERIAL AROUND NOSE	27439	5			2	2	2	2	2	1	1	1	1	1	1	2	2	2			1	1	1	
	27488	5			1	1				1						1	1			1	1			
	27511	5		1	2	2	2	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1		
	27496	5		1	1	1	1		1	1	1	1	1	1	1	1	1	1			1			
	27440	5			1	2				1						1	1					1	1	
	27423	5		1	2	1	1	1	1	1	1	1	1		1					1	1			
	27535	5		1	1	1	1			1	1	1				1	1	1	2		1	1	1	
	27485	5		1	2	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	
	27539	5		1	1	1	1	1												1	1	1	1	
	27476	5		1	2	2	1	2	2	3	2	2	2	2	2	1	2	2	2	1	1	1	1	
	27461	5		1	2	2	1	2	1	2	2	1	2	1	1	1	1			1	1	1	1	
	27457	5		1	1		1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	2	1	
	27518	5		2			1	1	1				1	1	1	2	1	1	1	1	1	1	1	
	27484	5		2	2	1	2	2	2	2	1	1	1	1	1					1	1		1	
	27551	5		2	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1	1	1	
	27568	5		2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	
	27472	5		2	1	1	2	2	2	1	2	2	1	2	1	1	1	1	1	1	1	1	1	
	27534	5					1		1		1		1	1	1	1	1	1	1			1	1	
	27442	5		1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	
	27455	5		1		1	1	1	1	1	1		1	1	1	1		1	1	1	1	1	1	
	27557	5			1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	1	
	27483	5			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	
	27480	5					1	1		1	1	1	1	1	1		1	1	1	1		1	1	
	27438	5		1	1	2	2	2	2	2		1	1	1	1	1		1	1	1	1	1	1	
HAIR LOSS AROUND RIGHT EYE	27507	1																			1	1	3	2
	27435	1																				1		

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 32

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY															
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
HAIR LOSS AROUND RIGHT EYE	27428	1																
	27451	1																
	27523	1																
	27493	1																
	27468	1																
	27437	1																
	27561	1																
	27544	1																
	27510	1																
	27528	1																
	27558	1																
	27459	1																
	27552	1																
	27516	2																
	27473	2																
	27498	2																
	27515	2																
	27504	2																
	27477	2																
	27419	2																
	27429	2																
	27531	2																
	27482	2																
	27475	2																
	27450	2																
	27519	2																
	27432	2																

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 33

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY															
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
HAIR LOSS AROUND RIGHT EYE	27560	2															1	
	27536	2															1	
	27431	2															1	
	27521	2																1
	27479	2																1
	27563	2															1	1
	27422	2																
	27467	2											1	1			2	
	27527	2															1	1
	27494	3															1	
	27517	3															2	
	27454	3															1	
	27460	3															1	
	27463	3															1	1
	27505	3															2	1
	27474	3															1	
	27486	3															1	
	27478	3															1	
	27425	3															1	
	27548	3															1	
	27466	3															1	
	27538	3															1	
	27465	3															1	1
	27470	3															1	1
	27524	3															1	1
	27420	3															1	1
	27509	3															1	1

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

[illegible]

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 35

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
HAIR LOSS AROUND RIGHT EYE	27511	5																			1			
	27496	5																			1			
	27440	5																			1			
	27423	5																		1	1		1	
	27535	5																		1				
	27485	5																		1				
	27539	5																		1				
	27476	5																		1				
	27461	5																		1				
	27518	5													1		2					2	1	1
	27484	5															1							
	27551	5															1						1	
	27568	5															1							
	27534	5															1						1	
	27442	5												1			1	1				1	1	1
	27455	5															1						1	1
	27557	5															1	1					1	
	27483	5															1	1	1	1	1	1	1	1
	27480	5															1						1	
	27438	5															1						1	
HAIR LOSS AROUND LEFT EYE	27507	1																			1	1	3	2
	27435	1																			1			
	27428	1																			1	2	2	1
	27451	1																			1			
	27523	1																			1	1		
	27493	1																			1	1	1	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 36

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
HAIR LOSS AROUND LEFT EYE	27468	1																	1					
	27437	1											1	1					1					
	27561	1																	1					
	27544	1																	1					
	27528	1																	1					
	27558	1																	1					
	27552	1																	1					
	27516	2																		1				
	27473	2																		1				
	27498	2																		1				
	27515	2															1		1	1				
	27504	2																	1					
	27477	2																	1					
	27419	2																	1					
	27429	2																	1		1			
	27531	2																	1					
	27482	2																	1					
	27475	2															1		1	1				
	27450	2																	1					
	27519	2																	1					
	27432	2																	1					
	27560	2																	1					
	27536	2																	1					
	27431	2																	1					
	27521	2																					1	
	27479	2																					1	
	27563	2																1	1				1	1

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 37

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY															
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
HAIR LOSS AROUND LEFT EYE	27422	2												1				
	27467	2												1	2			
	27527	2													2	1	1	
	27494	3														1		
	27517	3											2	1		2		
	27454	3														1		
	27460	3												1		1		
	27463	3												1		1	1	
	27505	3												1	1	2		2
	27474	3													1			
	27486	3													1			1
	27478	3													1			
	27425	3													1			
	27548	3													1			
	27466	3													1			
	27538	3											1			1		
	27465	3													1			1
	27470	3													1			
	27524	3										1		1	1			
	27420	3												1			1	
	27509	3												1			1	
	27469	3												2	3		3	2
	27572	3										1		1	1		1	1
	27502	3												1				
	27495	3												1			1	1
	27452	4														1		
	27443	4														2		

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 38

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY															
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
HAIR LOSS AROUND LEFT EYE	27447	4																1
	27506	4																1 1
	27448	4																1 1 1
	27530	4															2	1
	27503	4															1	
	27444	4																1
	27499	4															1	
	27545	4															1	
	27522	4															1	
	27489	4															1	
	27550	4															1	
	27446	4															1	1
	27501	4															1	
	27441	4															1	
	27487	4																
	27491	4															1	1
	27570	4															1	
	27449	4															2	
	27553	4															1	
	27426	4															1	1
	27439	5															1	
	27488	5															2	
	27511	5															1	
	27496	5															1	
	27440	5															1	
	27423	5															1 1	1
	27535	5															1	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 39

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
HAIR LOSS AROUND LEFT EYE	27485	5																						1
	27539	5																						1
	27476	5																						1
	27461	5																						1
	27518	5												1	2	2	1	2	2	1				
	27484	5																						1
	27551	5																						1
	27568	5																						1
	27534	5													1	1	1						1	
	27442	5											1		1	1	1	1	1	1	1	1	1	
	27455	5													1									1
	27557	5													1	1	1					1		
	27483	5													1	1	1			1	1	1	1	
	27480	5																					1	
	27438	5														1								1
DRIED YELLOW MATERIAL AROUND RIGHT EYE	27490	1																					1	
	27481	1																				1		
	27498	2																					1	
	27515	2																		1			1	
	27504	2																					1	
	27477	2																			1		1	
	27419	2																		1		1		
	27531	2																				1		
	27482	2																		1				
	27450	2																				1		
	27432	2																			1			

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY															
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
DRIED YELLOW MATERIAL AROUND RIGHT EYE	27547	2																1
	27560	2															1	1
	27458	2															1	1
	27521	2															1	1
	27479	2															1	1
	27563	2															1	1
	27460	3																1
	27548	3															1	1
	27465	3															1	1
	27430	3															2	1
	27470	3															1	1
	27420	3															1	1
	27572	3															1	1
	27506	4															1	1
	27427	4															1	1
	27530	4															1	1
	27545	4															1	1
	27489	4															1	1
	27441	4															1	1
	27426	4															1	1
	27514	5															2	2
	27496	5															1	1
	27440	5															1	1
	27423	5															1	1
	27485	5															1	1
	27461	5															1	1
	27484	5															1	1

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY															
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
DRIED YELLOW MATERIAL AROUND RIGHT EYE	27472	5															1	1
	27442	5															1	1
	27455	5															1	1
	27438	5															1	1
DRIED YELLOW MATERIAL AROUND LEFT EYE	27498	2																1
	27504	2																1
	27477	2															1	1
	27531	2																1
	27482	2															1	
	27547	2															1	
	27560	2															1	
	27458	2															1	1
	27521	2															1	1
	27479	2															1	1
	27467	2															1	1
	27460	3															1	1
	27548	3															1	
	27538	3															1	
	27465	3															1	
	27430	3															2	1
	27470	3															1	1
	27420	3															1	1
	27572	3															1	1
	27506	4															1	1
	27427	4															1	1
	27489	4															1	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY										1	1	1	1	1	1	1	1	2		
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRIED YELLOW MATERIAL AROUND LEFT EYE	27446	4																					1
	27501	4																					1
	27441	4																					1
	27514	5																					2
	27496	5																					1
	27440	5																					1
	27423	5																					1
	27485	5																					1
	27461	5																					1
	27484	5																					1
	27472	5																					1
	27442	5																					1
	27455	5																					1
	27438	5																					1
DRIED YELLOW MATERIAL AROUND NOSE	27504	2																					1
	27494	3																					1
	27478	3																					1
	27548	3																					1
	27538	3																					1
	27465	3																					1
	27430	3																					1
	27420	3																					1
	27572	3																					1
	27506	4																					2
	27522	4																					1
	27514	5																					2

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

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OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																							
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0			
DRIED YELLOW MATERIAL AROUND NOSE	27496	5																					1			
	27440	5																				2	1			
	27423	5																				1				
	27485	5																				1				
	27461	5																				1				
	27484	5																								
	27442	5																								
	27455	5																								
	27438	5																								
UPPER INCISORS MALALIGNED	27523	1																								
	27469	3																								
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																										
1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY																										

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 44

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																							
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0			
ANIMAL FOUND WITHOUT COLLAR	27507	1																						P	P	
	27512	1																						P		
	27428	1																						P		
	27481	1																						P		
	27523	1																		P					P	
	27437	1						P		P																
	27544	1													P		P									
	27552	1														P										
	27419	2							P																	
	27482	2																					P			
	27475	2																						P		
	27536	2									P															
	27467	2																		P						
	27527	2																		P	P					
	27517	3								P														P		
	27463	3																						P		
	27548	3																		P						
	27572	3																					P			
	27502	3																		P						
	27495	3																			P					
	27448	4																			P					
	27444	4											P				P								P	
	27522	4																P								
	27446	4																					P			
	27491	4																			P					
	27570	4																			P				P	
	GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																									
1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY																										

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A1 (DAILY EXAMINATIONS)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL CLINICAL OBSERVATIONS

PAGE 45

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY																		
			0	1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1	2
ANIMAL FOUND WITHOUT COLLAR	27449	4																P			
	27439	5																		P	
	27496	5										P									
	27539	5												P			P			P	
	27518	5									P										
	27557	5														P					
	27438	5									P										

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY

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TABLE A2 (AT TIME OF DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 1

- - - F E M A L E S - - -

OBSERVATION: TIME OF DOSE	ANIMAL	GD GP																						
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9		
NORMAL																								
NO SIGNIFICANT CLINICAL OBSERVATIONS	27507	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27435	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27512	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27428	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27471	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27424	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27490	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27546	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27481	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27497	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27451	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27523	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27493	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27468	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27437	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27561	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27564	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27544	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27510	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27528	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27500	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27558	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27459	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27552	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	27508	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
				27516	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
				27473	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
				27498	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
				27515	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
				27504	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1-0 MG/KG/DAY SHAM			2-0 MG/KG/DAY VEH.			3- 100 MG/KG/DAY			4- 300 MG/KG/DAY			5- 600 MG/KG/DAY												
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																								

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A2 (AT TIME OF DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 2

- - - F E M A L E S - - -

OBSERVATION: TIME OF DOSE	ANIMAL	GD GP																	1	1	1	1	1	1	1	1	1							
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9												
NO SIGNIFICANT CLINICAL OBSERVATIONS	27477	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27419	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27429	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27531	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27482	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27475	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27450	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27519	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27432	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27547	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27560	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27536	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27431	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27458	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27521	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27479	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27563	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27422	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27467	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27527	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27494	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27517	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27454	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27460	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27463	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27505	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27474	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27486	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27543	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27478	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27425	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
	27548	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P													
1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY																																		
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																																		

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A2 (AT TIME OF DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 3

- - - F E M A L E S - - -

OBSERVATION: TIME OF DOSE	ANIMAL	GD GP																
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
NO SIGNIFICANT CLINICAL OBSERVATIONS	27466	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27538	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27525	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27465	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27430	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27470	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27524	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27420	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27509	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27469	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27572	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27502	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27495	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27452	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27443	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27447	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27506	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27448	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27427	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27530	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27532	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27503	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27444	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27499	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27545	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27522	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27489	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27550	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27446	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27501	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27441	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27487	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY																		
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																		

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A2 (AT TIME OF DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 4

- - - F E M A L E S - - -

OBSERVATION: TIME OF DOSE	ANIMAL	GD GP																	1	1	1	1	1	1	1	1	1
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9					
NO SIGNIFICANT CLINICAL OBSERVATIONS	27491	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27541	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27570	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27449	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27553	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27426	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27514	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27439	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27488	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27511	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27496	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27440	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27423	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27535	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27485	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27539	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27476	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27461	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27457	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27518	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27484	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27551	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27568	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27472	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27534	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27442	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27455	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27557	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27483	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27480	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
	27438	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P						
1-0 MG/KG/DAY SHAM			2-0 MG/KG/DAY VEH.			3- 100 MG/KG/DAY			4- 300 MG/KG/DAY			5- 600 MG/KG/DAY															
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																											

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A2 (AT TIME OF DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 5

- - - F E M A L E S - - -

OBSERVATION: TIME OF DOSE	ANIMAL	GP	GD																					
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9		

SPECIAL II																								
ANIMAL FOUND WITHOUT COLLAR	27428	1																						

1-0 MG/KG/DAY SHAM	2-0 MG/KG/DAY VEH.	3- 100 MG/KG/DAY	4- 300 MG/KG/DAY	5- 600 MG/KG/DAY																				

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																								

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PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A3 (1-2 HOURS POST-DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 1

- - - F E M A L E S - - -

OBSERVATION: 1-2 HOURS POST-DOSING			ANIMAL	GD GP	0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	
NORMAL																								
NO SIGNIFICANT CLINICAL OBSERVATIONS			27507	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27435	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27512	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27428	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27471	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27424	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27490	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27546	1	P	P	P	P	P	P	P	P	P	P	P					P	P	P	P	
			27481	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27497	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27451	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27523	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27493	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27468	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27437	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27561	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27564	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27544	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27510	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27528	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27500	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27558	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27459	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27552	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27508	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27516	2	P	P	P	P	P	P	P	P	P	P	P	P	P			P	P	P	P	
			27473	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	
			27498	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
			27515	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	
			27504	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	
1-0 MG/KG/DAY SHAM			2-0 MG/KG/DAY VEH.			3- 100 MG/KG/DAY			4- 300 MG/KG/DAY			5- 600 MG/KG/DAY												
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																								

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A3 (1-2 HOURS POST-DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 2

- - - F E M A L E S - - -

OBSERVATION: 1-2 HOURS POST-DOSING	ANIMAL	GD GP																	1	1	1	1	1	1	1	1
			0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9				
NO SIGNIFICANT CLINICAL OBSERVATIONS	27477	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27419	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27429	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27531	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27482	2	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27475	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27450	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27519	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27432	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27547	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27560	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27536	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27431	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27458	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27521	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27479	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27563	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27422	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27467	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27527	2	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27494	3	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27517	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27454	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27460	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27463	3	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27505	3	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27474	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27486	3		P	P	P	P	P	P	P	P	P	P	P			P	P	P	P	P	P				
	27543	3	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
	27478	3	P	P	P	P	P	P	P	P	P	P	P	P	P			P	P	P	P	P				
	27425	3	P	P	P	P	P	P	P	P	P	P	P	P			P	P	P	P	P	P				
	27548	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY																										
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																										

TABLE A3 (1-2 HOURS POST-DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

- - - F E M A L E S - - -

OBSERVATION: 1-2 HOURS POST-DOSING	ANIMAL	GD GP																		
			0	1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1
NO SIGNIFICANT CLINICAL OBSERVATIONS	27466	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27538	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27525	3		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27465	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27430	3	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P
	27470	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27524	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27420	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27509	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27469	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27572	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27502	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27495	3	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27452	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27443	4	P		P	P	P	P	P	P	P	P	P	P		P	P	P	P	P
	27447	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27506	4	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27448	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27427	4	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27530	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27532	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27503	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27444	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27499	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27545	4	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P
	27522	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27489	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27550	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27446	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27501	4		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27441	4		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27487	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1-0 MG/KG/DAY SHAM 2-0 MG/KG/DAY VEH. 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 600 MG/KG/DAY																				
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																				

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A3 (1-2 HOURS POST-DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

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- - - F E M A L E S - - -

OBSERVATION: 1-2 HOURS POST-DOSING	ANIMAL	GD GP																		
			0	1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1
NO SIGNIFICANT CLINICAL OBSERVATIONS	27491	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27541	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27570	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27449	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27553	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27426	4	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27514	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27439	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27488	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27511	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27496	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27440	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27423	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27535	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27485	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27539	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27476	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27461	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27457	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27518	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27484	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27551	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27568	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27472	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27534	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27442	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27455	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27557	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27483	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27480	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	27438	5	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1-0 MG/KG/DAY SHAM			2-0 MG/KG/DAY VEH.			3- 100 MG/KG/DAY			4- 300 MG/KG/DAY			5- 600 MG/KG/DAY								
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																				

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A3 (1-2 HOURS POST-DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 5

- - - F E M A L E S - - -

OBSERVATION: 1-2 HOURS POST-DOSING	ANIMAL	GD GP	0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	
													0	1	2	3	4	5	6	7	8
BODY/INTEGUMENT																					
WET YELLOW MATERIAL UROGENITAL AREA	27482	2		1																	
	27494	3		1																	
	27463	3		1																	
	27505	3		1																	
	27543	3		1																	
	27525	3	1																		
	27443	4		1																	
	27506	4		1																	
	27427	4		1	1																
	27501	4	1																		
	27441	4	1																		
	27511	5		1	1																
	27423	5		1																	
	27568	5	1																		
	WET RED MATERIAL UROGENITAL AREA	27546	1													1					
		27516	2														1				
		27504	2														1				
		27505	3															3			
27486		3	1												1						
27478		3													1						
27443		4														1					
27545		4													1						
27514		5															1				
27511		5															2				
1-0 MG/KG/DAY SHAM			2-0 MG/KG/DAY VEH.			3- 100 MG/KG/DAY			4- 300 MG/KG/DAY			5- 600 MG/KG/DAY									
GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE																					

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A3 (1-2 HOURS POST-DOSING)
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL POST-DOSE OBSERVATIONS

PAGE 6

- - - F E M A L E S - - -

OBSERVATION: 1-2 HOURS POST-DOSING		ANIMAL	GD																					
			GP	0	1	2	3	4	5	6	7	8	9	0	1	1	2	3	4	5	6	7	8	9
WET RED MATERIAL UROGENITAL AREA		27496	5																					
		27539	5																					
		27461	5																					
DRIED RED MATERIAL UROGENITAL AREA		27486	3																					
		27478	3																					
		27430	3																					
		27461	5																					
WET YELLOW MATERIAL VENTRAL ABDOMINAL AREA		27543	3																					
WET CLEAR MATERIAL UROGENITAL AREA		27425	3																					
1-0 MG/KG/DAY SHAM		2-0 MG/KG/DAY VEH.		3- 100 MG/KG/DAY		4- 300 MG/KG/DAY		5- 600 MG/KG/DAY																

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

PC0PDv1.04
01/04/2012

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 1

GROUP : 0 MG/KG/DAY SHAM			ANIMAL NO. / SEX							
	27507/F	27435/F	27512/F	27428/F	27471/F	27424/F	27490/F	27546/F	27481/F	27497/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS									
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
11	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

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SEX CODE: M = MALE F = FEMALE

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PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 2

GROUP : 0 MG/KG/DAY SHAM		ANIMAL NO. / SEX								
	27451/F	27523/F	27493/F	27468/F	27437/F	27561/F	27564/F	27544/F	27510/F	27528/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS									
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
11	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 3

GROUP : 0 MG/KG/DAY SHAM				ANIMAL NO. / SEX	
27500/F		27558/F	27459/F	27552/F	27508/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS				
0	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	0/0/d	SNR
9	SNR	SNR	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR
11	SNR	SNR	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR
14	0/0/d	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 4

GROUP : 0 MG/KG/DAY VEH.										
ANIMAL NO. / SEX										
27516/F	27473/F	27498/F	27515/F	27504/F	27477/F	27419/F	27429/F	27531/F	27482/F	
ERYTHEMA+/EDEMA+/OTHER FINDINGS										
GESTATION DAY										
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR	SNR	0/0/h	SNR	SNR	SNR
11	SNR	SNR	SNR	1/0	SNR	SNR	1/0	SNR	SNR	SNR
12	SNR	SNR	SNR	1/0	SNR	SNR	1/0	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
15	SNR	SNR	SNR	1/0	SNR	SNR	1/0	SNR	SNR	SNR
16	SNR	SNR	SNR	1/0	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 5

GROUP : 0 MG/KG/DAY VEH.										ANIMAL NO. / SEX	
	27475/F	27450/F	27519/F	27432/F	27547/F	27560/F	27536/F	27431/F	27458/F	27521/F	
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS										
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	1/0/h	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR	SNR
11	1/0/h	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR	SNR
12	1/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR	SNR
13	1/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR	SNR
14	1/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
15	1/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
16	0/0/d	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	1/0/d	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	1/0/d	SNR	SNR	SNR	SNR

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 6

GROUP : 0 MG/KG/DAY VEH.			ANIMAL NO. / SEX		
	27479/F	27563/F	27422/F	27467/F	27527/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS				
0	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	1/0	SNR	SNR
7	SNR	SNR	1/0/d	SNR	SNR
8	SNR	SNR	1/0/d	SNR	SNR
9	SNR	SNR	1/0/d	SNR	SNR
10	SNR	SNR	1/0	SNR	SNR
11	SNR	SNR	1/0	SNR	SNR
12	SNR	SNR	1/0	SNR	SNR
13	SNR	SNR	1/0	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 7

GROUP : 100 MG/KG/DAY										
ANIMAL NO. / SEX										
27494/F	27517/F	27454/F	27460/F	27463/F	27505/F	27474/F	27486/F	27543/F	27478/F	
ERYTHEMA+/EDEMA+/OTHER FINDINGS										
GESTATION DAY										
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
11	SNR	SNR	SNR	SNR	SNR	SNR	1/0/d	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 8

GROUP : 100 MG/KG/DAY			ANIMAL NO. / SEX							
	27425/F	27548/F	27466/F	27538/F	27525/F	27465/F	27430/F	27470/F	27524/F	27420/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS									
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
11	1/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 9

GROUP : 100 MG/KG/DAY						ANIMAL NO. / SEX					
27509/F						27469/F					
27509/F						27572/F					
27509/F						27502/F					
27509/F						27495/F					
GESTATION DAY						ERYTHEMA+/EDEMA+/OTHER FINDINGS					
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	0/0/d	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	0/0/d	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	0/0/d	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
11	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

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GROUP : 300 MG/KG/DAY										
ANIMAL NO. / SEX										
	27452/F	27443/F	27447/F	27506/F	27448/F	27427/F	27530/F	27532/F	27503/F	27444/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS									
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	2/0/d	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR	SNR	1/0/d	SNR	SNR	SNR
11	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	1/0	SNR	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	1/0	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

+ = REFER TO DRAIZE SCALE FOR DERMAL SCORING CRITERIA

SEX CODE: M = MALE F = FEMALE

d = DESQUAMATION, SNR = SCORED, NOT REMARKABLE

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 11

GROUP : 300 MG/KG/DAY										
ANIMAL NO. / SEX										
	27499/F	27545/F	27522/F	27489/F	27550/F	27446/F	27501/F	27441/F	27487/F	27491/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS									
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	0/0/d	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
10	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
11	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	1/0	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

+ = REFER TO DRAIZE SCALE FOR DERMAL SCORING CRITERIA

SEX CODE: M = MALE F = FEMALE

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PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 12

GROUP : 300 MG/KG/DAY						ANIMAL NO. / SEX					
27541/F						27570/F					
27449/F						27553/F					
27426/F											
GESTATION DAY						ERYTHEMA+/EDEMA+/OTHER FINDINGS					
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	1/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
11	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
12	1/0	1/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
13	0/0	0/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

+ = REFER TO DRAIZE SCALE FOR DERMAL SCORING CRITERIA

SEX CODE: M = MALE F = FEMALE

d = DESQUAMATION, SNR = SCORED, NOT REMARKABLE

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 13

GROUP : 600 MG/KG/DAY										
ANIMAL NO. / SEX										
	27514/F	27439/F	27488/F	27511/F	27496/F	27440/F	27423/F	27535/F	27485/F	27539/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS									
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
8	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
9	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
10	SNR	1/0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
11	SNR	0/0/d	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
13	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
14	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	1/0/d	SNR
15	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	1/0/d	SNR
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

+ = REFER TO DRAIZE SCALE FOR DERMAL SCORING CRITERIA

SEX CODE: M = MALE F = FEMALE

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PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 14

GROUP : 600 MG/KG/DAY		ANIMAL NO. / SEX								
	27476/F	27461/F	27457/F	27518/F	27484/F	27551/F	27568/F	27472/F	27534/F	27442/F
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS									
0	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR
5	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR
6	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	SNR
7	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	1/0/d	2/0/d
8	SNR	SNR	SNR	SNR	SNR	SNR	2/0/d	SNR	0/0/d	1/0/d
9	SNR	1/0	1/0/d	SNR	SNR	SNR	1/0	SNR	0/0/hd	0/0/d
10	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
11	SNR	0/0/d	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
12	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	1/0	1/0
13	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	1/0	1/0/d
14	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d	1/1/d
15	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	0/0/d
16	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR	SNR

+ = REFER TO DRAIZE SCALE FOR DERMAL SCORING CRITERIA
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h = PINPOINT SCABBING

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TABLE A4
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL DERMAL OBSERVATIONS

PAGE 15

GROUP : 600 MG/KG/DAY					
ANIMAL NO. / SEX					
27455/F	27557/F	27483/F	27480/F	27438/F	
GESTATION DAY	ERYTHEMA+/EDEMA+/OTHER FINDINGS				
0	SNR	SNR	SNR	SNR	SNR
1	SNR	SNR	SNR	SNR	SNR
2	SNR	SNR	SNR	SNR	SNR
3	SNR	SNR	SNR	SNR	SNR
4	SNR	SNR	SNR	SNR	SNR
5	SNR	SNR	SNR	SNR	SNR
6	SNR	SNR	SNR	SNR	SNR
7	SNR	SNR	SNR	2/0	1/0
8	SNR	SNR	SNR	1/0	SNR
9	SNR	SNR	SNR	1/0/d	SNR
10	SNR	SNR	SNR	1/0	SNR
11	SNR	SNR	SNR	1/0/d	SNR
12	SNR	SNR	SNR	1/0/d	1/0
13	SNR	SNR	SNR	1/0/d	1/0
14	SNR	SNR	SNR	SNR	SNR
15	SNR	SNR	SNR	SNR	SNR
16	SNR	SNR	SNR	SNR	SNR
17	SNR	SNR	SNR	SNR	SNR
18	SNR	SNR	SNR	SNR	SNR
19	SNR	SNR	SNR	SNR	SNR
20	SNR	SNR	SNR	SNR	SNR

+ = REFER TO DRAIZE SCALE FOR DERMAL SCORING CRITERIA
SEX CODE: M = MALE F = FEMALE
d = DESQUAMATION, SNR = SCORED, NOT REMARKABLE

PIDERRv4.02
11/15/2011

TABLE A5
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

PREGNANCY STATUS		DAY 0	3	6	9	12	15	18	20			
DAMS FROM GROUP 1: 0 MG/KG/DAY SHAM												
27424	NG	274.	286.	295.	305.	299.	296.	318.	305.	SCHEDULED	NECROPSY	DAY 20
27428	G	255.	253.	265.	272.	299.	303.	344.	377.	SCHEDULED	NECROPSY	DAY 20
27435	G	244.	238.	251.	256.	281.	299.	347.	370.	SCHEDULED	NECROPSY	DAY 20
27437	G	259.	268.	284.	297.	318.	339.	378.	415.	SCHEDULED	NECROPSY	DAY 20
27451	G	254.	259.	262.	287.	305.	321.	348.	381.	SCHEDULED	NECROPSY	DAY 20
27459	G	256.	256.	267.	274.	297.	322.	364.	401.	SCHEDULED	NECROPSY	DAY 20
27468	G	246.	251.	264.	276.	296.	312.	337.	372.	SCHEDULED	NECROPSY	DAY 20
27471	G	264.	250.	263.	287.	301.	318.	367.	392.	SCHEDULED	NECROPSY	DAY 20
27481	G	263.	274.	283.	295.	318.	333.	363.	405.	SCHEDULED	NECROPSY	DAY 20
27490	G	283.	280.	296.	318.	333.	350.	404.	430.	SCHEDULED	NECROPSY	DAY 20
27493	G	244.	224.	252.	274.	298.	322.	355.	390.	SCHEDULED	NECROPSY	DAY 20
27497	G	259.	261.	277.	298.	316.	334.	367.	399.	SCHEDULED	NECROPSY	DAY 20
27500	G	268.	277.	297.	311.	331.	351.	400.	443.	SCHEDULED	NECROPSY	DAY 20
27507	G	227.	214.	223.	238.	252.	269.	313.	352.	SCHEDULED	NECROPSY	DAY 20
27508	G	250.	262.	276.	285.	300.	309.	343.	387.	SCHEDULED	NECROPSY	DAY 20
27510	G	276.	285.	305.	319.	338.	369.	407.	454.	SCHEDULED	NECROPSY	DAY 20
27512	G	250.	257.	269.	281.	296.	311.	354.	390.	SCHEDULED	NECROPSY	DAY 20
27523	NG	247.	222.	238.	265.	270.	276.	273.	285.	SCHEDULED	NECROPSY	DAY 20
27528	G	270.	264.	281.	296.	319.	342.	380.	415.	SCHEDULED	NECROPSY	DAY 20
27544	G	283.	273.	291.	300.	319.	344.	367.	405.	SCHEDULED	NECROPSY	DAY 20
27546	G	269.	271.	268.	285.	308.	323.	358.	394.	SCHEDULED	NECROPSY	DAY 20
27552	G	253.	252.	270.	273.	290.	304.	348.	383.	SCHEDULED	NECROPSY	DAY 20
27558	NG	266.	243.	258.	266.	267.	276.	276.	290.	SCHEDULED	NECROPSY	DAY 20
27561	G	263.	258.	275.	290.	311.	329.	378.	424.	SCHEDULED	NECROPSY	DAY 20
27564	G	270.	269.	286.	298.	320.	342.	375.	412.	SCHEDULED	NECROPSY	DAY 20
MEAN		259.	259.	273.	287.	307.	325.	364.	400.			
S.D.		13.5	17.1	18.0	18.9	19.0	21.8	22.6	24.4			
S.E.		2.9	3.7	3.8	4.0	4.0	4.6	4.8	5.2			
N		22	22	22	22	22	22	22	22			

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A5
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

PREGNANCY STATUS		DAY 0	3	6	9	12	15	18	20			
DAMS FROM GROUP 2: 0 MG/KG/DAY VEH.												
27419	G	284.	267.	286.	297.	314.	335.	370.	415.	SCHEDULED	NECROPSY	DAY 20
27422	G	259.	271.	270.	286.	292.	310.	349.	382.	SCHEDULED	NECROPSY	DAY 20
27429	G	265.	251.	260.	268.	287.	311.	340.	370.	SCHEDULED	NECROPSY	DAY 20
27431	G	277.	279.	291.	301.	314.	342.	386.	424.	SCHEDULED	NECROPSY	DAY 20
27432	NG	254.	249.	265.	252.	257.	274.	270.	268.	SCHEDULED	NECROPSY	DAY 20
27450	G	245.	247.	273.	291.	309.	333.	330.	381.	SCHEDULED	NECROPSY	DAY 20
27458	G	277.	283.	277.	293.	298.	326.	352.	390.	SCHEDULED	NECROPSY	DAY 20
27467	G	251.	254.	266.	279.	297.	313.	342.	382.	SCHEDULED	NECROPSY	DAY 20
27473	G	246.	243.	266.	272.	287.	300.	336.	366.	SCHEDULED	NECROPSY	DAY 20
27475	G	255.	256.	266.	279.	283.	303.	334.	381.	SCHEDULED	NECROPSY	DAY 20
27477	G	265.	270.	285.	289.	304.	321.	352.	373.	SCHEDULED	NECROPSY	DAY 20
27479	G	268.	257.	259.	271.	290.	304.	341.	378.	SCHEDULED	NECROPSY	DAY 20
27482	G	260.	240.	259.	269.	288.	310.	341.	385.	SCHEDULED	NECROPSY	DAY 20
27498	NG	250.	248.	263.	265.	264.	261.	257.	255.	SCHEDULED	NECROPSY	DAY 20
27504	G	262.	258.	275.	290.	303.	319.	353.	389.	SCHEDULED	NECROPSY	DAY 20
27515	G	255.	252.	262.	282.	300.	316.	358.	388.	SCHEDULED	NECROPSY	DAY 20
27516	G	219.	220.	231.	257.	267.	281.	322.	346.	SCHEDULED	NECROPSY	DAY 20
27519	G	244.	239.	255.	270.	276.	312.	330.	365.	SCHEDULED	NECROPSY	DAY 20
27521	G	269.	278.	291.	308.	328.	349.	381.	414.	SCHEDULED	NECROPSY	DAY 20
27527	G	251.	260.	273.	283.	289.	302.	321.	355.	SCHEDULED	NECROPSY	DAY 20
27531	G	263.	272.	287.	300.	316.	336.	371.	410.	SCHEDULED	NECROPSY	DAY 20
27536	NG	266.	264.	267.	283.	281.	293.	301.	306.	SCHEDULED	NECROPSY	DAY 20
27547	G	255.	255.	269.	289.	301.	324.	358.	400.	SCHEDULED	NECROPSY	DAY 20
27560	NG	264.	268.	278.	289.	286.	281.	282.	280.	SCHEDULED	NECROPSY	DAY 20
27563	G	264.	278.	284.	306.	314.	351.	355.	415.	SCHEDULED	NECROPSY	DAY 20
MEAN		259.	259.	271.	285.	298.	319.	349.	386.			
S.D.		14.0	15.9	14.4	13.7	14.8	17.6	17.9	20.8			
S.E.		3.1	3.5	3.1	3.0	3.2	3.8	3.9	4.5			
N		21	21	21	21	21	21	21	21			

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A5
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

PREGNANCY STATUS		DAY 0	3	6	9	12	15	18	20			
DAMS FROM GROUP 3: 100 MG/KG/DAY												
27420	G	274.	275.	287.	299.	316.	340.	372.	405.	SCHEDULED	NECROPSY	DAY 20
27425	G	253.	257.	267.	277.	296.	304.	311.	351.	SCHEDULED	NECROPSY	DAY 20
27430	G	270.	267.	278.	277.	292.	313.	339.	377.	SCHEDULED	NECROPSY	DAY 20
27454	G	252.	253.	261.	282.	297.	311.	361.	401.	SCHEDULED	NECROPSY	DAY 20
27460	G	255.	263.	280.	297.	311.	317.	352.	376.	SCHEDULED	NECROPSY	DAY 20
27463	G	262.	236.	253.	264.	293.	313.	352.	384.	SCHEDULED	NECROPSY	DAY 20
27465	G	261.	263.	276.	288.	308.	327.	348.	394.	SCHEDULED	NECROPSY	DAY 20
27466	G	240.	238.	248.	264.	281.	297.	330.	369.	SCHEDULED	NECROPSY	DAY 20
27469	G	259.	254.	256.	275.	294.	316.	346.	390.	SCHEDULED	NECROPSY	DAY 20
27470	G	290.	271.	286.	300.	305.	323.	359.	395.	SCHEDULED	NECROPSY	DAY 20
27474	G	280.	283.	298.	315.	340.	351.	368.	425.	SCHEDULED	NECROPSY	DAY 20
27478	G	260.	256.	272.	284.	298.	293.	338.	362.	SCHEDULED	NECROPSY	DAY 20
27486	G	271.	274.	282.	297.	318.	329.	367.	404.	SCHEDULED	NECROPSY	DAY 20
27494	G	232.	237.	261.	281.	296.	310.	342.	383.	SCHEDULED	NECROPSY	DAY 20
27495	G	249.	257.	254.	283.	294.	313.	340.	375.	SCHEDULED	NECROPSY	DAY 20
27502	G	251.	257.	261.	279.	291.	307.	349.	380.	SCHEDULED	NECROPSY	DAY 20
27505	G	270.	244.	258.	266.	286.	301.	335.	368.	SCHEDULED	NECROPSY	DAY 20
27509	G	269.	264.	272.	278.	288.	313.	349.	385.	SCHEDULED	NECROPSY	DAY 20
27517	G	247.	245.	258.	278.	285.	310.	349.	390.	SCHEDULED	NECROPSY	DAY 20
27524	G	277.	288.	300.	303.	325.	343.	390.	443.	SCHEDULED	NECROPSY	DAY 20
27525	G	257.	266.	273.	285.	311.	336.	372.	417.	SCHEDULED	NECROPSY	DAY 20
27538	G	248.	249.	270.	274.	291.	308.	355.	386.	SCHEDULED	NECROPSY	DAY 20
27543	G	263.	271.	281.	301.	321.	341.	376.	409.	SCHEDULED	NECROPSY	DAY 20
27548	G	247.	257.	271.	282.	301.	312.	349.	389.	SCHEDULED	NECROPSY	DAY 20
27572	G	257.	239.	241.	268.	266.	292.	332.	371.	SCHEDULED	NECROPSY	DAY 20
MEAN		260.	259.	270.	284.	300.	317.	351.	389.			
S.D.		13.3	14.2	14.9	13.3	15.9	15.8	17.0	20.5			
S.E.		2.7	2.8	3.0	2.7	3.2	3.2	3.4	4.1			
N		25	25	25	25	25	25	25	25			

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A5
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

PREGNANCY STATUS		DAY 0	3	6	9	12	15	18	20			
DAMS FROM GROUP 4: 300 MG/KG/DAY												
27426	G	249.	251.	266.	272.	295.	320.	323.	384.	SCHEDULED	NECROPSY	DAY 20
27427	NG	266.	227.	241.	248.	260.	253.	262.	266.	SCHEDULED	NECROPSY	DAY 20
27441	G	304.	313.	330.	340.	334.	374.	422.	459.	SCHEDULED	NECROPSY	DAY 20
27443	G	237.	238.	246.	251.	276.	282.	318.	343.	SCHEDULED	NECROPSY	DAY 20
27444	G	257.	260.	273.	278.	296.	315.	336.	384.	SCHEDULED	NECROPSY	DAY 20
27446	G	263.	262.	278.	285.	294.	328.	380.	424.	SCHEDULED	NECROPSY	DAY 20
27447	G	250.	251.	257.	272.	288.	308.	342.	380.	SCHEDULED	NECROPSY	DAY 20
27448	G	259.	255.	267.	287.	298.	310.	366.	384.	SCHEDULED	NECROPSY	DAY 20
27449	NG	255.	252.	256.	258.	271.	274.	288.	291.	SCHEDULED	NECROPSY	DAY 20
27452	G	235.	249.	253.	270.	276.	290.	342.	383.	SCHEDULED	NECROPSY	DAY 20
27487	G	276.	263.	283.	291.	320.	338.	368.	406.	SCHEDULED	NECROPSY	DAY 20
27489	G	252.	253.	273.	278.	282.	292.	328.	363.	SCHEDULED	NECROPSY	DAY 20
27491	G	274.	274.	283.	293.	312.	331.	356.	417.	SCHEDULED	NECROPSY	DAY 20
27499	G	255.	230.	257.	274.	296.	317.	348.	390.	SCHEDULED	NECROPSY	DAY 20
27501	G	266.	258.	282.	289.	309.	328.	356.	398.	SCHEDULED	NECROPSY	DAY 20
27503	NG	263.	250.	254.	259.	272.	275.	269.	262.	SCHEDULED	NECROPSY	DAY 20
27506	G	254.	253.	271.	281.	301.	307.	347.	382.	SCHEDULED	NECROPSY	DAY 20
27522	G	235.	233.	246.	254.	266.	289.	331.	361.	SCHEDULED	NECROPSY	DAY 20
27530	G	290.	290.	307.	329.	355.	365.	382.	439.	SCHEDULED	NECROPSY	DAY 20
27532	G	273.	273.	293.	321.	346.	367.	418.	483.	SCHEDULED	NECROPSY	DAY 20
27541	G	267.	260.	277.	287.	305.	341.	348.	378.	SCHEDULED	NECROPSY	DAY 20
27545	G	253.	255.	258.	263.	288.	301.	342.	374.	SCHEDULED	NECROPSY	DAY 20
27550	G	257.	242.	262.	268.	281.	301.	341.	372.	SCHEDULED	NECROPSY	DAY 20
27553	G	251.	240.	258.	274.	285.	304.	341.	372.	SCHEDULED	NECROPSY	DAY 20
27570	G	259.	263.	282.	290.	302.	322.	349.	382.	SCHEDULED	NECROPSY	DAY 20
MEAN		260.	258.	273.	284.	300.	320.	354.	394.			
S.D.		16.7	18.6	19.8	22.0	22.4	25.5	26.9	33.1			
S.E.		3.6	4.0	4.2	4.7	4.8	5.4	5.7	7.0			
N		22	22	22	22	22	22	22	22			

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A5
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

PREGNANCY STATUS		DAY 0	3	6	9	12	15	18	20			
DAMS FROM GROUP 5: 600 MG/KG/DAY												
27423	G	276.	259.	276.	296.	322.	343.	364.	420.	SCHEDULED	NECROPSY	DAY 20
27438	G	247.	243.	261.	276.	289.	323.	351.	386.	SCHEDULED	NECROPSY	DAY 20
27439	G	250.	233.	250.	260.	280.	289.	333.	352.	SCHEDULED	NECROPSY	DAY 20
27440	G	275.	285.	288.	311.	322.	334.	373.	393.	SCHEDULED	NECROPSY	DAY 20
27442	G	274.	278.	297.	303.	326.	347.	343.	401.	SCHEDULED	NECROPSY	DAY 20
27455	G	268.	275.	285.	294.	311.	336.	360.	400.	SCHEDULED	NECROPSY	DAY 20
27457	G	244.	246.	261.	269.	290.	316.	350.	402.	SCHEDULED	NECROPSY	DAY 20
27461	G	247.	251.	270.	277.	302.	318.	361.	402.	SCHEDULED	NECROPSY	DAY 20
27472	G	289.	284.	296.	309.	316.	346.	377.	414.	SCHEDULED	NECROPSY	DAY 20
27476	G	256.	261.	266.	277.	280.	300.	327.	375.	SCHEDULED	NECROPSY	DAY 20
27480	G	254.	266.	285.	292.	312.	337.	377.	421.	SCHEDULED	NECROPSY	DAY 20
27483	G	258.	258.	273.	278.	294.	317.	329.	373.	SCHEDULED	NECROPSY	DAY 20
27484	G	254.	258.	262.	272.	289.	312.	341.	378.	SCHEDULED	NECROPSY	DAY 20
27485	G	264.	254.	254.	279.	286.	307.	342.	380.	SCHEDULED	NECROPSY	DAY 20
27488	G	252.	235.	243.	261.	275.	292.	331.	351.	SCHEDULED	NECROPSY	DAY 20
27496	G	258.	262.	272.	290.	298.	314.	363.	389.	SCHEDULED	NECROPSY	DAY 20
27511	G	257.	245.	259.	275.	288.	306.	339.	360.	SCHEDULED	NECROPSY	DAY 20
27514	G	236.	229.	224.	237.	258.	267.	300.	307.	SCHEDULED	NECROPSY	DAY 20
27518	G	253.	247.	251.	274.	280.	293.	328.	357.	SCHEDULED	NECROPSY	DAY 20
27534	G	277.	291.	311.	329.	332.	367.	397.	439.	SCHEDULED	NECROPSY	DAY 20
27535	G	264.	244.	257.	269.	283.	303.	336.	360.	SCHEDULED	NECROPSY	DAY 20
27539	G	261.	262.	281.	300.	316.	335.	364.	413.	SCHEDULED	NECROPSY	DAY 20
27551	G	260.	261.	279.	291.	302.	335.	371.	413.	SCHEDULED	NECROPSY	DAY 20
27557	G	265.	268.	263.	270.	293.	321.	347.	381.	SCHEDULED	NECROPSY	DAY 20
27568	G	277.	277.	292.	294.	311.	331.	366.	411.	SCHEDULED	NECROPSY	DAY 20
MEAN		261.	259.	270.	283.	298.	320.	351.	387.			
S.D.		12.4	16.7	19.4	19.3	18.4	22.3	21.2	29.0			
S.E.		2.5	3.3	3.9	3.9	3.7	4.5	4.2	5.8			
N		25	25	25	25	25	25	25	25			

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A6
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

PREGNANCY STATUS		DAY	0- 3	3- 6	6- 9	9- 12	12- 15	15- 18	18- 20	0- 20			
DAMS FROM GROUP 1: 0 MG/KG/DAY SHAM													
27424	NG		12.	9.	10.	-6.	-3.	22.	-13.	31.	SCHEDULED	NECROPSY	DAY 20
27428	G		-2.	12.	7.	27.	4.	41.	33.	122.	SCHEDULED	NECROPSY	DAY 20
27435	G		-6.	13.	5.	25.	18.	48.	23.	126.	SCHEDULED	NECROPSY	DAY 20
27437	G		9.	16.	13.	21.	21.	39.	37.	156.	SCHEDULED	NECROPSY	DAY 20
27451	G		5.	3.	25.	18.	16.	27.	33.	127.	SCHEDULED	NECROPSY	DAY 20
27459	G		0.	11.	7.	23.	25.	42.	37.	145.	SCHEDULED	NECROPSY	DAY 20
27468	G		5.	13.	12.	20.	16.	25.	35.	126.	SCHEDULED	NECROPSY	DAY 20
27471	G		-14.	13.	24.	14.	17.	49.	25.	128.	SCHEDULED	NECROPSY	DAY 20
27481	G		11.	9.	12.	23.	15.	30.	42.	142.	SCHEDULED	NECROPSY	DAY 20
27490	G		-3.	16.	22.	15.	17.	54.	26.	147.	SCHEDULED	NECROPSY	DAY 20
27493	G		-20.	28.	22.	24.	24.	33.	35.	146.	SCHEDULED	NECROPSY	DAY 20
27497	G		2.	16.	21.	18.	18.	33.	32.	140.	SCHEDULED	NECROPSY	DAY 20
27500	G		9.	20.	14.	20.	20.	49.	43.	175.	SCHEDULED	NECROPSY	DAY 20
27507	G		-13.	9.	15.	14.	17.	44.	39.	125.	SCHEDULED	NECROPSY	DAY 20
27508	G		12.	14.	9.	15.	9.	34.	44.	137.	SCHEDULED	NECROPSY	DAY 20
27510	G		9.	20.	14.	19.	31.	38.	47.	178.	SCHEDULED	NECROPSY	DAY 20
27512	G		7.	12.	12.	15.	15.	43.	36.	140.	SCHEDULED	NECROPSY	DAY 20
27523	NG		-25.	16.	27.	5.	6.	-3.	12.	38.	SCHEDULED	NECROPSY	DAY 20
27528	G		-6.	17.	15.	23.	23.	38.	35.	145.	SCHEDULED	NECROPSY	DAY 20
27544	G		-10.	18.	9.	19.	25.	23.	38.	122.	SCHEDULED	NECROPSY	DAY 20
27546	G		2.	-3.	17.	23.	15.	35.	36.	125.	SCHEDULED	NECROPSY	DAY 20
27552	G		-1.	18.	3.	17.	14.	44.	35.	130.	SCHEDULED	NECROPSY	DAY 20
27558	NG		-23.	15.	8.	1.	9.	0.	14.	24.	SCHEDULED	NECROPSY	DAY 20
27561	G		-5.	17.	15.	21.	18.	49.	46.	161.	SCHEDULED	NECROPSY	DAY 20
27564	G		-1.	17.	12.	22.	22.	33.	37.	142.	SCHEDULED	NECROPSY	DAY 20
MEAN			0.	14.	14.	20.	18.	39.	36.	140.			
S.D.			8.7	6.2	6.1	3.8	5.7	8.5	6.2	16.1			
S.E.			1.9	1.3	1.3	0.8	1.2	1.8	1.3	3.4			
N			22	22	22	22	22	22	22	22			

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A6
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

PREGNANCY STATUS		DAY	0- 3	3- 6	6- 9	9- 12	12- 15	15- 18	18- 20	0- 20		
DAMS FROM GROUP 2: 0 MG/KG/DAY VEH.												
27419	G		-17.	19.	11.	17.	21.	35.	45.	131.	SCHEDULED	NECROPSY DAY 20
27422	G		12.	-1.	16.	6.	18.	39.	33.	123.	SCHEDULED	NECROPSY DAY 20
27429	G		-14.	9.	8.	19.	24.	29.	30.	105.	SCHEDULED	NECROPSY DAY 20
27431	G		2.	12.	10.	13.	28.	44.	38.	147.	SCHEDULED	NECROPSY DAY 20
27432	NG		-5.	16.	-13.	5.	17.	-4.	-2.	14.	SCHEDULED	NECROPSY DAY 20
27450	G		2.	26.	18.	18.	24.	-3.	51.	136.	SCHEDULED	NECROPSY DAY 20
27458	G		6.	-6.	16.	5.	28.	26.	38.	113.	SCHEDULED	NECROPSY DAY 20
27467	G		3.	12.	13.	18.	16.	29.	40.	131.	SCHEDULED	NECROPSY DAY 20
27473	G		-3.	23.	6.	15.	13.	36.	30.	120.	SCHEDULED	NECROPSY DAY 20
27475	G		1.	10.	13.	4.	20.	31.	47.	126.	SCHEDULED	NECROPSY DAY 20
27477	G		5.	15.	4.	15.	17.	31.	21.	108.	SCHEDULED	NECROPSY DAY 20
27479	G		-11.	2.	12.	19.	14.	37.	37.	110.	SCHEDULED	NECROPSY DAY 20
27482	G		-20.	19.	10.	19.	22.	31.	44.	125.	SCHEDULED	NECROPSY DAY 20
27498	NG		-2.	15.	2.	-1.	-3.	-4.	-2.	5.	SCHEDULED	NECROPSY DAY 20
27504	G		-4.	17.	15.	13.	16.	34.	36.	127.	SCHEDULED	NECROPSY DAY 20
27515	G		-3.	10.	20.	18.	16.	42.	30.	133.	SCHEDULED	NECROPSY DAY 20
27516	G		1.	11.	26.	10.	14.	41.	24.	127.	SCHEDULED	NECROPSY DAY 20
27519	G		-5.	16.	15.	6.	36.	18.	35.	121.	SCHEDULED	NECROPSY DAY 20
27521	G		9.	13.	17.	20.	21.	32.	33.	145.	SCHEDULED	NECROPSY DAY 20
27527	G		9.	13.	10.	6.	13.	19.	34.	104.	SCHEDULED	NECROPSY DAY 20
27531	G		9.	15.	13.	16.	20.	35.	39.	147.	SCHEDULED	NECROPSY DAY 20
27536	NG		-2.	3.	16.	-2.	12.	8.	5.	40.	SCHEDULED	NECROPSY DAY 20
27547	G		0.	14.	20.	12.	23.	34.	42.	145.	SCHEDULED	NECROPSY DAY 20
27560	NG		4.	10.	11.	-3.	-5.	1.	-2.	16.	SCHEDULED	NECROPSY DAY 20
27563	G		14.	6.	22.	8.	37.	4.	60.	151.	SCHEDULED	NECROPSY DAY 20
MEAN			0.	12.	14.	13.	21.	30.	37.	127.		
S.D.			9.3	7.5	5.4	5.4	6.8	11.8	8.9	14.4		
S.E.			2.0	1.6	1.2	1.2	1.5	2.6	1.9	3.1		
N			21	21	21	21	21	21	21	21		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A6
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

PREGNANCY STATUS		DAY	0- 3	3- 6	6- 9	9- 12	12- 15	15- 18	18- 20	0- 20		
DAMS FROM GROUP 3: 100 MG/KG/DAY												
27420	G		1.	12.	12.	17.	24.	32.	33.	131.	SCHEDULED	NECROPSY DAY 20
27425	G		4.	10.	10.	19.	8.	7.	40.	98.	SCHEDULED	NECROPSY DAY 20
27430	G		-3.	11.	-1.	15.	21.	26.	38.	107.	SCHEDULED	NECROPSY DAY 20
27454	G		1.	8.	21.	15.	14.	50.	40.	149.	SCHEDULED	NECROPSY DAY 20
27460	G		8.	17.	17.	14.	6.	35.	24.	121.	SCHEDULED	NECROPSY DAY 20
27463	G		-26.	17.	11.	29.	20.	39.	32.	122.	SCHEDULED	NECROPSY DAY 20
27465	G		2.	13.	12.	20.	19.	21.	46.	133.	SCHEDULED	NECROPSY DAY 20
27466	G		-2.	10.	16.	17.	16.	33.	39.	129.	SCHEDULED	NECROPSY DAY 20
27469	G		-5.	2.	19.	19.	22.	30.	44.	131.	SCHEDULED	NECROPSY DAY 20
27470	G		-19.	15.	14.	5.	18.	36.	36.	105.	SCHEDULED	NECROPSY DAY 20
27474	G		3.	15.	17.	25.	11.	17.	57.	145.	SCHEDULED	NECROPSY DAY 20
27478	G		-4.	16.	12.	14.	-5.	45.	24.	102.	SCHEDULED	NECROPSY DAY 20
27486	G		3.	8.	15.	21.	11.	38.	37.	133.	SCHEDULED	NECROPSY DAY 20
27494	G		5.	24.	20.	15.	14.	32.	41.	151.	SCHEDULED	NECROPSY DAY 20
27495	G		8.	-3.	29.	11.	19.	27.	35.	126.	SCHEDULED	NECROPSY DAY 20
27502	G		6.	4.	18.	12.	16.	42.	31.	129.	SCHEDULED	NECROPSY DAY 20
27505	G		-26.	14.	8.	20.	15.	34.	33.	98.	SCHEDULED	NECROPSY DAY 20
27509	G		-5.	8.	6.	10.	25.	36.	36.	116.	SCHEDULED	NECROPSY DAY 20
27517	G		-2.	13.	20.	7.	25.	39.	41.	143.	SCHEDULED	NECROPSY DAY 20
27524	G		11.	12.	3.	22.	18.	47.	53.	166.	SCHEDULED	NECROPSY DAY 20
27525	G		9.	7.	12.	26.	25.	36.	45.	160.	SCHEDULED	NECROPSY DAY 20
27538	G		1.	21.	4.	17.	17.	47.	31.	138.	SCHEDULED	NECROPSY DAY 20
27543	G		8.	10.	20.	20.	20.	35.	33.	146.	SCHEDULED	NECROPSY DAY 20
27548	G		10.	14.	11.	19.	11.	37.	40.	142.	SCHEDULED	NECROPSY DAY 20
27572	G		-18.	2.	27.	-2.	26.	40.	39.	114.	SCHEDULED	NECROPSY DAY 20
MEAN			-1.	11.	14.	16.	17.	34.	38.	129.		
S.D.			10.6	6.0	7.1	6.8	7.1	9.6	7.6	18.8		
S.E.			2.1	1.2	1.4	1.4	1.4	1.9	1.5	3.8		
N			25	25	25	25	25	25	25	25		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A6
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

PREGNANCY STATUS		DAY	0- 3	3- 6	6- 9	9- 12	12- 15	15- 18	18- 20	0- 20		
DAMS FROM GROUP 4: 300 MG/KG/DAY												
27426	G		2.	15.	6.	23.	25.	3.	61.	135.	SCHEDULED	NECROPSY DAY 20
27427	NG		-39.	14.	7.	12.	-7.	9.	4.	0.	SCHEDULED	NECROPSY DAY 20
27441	G		9.	17.	10.	-6.	40.	48.	37.	155.	SCHEDULED	NECROPSY DAY 20
27443	G		1.	8.	5.	25.	6.	36.	25.	106.	SCHEDULED	NECROPSY DAY 20
27444	G		3.	13.	5.	18.	19.	21.	48.	127.	SCHEDULED	NECROPSY DAY 20
27446	G		-1.	16.	7.	9.	34.	52.	44.	161.	SCHEDULED	NECROPSY DAY 20
27447	G		1.	6.	15.	16.	20.	34.	38.	130.	SCHEDULED	NECROPSY DAY 20
27448	G		-4.	12.	20.	11.	12.	56.	18.	125.	SCHEDULED	NECROPSY DAY 20
27449	NG		-3.	4.	2.	13.	3.	14.	3.	36.	SCHEDULED	NECROPSY DAY 20
27452	G		14.	4.	17.	6.	14.	52.	41.	148.	SCHEDULED	NECROPSY DAY 20
27487	G		-13.	20.	8.	29.	18.	30.	38.	130.	SCHEDULED	NECROPSY DAY 20
27489	G		1.	20.	5.	4.	10.	36.	35.	111.	SCHEDULED	NECROPSY DAY 20
27491	G		0.	9.	10.	19.	19.	25.	61.	143.	SCHEDULED	NECROPSY DAY 20
27499	G		-25.	27.	17.	22.	21.	31.	42.	135.	SCHEDULED	NECROPSY DAY 20
27501	G		-8.	24.	7.	20.	19.	28.	42.	132.	SCHEDULED	NECROPSY DAY 20
27503	NG		-13.	4.	5.	13.	3.	-6.	-7.	-1.	SCHEDULED	NECROPSY DAY 20
27506	G		-1.	18.	10.	20.	6.	40.	35.	128.	SCHEDULED	NECROPSY DAY 20
27522	G		-2.	13.	8.	12.	23.	42.	30.	126.	SCHEDULED	NECROPSY DAY 20
27530	G		0.	17.	22.	26.	10.	17.	57.	149.	SCHEDULED	NECROPSY DAY 20
27532	G		0.	20.	28.	25.	21.	51.	65.	210.	SCHEDULED	NECROPSY DAY 20
27541	G		-7.	17.	10.	18.	36.	7.	30.	111.	SCHEDULED	NECROPSY DAY 20
27545	G		2.	3.	5.	25.	13.	41.	32.	121.	SCHEDULED	NECROPSY DAY 20
27550	G		-15.	20.	6.	13.	20.	40.	31.	115.	SCHEDULED	NECROPSY DAY 20
27553	G		-11.	18.	16.	11.	19.	37.	31.	121.	SCHEDULED	NECROPSY DAY 20
27570	G		4.	19.	8.	12.	20.	27.	33.	123.	SCHEDULED	NECROPSY DAY 20
MEAN			-2.	15.	11.	16.	19.	34.	40.	134.		
S.D.			8.4	6.2	6.4	8.5	8.8	14.1	12.2	22.2		
S.E.			1.8	1.3	1.4	1.8	1.9	3.0	2.6	4.7		
N			22	22	22	22	22	22	22	22		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A6
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

PREGNANCY STATUS		DAY	0- 3	3- 6	6- 9	9- 12	12- 15	15- 18	18- 20	0- 20		
DAMS FROM GROUP 5: 600 MG/KG/DAY												
27423	G		-17.	17.	20.	26.	21.	21.	56.	144.	SCHEDULED	NECROPSY DAY 20
27438	G		-4.	18.	15.	13.	34.	28.	35.	139.	SCHEDULED	NECROPSY DAY 20
27439	G		-17.	17.	10.	20.	9.	44.	19.	102.	SCHEDULED	NECROPSY DAY 20
27440	G		10.	3.	23.	11.	12.	39.	20.	118.	SCHEDULED	NECROPSY DAY 20
27442	G		4.	19.	6.	23.	21.	-4.	58.	127.	SCHEDULED	NECROPSY DAY 20
27455	G		7.	10.	9.	17.	25.	24.	40.	132.	SCHEDULED	NECROPSY DAY 20
27457	G		2.	15.	8.	21.	26.	34.	52.	158.	SCHEDULED	NECROPSY DAY 20
27461	G		4.	19.	7.	25.	16.	43.	41.	155.	SCHEDULED	NECROPSY DAY 20
27472	G		-5.	12.	13.	7.	30.	31.	37.	125.	SCHEDULED	NECROPSY DAY 20
27476	G		5.	5.	11.	3.	20.	27.	48.	119.	SCHEDULED	NECROPSY DAY 20
27480	G		12.	19.	7.	20.	25.	40.	44.	167.	SCHEDULED	NECROPSY DAY 20
27483	G		0.	15.	5.	16.	23.	12.	44.	115.	SCHEDULED	NECROPSY DAY 20
27484	G		4.	4.	10.	17.	23.	29.	37.	124.	SCHEDULED	NECROPSY DAY 20
27485	G		-10.	0.	25.	7.	21.	35.	38.	116.	SCHEDULED	NECROPSY DAY 20
27488	G		-17.	8.	18.	14.	17.	39.	20.	99.	SCHEDULED	NECROPSY DAY 20
27496	G		4.	10.	18.	8.	16.	49.	26.	131.	SCHEDULED	NECROPSY DAY 20
27511	G		-12.	14.	16.	13.	18.	33.	21.	103.	SCHEDULED	NECROPSY DAY 20
27514	G		-7.	-5.	13.	21.	9.	33.	7.	71.	SCHEDULED	NECROPSY DAY 20
27518	G		-6.	4.	23.	6.	13.	35.	29.	104.	SCHEDULED	NECROPSY DAY 20
27534	G		14.	20.	18.	3.	35.	30.	42.	162.	SCHEDULED	NECROPSY DAY 20
27535	G		-20.	13.	12.	14.	20.	33.	24.	96.	SCHEDULED	NECROPSY DAY 20
27539	G		1.	19.	19.	16.	19.	29.	49.	152.	SCHEDULED	NECROPSY DAY 20
27551	G		1.	18.	12.	11.	33.	36.	42.	153.	SCHEDULED	NECROPSY DAY 20
27557	G		3.	-5.	7.	23.	28.	26.	34.	116.	SCHEDULED	NECROPSY DAY 20
27568	G		0.	15.	2.	17.	20.	35.	45.	134.	SCHEDULED	NECROPSY DAY 20
MEAN			-2.	11.	13.	15.	21.	31.	36.	126.		
S.D.			9.5	7.7	6.2	6.7	7.1	10.7	12.8	23.8		
S.E.			1.9	1.5	1.2	1.3	1.4	2.1	2.6	4.8		
N			25	25	25	25	25	25	25	25		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A7
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

	PREGNANCY STATUS	INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
DAM #	GROUP	1: 0 MG/KG/DAY SHAM				
27424	NG	274.	305.	NA	NA	NA
27428	G	255.	377.	82.1	294.9	39.9
27435	G	244.	370.	80.7	289.3	45.3
27437	G	259.	415.	96.7	318.3	59.3
27451	G	254.	381.	70.6	310.4	56.4
27459	G	256.	401.	71.7	329.3	73.3
27468	G	246.	372.	77.0	295.0	49.0
27471	G	264.	392.	92.5	299.5	35.5
27481	G	263.	405.	81.5	323.5	60.5
27490	G	283.	430.	92.3	337.7	54.7
27493	G	244.	390.	95.7	294.3	50.3
27497	G	259.	399.	92.3	306.7	47.7
27500	G	268.	443.	107.0	336.0	68.0
27507	G	227.	352.	85.2	266.8	39.8
27508	G	250.	387.	85.5	301.5	51.5
27510	G	276.	454.	100.8	353.2	77.2
27512	G	250.	390.	88.0	302.0	52.0
27523	NG	247.	285.	NA	NA	NA
27528	G	270.	415.	87.2	327.8	57.8
27544	G	283.	405.	82.3	322.7	39.7
27546	G	269.	394.	78.7	315.3	46.3
27552	G	253.	383.	88.5	294.5	41.5
27558	NG	266.	290.	NA	NA	NA
27561	G	263.	424.	94.9	329.1	66.1
27564	G	270.	412.	84.4	327.6	57.6
MEAN		259.	400.	87.1	312.5	53.2
S.D.		13.5	24.4	9.03	20.08	11.27
S.E.		2.9	5.2	1.93	4.28	2.40
N		22	22	22	22	22

G = GRAVID, NG = NONGRAVID, NOT INCLUDED IN CALCULATION OF THE MEAN
NA = NOT APPLICABLE

TABLE A7
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

	PREGNANCY STATUS	INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
DAM #	GROUP	2: 0 MG/KG/DAY VEH.				
27419	G	284.	415.	96.9	318.1	34.1
27422	G	259.	382.	86.6	295.4	36.4
27429	G	265.	370.	81.0	289.0	24.0
27431	G	277.	424.	83.4	340.6	63.6
27432	NG	254.	268.	NA	NA	NA
27450	G	245.	381.	72.8	308.2	63.2
27458	G	277.	390.	89.6	300.4	23.4
27467	G	251.	382.	84.6	297.4	46.4
27473	G	246.	366.	69.8	296.2	50.2
27475	G	255.	381.	87.6	293.4	38.4
27477	G	265.	373.	87.4	285.6	20.6
27479	G	268.	378.	90.2	287.8	19.8
27482	G	260.	385.	78.6	306.4	46.4
27498	NG	250.	255.	NA	NA	NA
27504	G	262.	389.	92.8	296.2	34.2
27515	G	255.	388.	80.3	307.7	52.7
27516	G	219.	346.	78.7	267.3	48.3
27519	G	244.	365.	60.3	304.7	60.7
27521	G	269.	414.	89.8	324.2	55.2
27527	G	251.	355.	47.8	307.2	56.2
27531	G	263.	410.	97.8	312.2	49.2
27536	NG	266.	306.	NA	NA	NA
27547	G	255.	400.	89.0	311.0	56.0
27560	NG	264.	280.	NA	NA	NA
27563	G	264.	415.	87.3	327.7	63.7
MEAN		259.	386.	82.5	303.7	44.9
S.D.		14.0	20.8	11.91	16.14	14.55
S.E.		3.1	4.5	2.60	3.52	3.17
N		21	21	21	21	21

G = GRAVID, NG = NONGRAVID, NOT INCLUDED IN CALCULATION OF THE MEAN
NA = NOT APPLICABLE

TABLE A7
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

PREGNANCY STATUS		INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
DAM #	GROUP	3: 100 MG/KG/DAY				
27420	G	274.	405.	88.8	316.2	42.2
27425	G	253.	351.	61.3	289.7	36.7
27430	G	270.	377.	87.4	289.6	19.6
27454	G	252.	401.	86.2	314.8	62.8
27460	G	255.	376.	71.9	304.1	49.1
27463	G	262.	384.	80.9	303.1	41.1
27465	G	261.	394.	72.6	321.4	60.4
27466	G	240.	369.	82.4	286.6	46.6
27469	G	259.	390.	95.2	294.8	35.8
27470	G	290.	395.	79.4	315.6	25.6
27474	G	280.	425.	88.3	336.7	56.7
27478	G	260.	362.	70.1	291.9	31.9
27486	G	271.	404.	83.9	320.1	49.1
27494	G	232.	383.	80.4	302.6	70.6
27495	G	249.	375.	81.0	294.0	45.0
27502	G	251.	380.	83.6	296.4	45.4
27505	G	270.	368.	87.4	280.6	10.6
27509	G	269.	385.	79.5	305.5	36.5
27517	G	247.	390.	85.7	304.3	57.3
27524	G	277.	443.	104.1	338.9	61.9
27525	G	257.	417.	85.8	331.2	74.2
27538	G	248.	386.	95.1	290.9	42.9
27543	G	263.	409.	96.1	312.9	49.9
27548	G	247.	389.	86.8	302.2	55.2
27572	G	257.	371.	68.8	302.2	45.2
MEAN		260.	389.	83.3	305.9	46.1
S.D.		13.3	20.5	9.49	15.57	15.00
S.E.		2.7	4.1	1.90	3.11	3.00
N		25	25	25	25	25

G = GRAVID

TABLE A7
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

PREGNANCY STATUS		INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
DAM #	GROUP	4: 300 MG/KG/DAY				
27426	G	249.	384.	85.0	299.0	50.0
27427	NG	266.	266.	NA	NA	NA
27441	G	304.	459.	87.7	371.3	67.3
27443	G	237.	343.	70.0	273.0	36.0
27444	G	257.	384.	74.5	309.5	52.5
27446	G	263.	424.	112.8	311.2	48.2
27447	G	250.	380.	89.1	290.9	40.9
27448	G	259.	384.	95.7	288.3	29.3
27449	NG	255.	291.	NA	NA	NA
27452	G	235.	383.	91.5	291.5	56.5
27487	G	276.	406.	85.9	320.1	44.1
27489	G	252.	363.	75.0	288.0	36.0
27491	G	274.	417.	73.7	343.3	69.3
27499	G	255.	390.	86.4	303.6	48.6
27501	G	266.	398.	84.0	314.0	48.0
27503	NG	263.	262.	NA	NA	NA
27506	G	254.	382.	89.9	292.1	38.1
27522	G	235.	361.	86.0	275.0	40.0
27530	G	290.	439.	103.9	335.1	45.1
27532	G	273.	483.	138.1	344.9	71.9
27541	G	267.	378.	56.0	322.0	55.0
27545	G	253.	374.	76.5	297.5	44.5
27550	G	257.	372.	82.9	289.1	32.1
27553	G	251.	372.	68.8	303.2	52.2
27570	G	259.	382.	62.5	319.5	60.5
MEAN		260.	394.	85.3	308.3	48.5
S.D.		16.7	33.1	17.47	24.28	11.65
S.E.		3.6	7.0	3.72	5.18	2.48
N		22	22	22	22	22

G = GRAVID, NG = NONGRAVID, NOT INCLUDED IN CALCULATION OF THE MEAN
NA = NOT APPLICABLE

TABLE A7
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

PREGNANCY STATUS		INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
DAM #	GROUP	5: 600 MG/KG/DAY				
27423	G	276.	420.	98.5	321.5	45.5
27438	G	247.	386.	91.8	294.2	47.2
27439	G	250.	352.	71.1	280.9	30.9
27440	G	275.	393.	86.4	306.6	31.6
27442	G	274.	401.	88.1	312.9	38.9
27455	G	268.	400.	83.3	316.7	48.7
27457	G	244.	402.	78.1	323.9	79.9
27461	G	247.	402.	97.1	304.9	57.9
27472	G	289.	414.	96.2	317.8	28.8
27476	G	256.	375.	83.1	291.9	35.9
27480	G	254.	421.	91.0	330.0	76.0
27483	G	258.	373.	75.3	297.7	39.7
27484	G	254.	378.	78.4	299.6	45.6
27485	G	264.	380.	88.4	291.6	27.6
27488	G	252.	351.	69.5	281.5	29.5
27496	G	258.	389.	89.9	299.1	41.1
27511	G	257.	360.	55.4	304.6	47.6
27514	G	236.	307.	64.8	242.2	6.2
27518	G	253.	357.	75.8	281.2	28.2
27534	G	277.	439.	92.9	346.1	69.1
27535	G	264.	360.	70.0	290.0	26.0
27539	G	261.	413.	90.3	322.7	61.7
27551	G	260.	413.	88.1	324.9	64.9
27557	G	265.	381.	76.3	304.7	39.7
27568	G	277.	411.	94.5	316.5	39.5
MEAN		261.	387.	83.0	304.1	43.5
S.D.		12.4	29.0	11.12	21.00	17.23
S.E.		2.5	5.8	2.22	4.20	3.45
N		25	25	25	25	25

G = GRAVID

TABLE A8
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

PREGNANCY		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
STATUS												
DAMS FROM GROUP 1: 0 MG/KG/DAY SHAM												
27424	NG		22.	20.	23.	22.	19.	23.	23.	21.	SCHEDULED	NECROPSY DAY 20
27428	G		15.	21.	22.	24.	26.	28.	32.	24.	SCHEDULED	NECROPSY DAY 20
27435	G		16.	18.	18.	23.	26.	27.	22.	21.	SCHEDULED	NECROPSY DAY 20
27437	G		18.	22.	25.	24.	26.	28.	28.	24.	SCHEDULED	NECROPSY DAY 20
27451	G		25.	20.	23.	25.	28.	28.	33.	26.	SCHEDULED	NECROPSY DAY 20
27459	G		19.	21.	22.	24.	29.	31.	32.	25.	SCHEDULED	NECROPSY DAY 20
27468	G		18.	21.	23.	23.	24.	24.	28.	23.	SCHEDULED	NECROPSY DAY 20
27471	G		16.	19.	24.	26.	27.	28.	31.	24.	SCHEDULED	NECROPSY DAY 20
27481	G		28.	22.	24.	30.	27.	29.	36.	28.	SCHEDULED	NECROPSY DAY 20
27490	G		19.	21.	25.	26.	29.	32.	29.	26.	SCHEDULED	NECROPSY DAY 20
27493	G		17.	22.	23.	29.	29.	29.	29.	25.	SCHEDULED	NECROPSY DAY 20
27497	G		21.	24.	22.	26.	26.	27.	27.	25.	SCHEDULED	NECROPSY DAY 20
27500	G		20.	24.	26.	26.	29.	32.	35.	27.	SCHEDULED	NECROPSY DAY 20
27507	G		13.	15.	19.	21.	22.	30.	28.	21.	SCHEDULED	NECROPSY DAY 20
27508	G		23.	21.	24.	24.	23.	26.	30.	24.	SCHEDULED	NECROPSY DAY 20
27510	G		22.	26.	29.	29.	30.	33.	34.	29.	SCHEDULED	NECROPSY DAY 20
27512	G		19.	19.	21.	24.	26.	26.	27.	23.	SCHEDULED	NECROPSY DAY 20
27523	NG		20.	16.	21.	21.	18.	20.	21.	20.	SCHEDULED	NECROPSY DAY 20
27528	G		20.	23.	25.	25.	33.	31.	30.	27.	SCHEDULED	NECROPSY DAY 20
27544	G		23.	22.	25.	25.	28.	29.	32.	26.	SCHEDULED	NECROPSY DAY 20
27546	G		17.	17.	21.	28.	28.	28.	26.	24.	SCHEDULED	NECROPSY DAY 20
27552	G		24.	21.	21.	22.	23.	28.	28.	24.	SCHEDULED	NECROPSY DAY 20
27558	NG		14.	24.	22.	23.	21.	25.	25.	22.	SCHEDULED	NECROPSY DAY 20
27561	G		22.	21.	23.	24.	28.	31.	31.	25.	SCHEDULED	NECROPSY DAY 20
27564	G		17.	22.	30.	24.	28.	30.	32.	26.	SCHEDULED	NECROPSY DAY 20
MEAN			20.	21.	23.	25.	27.	29.	30.	25.		
S.D.			3.6	2.4	2.8	2.3	2.6	2.2	3.2	2.0		
S.E.			0.8	0.5	0.6	0.5	0.5	0.5	0.7	0.4		
N			22	22	22	22	22	22	22	22		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A8
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

PREGNANCY		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
STATUS												
DAMS FROM GROUP 2: 0 MG/KG/DAY VEH.												
27419	G		15.	21.	26.	28.	35.	30.	34.	27.	SCHEDULED	NECROPSY DAY 20
27422	G		29.	22.	25.	25.	27.	30.	27.	26.	SCHEDULED	NECROPSY DAY 20
27429	G		12.	19.	23.	27.	28.	26.	29.	23.	SCHEDULED	NECROPSY DAY 20
27431	G		22.	23.	25.	25.	33.	35.	34.	28.	SCHEDULED	NECROPSY DAY 20
27432	NG		17.	25.	20.	19.	26.	23.	22.	22.	SCHEDULED	NECROPSY DAY 20
27450	G		19.	25.	27.	29.	31.	25.	35.	27.	SCHEDULED	NECROPSY DAY 20
27458	G		26.	21.	26.	19.	33.	29.	32.	26.	SCHEDULED	NECROPSY DAY 20
27467	G		21.	25.	24.	27.	29.	29.	34.	27.	SCHEDULED	NECROPSY DAY 20
27473	G		15.	20.	22.	25.	29.	29.	31.	24.	SCHEDULED	NECROPSY DAY 20
27475	G		22.	22.	24.	28.	26.	29.	29.	26.	SCHEDULED	NECROPSY DAY 20
27477	G		21.	21.	25.	27.	27.	29.	29.	26.	SCHEDULED	NECROPSY DAY 20
27479	G		19.	19.	23.	25.	33.	28.	30.	25.	SCHEDULED	NECROPSY DAY 20
27482	G		24.	22.	24.	28.	30.	29.	32.	27.	SCHEDULED	NECROPSY DAY 20
27498	NG		19.	19.	20.	23.	19.	19.	24.	20.	SCHEDULED	NECROPSY DAY 20
27504	G		16.	22.	26.	28.	29.	31.	34.	26.	SCHEDULED	NECROPSY DAY 20
27515	G		17.	20.	24.	28.	29.	30.	31.	25.	SCHEDULED	NECROPSY DAY 20
27516	G		16.	18.	25.	27.	25.	36.	29.	25.	SCHEDULED	NECROPSY DAY 20
27519	G		25.	22.	25.	25.	33.	29.	37.	27.	SCHEDULED	NECROPSY DAY 20
27521	G		25.	25.	27.	27.	40.	31.	32.	29.	SCHEDULED	NECROPSY DAY 20
27527	G		21.	24.	24.	24.	28.	29.	30.	25.	SCHEDULED	NECROPSY DAY 20
27531	G		20.	23.	25.	28.	30.	30.	29.	26.	SCHEDULED	NECROPSY DAY 20
27536	NG		17.	21.	26.	19.	27.	25.	25.	23.	SCHEDULED	NECROPSY DAY 20
27547	G		20.	23.	26.	24.	28.	30.	31.	26.	SCHEDULED	NECROPSY DAY 20
27560	NG		20.	23.	25.	21.	19.	20.	23.	21.	SCHEDULED	NECROPSY DAY 20
27563	G		21.	23.	28.	28.	32.	27.	39.	28.	SCHEDULED	NECROPSY DAY 20
MEAN			20.	22.	25.	26.	30.	30.	32.	26.		
S.D.			4.2	2.0	1.5	2.3	3.5	2.5	3.0	1.4		
S.E.			0.9	0.4	0.3	0.5	0.8	0.5	0.7	0.3		
N			21	21	21	21	21	21	21	21		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A8
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

PREGNANCY		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
STATUS												
DAMS FROM GROUP 3: 100 MG/KG/DAY												
27420	G		19.	22.	28.	27.	35.	31.	29.	27.	SCHEDULED	NECROPSY DAY 20
27425	G		28.	23.	26.	30.	32.	25.	33.	28.	SCHEDULED	NECROPSY DAY 20
27430	G		18.	20.	21.	24.	30.	29.	32.	25.	SCHEDULED	NECROPSY DAY 20
27454	G		18.	18.	25.	28.	26.	33.	33.	25.	SCHEDULED	NECROPSY DAY 20
27460	G		26.	23.	29.	32.	29.	34.	34.	29.	SCHEDULED	NECROPSY DAY 20
27463	G		11.	18.	21.	26.	26.	31.	31.	23.	SCHEDULED	NECROPSY DAY 20
27465	G		18.	22.	31.	26.	29.	29.	35.	27.	SCHEDULED	NECROPSY DAY 20
27466	G		15.	18.	27.	36.	36.	25.	30.	27.	SCHEDULED	NECROPSY DAY 20
27469	G		17.	22.	23.	23.	29.	29.	31.	25.	SCHEDULED	NECROPSY DAY 20
27470	G		19.	21.	31.	24.	28.	30.	39.	27.	SCHEDULED	NECROPSY DAY 20
27474	G		19.	23.	27.	32.	34.	27.	34.	28.	SCHEDULED	NECROPSY DAY 20
27478	G		24.	22.	25.	31.	32.	29.	31.	28.	SCHEDULED	NECROPSY DAY 20
27486	G		22.	21.	26.	31.	30.	30.	32.	27.	SCHEDULED	NECROPSY DAY 20
27494	G		16.	22.	26.	25.	27.	30.	32.	25.	SCHEDULED	NECROPSY DAY 20
27495	G		19.	22.	24.	26.	28.	29.	30.	25.	SCHEDULED	NECROPSY DAY 20
27502	G		19.	22.	26.	27.	32.	31.	33.	27.	SCHEDULED	NECROPSY DAY 20
27505	G		16.	18.	23.	27.	25.	28.	31.	24.	SCHEDULED	NECROPSY DAY 20
27509	G		20.	20.	23.	26.	29.	29.	33.	25.	SCHEDULED	NECROPSY DAY 20
27517	G		16.	19.	22.	25.	28.	29.	31.	24.	SCHEDULED	NECROPSY DAY 20
27524	G		21.	23.	24.	29.	26.	29.	33.	26.	SCHEDULED	NECROPSY DAY 20
27525	G		25.	23.	25.	27.	33.	32.	37.	28.	SCHEDULED	NECROPSY DAY 20
27538	G		21.	21.	24.	25.	27.	30.	29.	25.	SCHEDULED	NECROPSY DAY 20
27543	G		24.	22.	24.	27.	28.	29.	28.	26.	SCHEDULED	NECROPSY DAY 20
27548	G		23.	22.	25.	32.	32.	30.	32.	28.	SCHEDULED	NECROPSY DAY 20
27572	G		17.	17.	24.	24.	27.	28.	33.	24.	SCHEDULED	NECROPSY DAY 20
MEAN			20.	21.	25.	28.	30.	29.	32.	26.		
S.D.			3.9	1.9	2.6	3.2	3.0	2.0	2.4	1.6		
S.E.			0.8	0.4	0.5	0.6	0.6	0.4	0.5	0.3		
N			25	25	25	25	25	25	25	25		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A8
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

PREGNANCY STATUS		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
DAMS FROM GROUP 4: 300 MG/KG/DAY												
27426	G		22.	22.	24.	27.	29.	24.	37.	26.	SCHEDULED	NECROPSY DAY 20
27427	NG		10.	15.	21.	22.	21.	24.	22.	19.	SCHEDULED	NECROPSY DAY 20
27441	G		26.	25.	28.	24.	37.	37.	35.	30.	SCHEDULED	NECROPSY DAY 20
27443	G		19.	18.	23.	26.	24.	29.	28.	24.	SCHEDULED	NECROPSY DAY 20
27444	G		19.	22.	20.	28.	30.	27.	36.	25.	SCHEDULED	NECROPSY DAY 20
27446	G		17.	22.	28.	23.	34.	34.	36.	27.	SCHEDULED	NECROPSY DAY 20
27447	G		18.	19.	22.	26.	26.	29.	30.	24.	SCHEDULED	NECROPSY DAY 20
27448	G		16.	19.	26.	26.	26.	34.	29.	25.	SCHEDULED	NECROPSY DAY 20
27449	NG		16.	18.	21.	23.	32.	26.	27.	23.	SCHEDULED	NECROPSY DAY 20
27452	G		21.	21.	23.	24.	26.	29.	34.	25.	SCHEDULED	NECROPSY DAY 20
27487	G		22.	20.	24.	26.	29.	28.	28.	25.	SCHEDULED	NECROPSY DAY 20
27489	G		23.	25.	22.	21.	24.	29.	25.	24.	SCHEDULED	NECROPSY DAY 20
27491	G		22.	23.	30.	27.	32.	29.	41.	29.	SCHEDULED	NECROPSY DAY 20
27499	G		17.	23.	24.	28.	29.	31.	32.	26.	SCHEDULED	NECROPSY DAY 20
27501	G		18.	23.	25.	26.	28.	30.	31.	26.	SCHEDULED	NECROPSY DAY 20
27503	NG		16.	18.	20.	25.	23.	19.	20.	20.	SCHEDULED	NECROPSY DAY 20
27506	G		19.	22.	23.	27.	27.	30.	32.	25.	SCHEDULED	NECROPSY DAY 20
27522	G		17.	22.	21.	21.	24.	29.	25.	23.	SCHEDULED	NECROPSY DAY 20
27530	G		26.	22.	28.	31.	32.	26.	38.	29.	SCHEDULED	NECROPSY DAY 20
27532	G		20.	24.	27.	30.	31.	30.	36.	28.	SCHEDULED	NECROPSY DAY 20
27541	G		19.	21.	24.	23.	37.	27.	33.	26.	SCHEDULED	NECROPSY DAY 20
27545	G		18.	20.	22.	27.	28.	27.	29.	24.	SCHEDULED	NECROPSY DAY 20
27550	G		20.	23.	25.	24.	26.	30.	26.	25.	SCHEDULED	NECROPSY DAY 20
27553	G		21.	21.	24.	24.	25.	33.	31.	25.	SCHEDULED	NECROPSY DAY 20
27570	G		18.	23.	25.	24.	28.	31.	34.	26.	SCHEDULED	NECROPSY DAY 20
MEAN			20.	22.	24.	26.	29.	30.	32.	26.		
S.D.			2.7	1.8	2.5	2.6	3.8	2.9	4.4	1.8		
S.E.			0.6	0.4	0.5	0.5	0.8	0.6	0.9	0.4		
N			22	22	22	22	22	22	22	22		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A8
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

PREGNANCY		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
STATUS												
DAMS FROM GROUP 5: 600 MG/KG/DAY												
27423	G		17.	21.	24.	29.	33.	29.	37.	27.	SCHEDULED	NECROPSY DAY 20
27438	G		16.	25.	25.	26.	34.	30.	32.	26.	SCHEDULED	NECROPSY DAY 20
27439	G		12.	18.	20.	25.	24.	29.	26.	22.	SCHEDULED	NECROPSY DAY 20
27440	G		23.	21.	26.	27.	27.	39.	27.	27.	SCHEDULED	NECROPSY DAY 20
27442	G		21.	23.	24.	27.	28.	25.	37.	26.	SCHEDULED	NECROPSY DAY 20
27455	G		20.	21.	25.	26.	30.	28.	33.	26.	SCHEDULED	NECROPSY DAY 20
27457	G		18.	20.	21.	25.	29.	29.	33.	25.	SCHEDULED	NECROPSY DAY 20
27461	G		21.	21.	22.	31.	29.	32.	34.	27.	SCHEDULED	NECROPSY DAY 20
27472	G		19.	23.	27.	26.	30.	34.	31.	27.	SCHEDULED	NECROPSY DAY 20
27476	G		19.	20.	21.	26.	26.	28.	31.	24.	SCHEDULED	NECROPSY DAY 20
27480	G		25.	25.	29.	28.	31.	32.	37.	29.	SCHEDULED	NECROPSY DAY 20
27483	G		20.	24.	24.	24.	30.	27.	37.	26.	SCHEDULED	NECROPSY DAY 20
27484	G		20.	22.	23.	24.	31.	29.	31.	26.	SCHEDULED	NECROPSY DAY 20
27485	G		16.	17.	32.	26.	28.	28.	30.	25.	SCHEDULED	NECROPSY DAY 20
27488	G		13.	16.	21.	24.	27.	30.	30.	23.	SCHEDULED	NECROPSY DAY 20
27496	G		20.	20.	25.	27.	28.	34.	31.	26.	SCHEDULED	NECROPSY DAY 20
27511	G		13.	19.	22.	28.	27.	33.	29.	24.	SCHEDULED	NECROPSY DAY 20
27514	G		13.	14.	21.	23.	25.	26.	23.	21.	SCHEDULED	NECROPSY DAY 20
27518	G		24.	19.	26.	24.	24.	27.	27.	24.	SCHEDULED	NECROPSY DAY 20
27534	G		27.	29.	34.	27.	33.	30.	35.	30.	SCHEDULED	NECROPSY DAY 20
27535	G		18.	19.	21.	26.	26.	29.	27.	24.	SCHEDULED	NECROPSY DAY 20
27539	G		18.	20.	26.	30.	31.	30.	34.	27.	SCHEDULED	NECROPSY DAY 20
27551	G		19.	22.	26.	25.	32.	31.	32.	27.	SCHEDULED	NECROPSY DAY 20
27557	G		20.	16.	23.	25.	28.	30.	35.	25.	SCHEDULED	NECROPSY DAY 20
27568	G		19.	21.	23.	24.	29.	29.	30.	25.	SCHEDULED	NECROPSY DAY 20
MEAN			19.	21.	24.	26.	29.	30.	32.	26.		
S.D.			3.7	3.2	3.4	2.0	2.7	2.9	3.8	2.0		
S.E.			0.7	0.6	0.7	0.4	0.5	0.6	0.8	0.4		
N			25	25	25	25	25	25	25	25		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A9
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

PREGNANCY		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
STATUS												
DAMS FROM GROUP 1: 0 MG/KG/DAY SHAM												
27424	NG		79.	69.	77.	73.	64.	75.	74.	71.	SCHEDULED	NECROPSY DAY 20
27428	G		59.	81.	82.	84.	86.	86.	89.	81.	SCHEDULED	NECROPSY DAY 20
27435	G		66.	73.	71.	86.	90.	84.	61.	73.	SCHEDULED	NECROPSY DAY 20
27437	G		68.	80.	86.	78.	79.	78.	71.	75.	SCHEDULED	NECROPSY DAY 20
27451	G		97.	77.	84.	84.	89.	84.	90.	86.	SCHEDULED	NECROPSY DAY 20
27459	G		74.	80.	81.	84.	94.	90.	84.	82.	SCHEDULED	NECROPSY DAY 20
27468	G		72.	81.	85.	80.	79.	74.	79.	78.	SCHEDULED	NECROPSY DAY 20
27471	G		62.	74.	87.	88.	87.	82.	82.	79.	SCHEDULED	NECROPSY DAY 20
27481	G	104.	79.	83.	98.	83.	83.	94.	88.	SCHEDULED	NECROPSY DAY 20	
27490	G		67.	73.	81.	80.	85.	85.	70.	77.	SCHEDULED	NECROPSY DAY 20
27493	G		73.	92.	87.	101.	94.	86.	78.	85.	SCHEDULED	NECROPSY DAY 20
27497	G		81.	89.	76.	85.	80.	77.	70.	80.	SCHEDULED	NECROPSY DAY 20
27500	G		73.	84.	86.	81.	85.	85.	83.	81.	SCHEDULED	NECROPSY DAY 20
27507	G		59.	68.	82.	86.	84.	103.	84.	80.	SCHEDULED	NECROPSY DAY 20
27508	G		90.	78.	85.	82.	75.	80.	82.	79.	SCHEDULED	NECROPSY DAY 20
27510	G		78.	88.	93.	88.	85.	85.	79.	84.	SCHEDULED	NECROPSY DAY 20
27512	G		75.	72.	76.	83.	86.	78.	73.	76.	SCHEDULED	NECROPSY DAY 20
27523	NG		85.	70.	83.	78.	66.	73.	75.	77.	SCHEDULED	NECROPSY DAY 20
27528	G		75.	84.	87.	81.	100.	86.	75.	84.	SCHEDULED	NECROPSY DAY 20
27544	G		83.	78.	84.	81.	84.	81.	83.	80.	SCHEDULED	NECROPSY DAY 20
27546	G		63.	63.	76.	94.	89.	82.	69.	77.	SCHEDULED	NECROPSY DAY 20
27552	G		95.	80.	77.	78.	77.	86.	77.	81.	SCHEDULED	NECROPSY DAY 20
27558	NG		55.	96.	84.	86.	77.	91.	88.	82.	SCHEDULED	NECROPSY DAY 20
27561	G		84.	79.	81.	80.	88.	88.	77.	79.	SCHEDULED	NECROPSY DAY 20
27564	G		63.	79.	103.	78.	85.	84.	81.	81.	SCHEDULED	NECROPSY DAY 20
MEAN			76.	79.	83.	85.	86.	84.	79.	80.		
S.D.			12.6	6.7	6.6	6.2	5.8	5.7	7.7	3.6		
S.E.			2.7	1.4	1.4	1.3	1.2	1.2	1.7	0.8		
N			22	22	22	22	22	22	22	22		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A9
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

PREGNANCY		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
STATUS												
DAMS FROM GROUP 2: 0 MG/KG/DAY VEH.												
27419	G		54.	76.	89.	92.	108.	85.	87.	84.	SCHEDULED	NECROPSY DAY 20
27422	G		109.	81.	90.	87.	90.	91.	74.	86.	SCHEDULED	NECROPSY DAY 20
27429	G		47.	74.	87.	97.	94.	80.	82.	78.	SCHEDULED	NECROPSY DAY 20
27431	G		79.	81.	84.	81.	101.	96.	84.	86.	SCHEDULED	NECROPSY DAY 20
27432	NG		67.	97.	77.	75.	98.	85.	82.	84.	SCHEDULED	NECROPSY DAY 20
27450	G		77.	96.	96.	97.	97.	75.	98.	90.	SCHEDULED	NECROPSY DAY 20
27458	G		93.	75.	91.	64.	106.	86.	86.	83.	SCHEDULED	NECROPSY DAY 20
27467	G		83.	96.	88.	94.	95.	88.	94.	91.	SCHEDULED	NECROPSY DAY 20
27473	G		61.	78.	82.	89.	99.	91.	88.	83.	SCHEDULED	NECROPSY DAY 20
27475	G		86.	84.	88.	100.	89.	91.	81.	88.	SCHEDULED	NECROPSY DAY 20
27477	G		78.	76.	87.	91.	86.	86.	80.	85.	SCHEDULED	NECROPSY DAY 20
27479	G		72.	74.	87.	89.	111.	87.	83.	84.	SCHEDULED	NECROPSY DAY 20
27482	G		96.	88.	91.	100.	100.	89.	88.	92.	SCHEDULED	NECROPSY DAY 20
27498	NG		76.	74.	76.	87.	72.	73.	94.	78.	SCHEDULED	NECROPSY DAY 20
27504	G		62.	82.	92.	94.	93.	92.	92.	85.	SCHEDULED	NECROPSY DAY 20
27515	G		67.	78.	88.	96.	94.	89.	83.	83.	SCHEDULED	NECROPSY DAY 20
27516	G		73.	80.	102.	103.	91.	119.	87.	93.	SCHEDULED	NECROPSY DAY 20
27519	G		103.	89.	95.	92.	112.	90.	106.	94.	SCHEDULED	NECROPSY DAY 20
27521	G		91.	88.	90.	85.	118.	85.	80.	89.	SCHEDULED	NECROPSY DAY 20
27527	G		82.	90.	86.	84.	95.	93.	89.	86.	SCHEDULED	NECROPSY DAY 20
27531	G		75.	82.	85.	91.	92.	85.	74.	82.	SCHEDULED	NECROPSY DAY 20
27536	NG		64.	79.	95.	67.	94.	84.	82.	81.	SCHEDULED	NECROPSY DAY 20
27547	G		78.	88.	93.	81.	89.	88.	82.	85.	SCHEDULED	NECROPSY DAY 20
27560	NG		75.	84.	88.	73.	67.	71.	82.	75.	SCHEDULED	NECROPSY DAY 20
27563	G		77.	82.	95.	90.	96.	76.	101.	87.	SCHEDULED	NECROPSY DAY 20
MEAN			78.	83.	90.	90.	98.	89.	87.	86.		
S.D.			15.3	6.7	4.6	8.5	8.6	8.7	8.1	4.0		
S.E.			3.3	1.5	1.0	1.9	1.9	1.9	1.8	0.9		
N			21	21	21	21	21	21	21	21		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A9
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

PREGNANCY		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
STATUS												
DAMS FROM GROUP 3: 100 MG/KG/DAY												
27420	G		69.	78.	96.	88.	107.	87.	75.	84.	SCHEDULED	NECROPSY DAY 20
27425	G		110.	88.	96.	105.	107.	81.	100.	97.	SCHEDULED	NECROPSY DAY 20
27430	G		67.	73.	76.	84.	99.	89.	89.	83.	SCHEDULED	NECROPSY DAY 20
27454	G		71.	70.	92.	97.	86.	98.	87.	83.	SCHEDULED	NECROPSY DAY 20
27460	G		100.	85.	100.	105.	92.	101.	93.	95.	SCHEDULED	NECROPSY DAY 20
27463	G		44.	73.	81.	93.	86.	93.	84.	78.	SCHEDULED	NECROPSY DAY 20
27465	G		69.	81.	110.	87.	91.	86.	94.	88.	SCHEDULED	NECROPSY DAY 20
27466	G		63.	74.	105.	132.	125.	80.	86.	95.	SCHEDULED	NECROPSY DAY 20
27469	G		66.	86.	86.	81.	95.	88.	84.	84.	SCHEDULED	NECROPSY DAY 20
27470	G		68.	75.	106.	79.	89.	88.	103.	85.	SCHEDULED	NECROPSY DAY 20
27474	G		67.	79.	88.	98.	98.	75.	86.	84.	SCHEDULED	NECROPSY DAY 20
27478	G		93.	83.	90.	107.	108.	92.	89.	95.	SCHEDULED	NECROPSY DAY 20
27486	G		81.	76.	90.	101.	93.	86.	83.	85.	SCHEDULED	NECROPSY DAY 20
27494	G		68.	88.	96.	87.	89.	92.	88.	85.	SCHEDULED	NECROPSY DAY 20
27495	G		75.	86.	89.	90.	92.	89.	84.	84.	SCHEDULED	NECROPSY DAY 20
27502	G		75.	85.	96.	95.	107.	95.	90.	91.	SCHEDULED	NECROPSY DAY 20
27505	G		62.	72.	88.	98.	85.	88.	88.	82.	SCHEDULED	NECROPSY DAY 20
27509	G		75.	75.	84.	92.	96.	88.	90.	83.	SCHEDULED	NECROPSY DAY 20
27517	G		65.	75.	82.	89.	94.	88.	84.	81.	SCHEDULED	NECROPSY DAY 20
27524	G		74.	78.	79.	92.	78.	79.	79.	78.	SCHEDULED	NECROPSY DAY 20
27525	G		95.	85.	90.	91.	102.	90.	94.	89.	SCHEDULED	NECROPSY DAY 20
27538	G		84.	81.	88.	88.	90.	90.	78.	84.	SCHEDULED	NECROPSY DAY 20
27543	G		90.	80.	82.	87.	85.	81.	71.	81.	SCHEDULED	NECROPSY DAY 20
27548	G		91.	83.	90.	110.	104.	91.	87.	93.	SCHEDULED	NECROPSY DAY 20
27572	G		69.	71.	94.	90.	97.	90.	94.	85.	SCHEDULED	NECROPSY DAY 20
MEAN			76.	79.	91.	95.	96.	88.	87.	86.		
S.D.			14.4	5.6	8.4	11.1	10.1	5.8	7.2	5.4		
S.E.			2.9	1.1	1.7	2.2	2.0	1.2	1.4	1.1		
N			25	25	25	25	25	25	25	25		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A9
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

PREGNANCY STATUS		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
DAMS FROM GROUP 4: 300 MG/KG/DAY												
27426	G		88.	85.	89.	95.	94.	75.	105.	88.	SCHEDULED	NECROPSY DAY 20
27427	NG		40.	64.	86.	87.	82.	93.	83.	75.	SCHEDULED	NECROPSY DAY 20
27441	G		84.	78.	84.	71.	105.	93.	79.	83.	SCHEDULED	NECROPSY DAY 20
27443	G		80.	74.	92.	98.	86.	97.	85.	88.	SCHEDULED	NECROPSY DAY 20
27444	G		73.	82.	72.	98.	98.	83.	100.	83.	SCHEDULED	NECROPSY DAY 20
27446	G		65.	81.	99.	79.	109.	96.	90.	86.	SCHEDULED	NECROPSY DAY 20
27447	G		72.	75.	83.	93.	87.	89.	83.	82.	SCHEDULED	NECROPSY DAY 20
27448	G		62.	73.	94.	89.	86.	101.	77.	83.	SCHEDULED	NECROPSY DAY 20
27449	NG		63.	71.	82.	87.	117.	93.	93.	86.	SCHEDULED	NECROPSY DAY 20
27452	G		87.	84.	88.	88.	92.	92.	94.	87.	SCHEDULED	NECROPSY DAY 20
27487	G		81.	73.	84.	85.	88.	79.	72.	79.	SCHEDULED	NECROPSY DAY 20
27489	G		91.	95.	80.	75.	84.	94.	72.	83.	SCHEDULED	NECROPSY DAY 20
27491	G		80.	82.	104.	89.	99.	84.	106.	91.	SCHEDULED	NECROPSY DAY 20
27499	G		70.	94.	90.	98.	94.	93.	87.	88.	SCHEDULED	NECROPSY DAY 20
27501	G		69.	85.	87.	87.	88.	88.	82.	84.	SCHEDULED	NECROPSY DAY 20
27503	NG		62.	71.	78.	94.	84.	70.	75.	76.	SCHEDULED	NECROPSY DAY 20
27506	G		75.	84.	83.	93.	89.	92.	88.	83.	SCHEDULED	NECROPSY DAY 20
27522	G		73.	92.	84.	81.	86.	94.	72.	83.	SCHEDULED	NECROPSY DAY 20
27530	G		90.	74.	88.	91.	89.	70.	92.	84.	SCHEDULED	NECROPSY DAY 20
27532	G		73.	85.	88.	90.	87.	76.	80.	81.	SCHEDULED	NECROPSY DAY 20
27541	G		72.	78.	85.	78.	115.	78.	91.	84.	SCHEDULED	NECROPSY DAY 20
27545	G		71.	78.	84.	98.	95.	84.	81.	82.	SCHEDULED	NECROPSY DAY 20
27550	G		80.	91.	94.	87.	89.	93.	73.	86.	SCHEDULED	NECROPSY DAY 20
27553	G		85.	84.	90.	86.	85.	102.	87.	86.	SCHEDULED	NECROPSY DAY 20
27570	G		69.	84.	87.	81.	90.	92.	93.	85.	SCHEDULED	NECROPSY DAY 20
MEAN			77.	82.	88.	88.	93.	88.	86.	85.		
S.D.			8.2	6.6	6.6	7.8	8.2	8.7	10.1	2.8		
S.E.			1.8	1.4	1.4	1.7	1.8	1.8	2.1	0.6		
N			22	22	22	22	22	22	22	22		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE A9
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

PREGNANCY		DAY	0- 3	3- 6	6- 9	9-12	12-15	15-18	18-20	0-20		
STATUS												
DAMS FROM GROUP 5: 600 MG/KG/DAY												
27423	G		63.	78.	84.	94.	99.	82.	94.	84.	SCHEDULED	NECROPSY DAY 20
27438	G		65.	99.	93.	92.	111.	89.	87.	88.	SCHEDULED	NECROPSY DAY 20
27439	G		50.	74.	78.	93.	84.	93.	76.	78.	SCHEDULED	NECROPSY DAY 20
27440	G		82.	73.	87.	85.	82.	110.	70.	84.	SCHEDULED	NECROPSY DAY 20
27442	G		76.	80.	80.	86.	83.	72.	99.	81.	SCHEDULED	NECROPSY DAY 20
27455	G		74.	75.	86.	86.	93.	80.	87.	82.	SCHEDULED	NECROPSY DAY 20
27457	G		73.	79.	79.	89.	96.	87.	88.	84.	SCHEDULED	NECROPSY DAY 20
27461	G		84.	80.	80.	107.	94.	94.	89.	89.	SCHEDULED	NECROPSY DAY 20
27472	G		66.	79.	89.	83.	91.	94.	78.	82.	SCHEDULED	NECROPSY DAY 20
27476	G		73.	76.	77.	93.	90.	89.	88.	82.	SCHEDULED	NECROPSY DAY 20
27480	G		96.	91.	100.	93.	95.	90.	93.	91.	SCHEDULED	NECROPSY DAY 20
27483	G		78.	90.	87.	84.	98.	84.	105.	87.	SCHEDULED	NECROPSY DAY 20
27484	G		78.	85.	86.	85.	103.	89.	86.	88.	SCHEDULED	NECROPSY DAY 20
27485	G		62.	67.	120.	92.	94.	86.	83.	84.	SCHEDULED	NECROPSY DAY 20
27488	G		53.	67.	83.	90.	95.	96.	88.	82.	SCHEDULED	NECROPSY DAY 20
27496	G		77.	75.	89.	92.	92.	100.	82.	85.	SCHEDULED	NECROPSY DAY 20
27511	G		52.	75.	82.	99.	91.	102.	83.	82.	SCHEDULED	NECROPSY DAY 20
27514	G		56.	62.	91.	93.	95.	92.	76.	82.	SCHEDULED	NECROPSY DAY 20
27518	G		96.	76.	99.	87.	84.	87.	79.	84.	SCHEDULED	NECROPSY DAY 20
27534	G		95.	96.	106.	82.	94.	79.	84.	87.	SCHEDULED	NECROPSY DAY 20
27535	G		71.	76.	80.	94.	89.	91.	78.	83.	SCHEDULED	NECROPSY DAY 20
27539	G		69.	74.	89.	97.	95.	86.	87.	85.	SCHEDULED	NECROPSY DAY 20
27551	G		73.	81.	91.	84.	100.	88.	82.	86.	SCHEDULED	NECROPSY DAY 20
27557	G		75.	60.	86.	89.	91.	90.	96.	83.	SCHEDULED	NECROPSY DAY 20
27568	G		69.	74.	78.	79.	90.	83.	77.	78.	SCHEDULED	NECROPSY DAY 20
MEAN			72.	78.	88.	90.	93.	89.	85.	84.		
S.D.			12.6	9.3	9.9	6.1	6.4	7.8	8.0	3.1		
S.E.			2.5	1.9	2.0	1.2	1.3	1.6	1.6	0.6		
N			25	25	25	25	25	25	25	25		

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

DAMS FROM GROUP 1: 0 MG/KG/DAY SHAM	MATERNAL GROSS OBSERVATION
27424	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27428	NO SIGNIFICANT CHANGES OBSERVED
27435	NO SIGNIFICANT CHANGES OBSERVED
27437	NO SIGNIFICANT CHANGES OBSERVED
27451	NO SIGNIFICANT CHANGES OBSERVED
27459	NO SIGNIFICANT CHANGES OBSERVED
27468	NO SIGNIFICANT CHANGES OBSERVED
27471	OVARIES: CYST(S) ONE, 5 MM IN DIAMETER, RIGHT
27481	NO SIGNIFICANT CHANGES OBSERVED
27490	NO SIGNIFICANT CHANGES OBSERVED
27493	NO SIGNIFICANT CHANGES OBSERVED
27497	NO SIGNIFICANT CHANGES OBSERVED
27500	NO SIGNIFICANT CHANGES OBSERVED
27507	NO SIGNIFICANT CHANGES OBSERVED
27508	NO SIGNIFICANT CHANGES OBSERVED
27510	NO SIGNIFICANT CHANGES OBSERVED
27512	NO SIGNIFICANT CHANGES OBSERVED
27523	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27528	NO SIGNIFICANT CHANGES OBSERVED
27544	NO SIGNIFICANT CHANGES OBSERVED
27546	NO SIGNIFICANT CHANGES OBSERVED
27552	NO SIGNIFICANT CHANGES OBSERVED
27558	URINARY BLADDER: THICKENED URINARY BLADDER: CALCULUS(I) ONE, 12 X 9 X 9 MM KIDNEYS: MISSHAPEN RIGHT KIDNEYS: AREA(S), WHITE FEW, 1 TO 3 MM IN DIAMETER, IN CORTEX, RIGHT KIDNEYS: DILATED PELVIS MODERATE, RIGHT URETERS: DILATED

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TABLE A10
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL MATERNAL MACROSCOPIC FINDINGS

PAGE 2

DAMS FROM GROUP 1: 0 MG/KG/DAY SHAM		MATERNAL GROSS OBSERVATION
27558		SLIGHT, RIGHT NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27561		THYMUS: AREA(S), DARK RED MULTIPLE, IRREGULARLY SHAPED
27564		NO SIGNIFICANT CHANGES OBSERVED

DAMS FROM GROUP 2: 0 MG/KG/DAY VEH.	MATERNAL GROSS OBSERVATION
27419	NO SIGNIFICANT CHANGES OBSERVED
27422	NO SIGNIFICANT CHANGES OBSERVED
27429	NO SIGNIFICANT CHANGES OBSERVED
27431	NO SIGNIFICANT CHANGES OBSERVED
27432	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27450	NO SIGNIFICANT CHANGES OBSERVED
27458	NO SIGNIFICANT CHANGES OBSERVED
27467	NO SIGNIFICANT CHANGES OBSERVED
27473	NO SIGNIFICANT CHANGES OBSERVED
27475	NO SIGNIFICANT CHANGES OBSERVED
27477	NO SIGNIFICANT CHANGES OBSERVED
27479	UTERUS: CONTENTS, DARK RED SURROUNDS SITES #12 THROUGH #17 PLACENTAE: FUSED SITES #14 AND #15
27482	NO SIGNIFICANT CHANGES OBSERVED
27498	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27504	NO SIGNIFICANT CHANGES OBSERVED
27515	OVARIES: CYST(S) ONE, 3 MM IN DIAMETER, LEFT THYMUS: DISCOLORATION, DARK RED
27516	NO SIGNIFICANT CHANGES OBSERVED
27519	NO SIGNIFICANT CHANGES OBSERVED
27521	NO SIGNIFICANT CHANGES OBSERVED
27527	NO SIGNIFICANT CHANGES OBSERVED
27531	NO SIGNIFICANT CHANGES OBSERVED
27536	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27547	NO SIGNIFICANT CHANGES OBSERVED
27560	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27563	UTERUS: CONTENTS, DARK RED SURROUNDS SITES #1 AND #2

DAMS FROM GROUP 3: 100 MG/KG/DAY	MATERNAL GROSS OBSERVATION
27420	NO SIGNIFICANT CHANGES OBSERVED
27425	NO SIGNIFICANT CHANGES OBSERVED
27430	PLACENTAE: FUSED SITES #13 THROUGH #15
27454	NO SIGNIFICANT CHANGES OBSERVED
27460	THYMUS: AREA(S), DARK RED FEW, IRREGULARLY SHAPED
27463	NO SIGNIFICANT CHANGES OBSERVED
27465	NO SIGNIFICANT CHANGES OBSERVED
27466	NO SIGNIFICANT CHANGES OBSERVED
27469	SKIN: HAIR LOSS OCULAR, BILATERAL PLACENTAE: FUSED SITES #3 AND #4
27470	MANDIBULAR SALIVARY GLANDS: EDEMATOUS BILATERAL
27474	NO SIGNIFICANT CHANGES OBSERVED
27478	NO SIGNIFICANT CHANGES OBSERVED
27486	NO SIGNIFICANT CHANGES OBSERVED
27494	NO SIGNIFICANT CHANGES OBSERVED
27495	NO SIGNIFICANT CHANGES OBSERVED
27502	NO SIGNIFICANT CHANGES OBSERVED
27505	NO SIGNIFICANT CHANGES OBSERVED
27509	NO SIGNIFICANT CHANGES OBSERVED
27517	NO SIGNIFICANT CHANGES OBSERVED
27524	THYMUS: AREA(S), DARK RED ONE, 15 X 6 MM
27525	ORGAN DAMAGED AT NECROPSY BRAIN
27538	NO SIGNIFICANT CHANGES OBSERVED
27543	NO SIGNIFICANT CHANGES OBSERVED
27548	NO SIGNIFICANT CHANGES OBSERVED
27572	NO SIGNIFICANT CHANGES OBSERVED

DAMS FROM GROUP 4: 300 MG/KG/DAY	MATERNAL GROSS OBSERVATION
27426	NO SIGNIFICANT CHANGES OBSERVED
27427	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27441	NO SIGNIFICANT CHANGES OBSERVED
27443	NO SIGNIFICANT CHANGES OBSERVED
27444	NO SIGNIFICANT CHANGES OBSERVED
27446	NO SIGNIFICANT CHANGES OBSERVED
27447	NO SIGNIFICANT CHANGES OBSERVED
27448	NO SIGNIFICANT CHANGES OBSERVED
27449	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27452	NO SIGNIFICANT CHANGES OBSERVED
27487	NO SIGNIFICANT CHANGES OBSERVED
27489	NO SIGNIFICANT CHANGES OBSERVED
27491	NO SIGNIFICANT CHANGES OBSERVED
27499	NO SIGNIFICANT CHANGES OBSERVED
27501	NO SIGNIFICANT CHANGES OBSERVED
27503	NONGRAVID -- AMMONIUM SULFIDE NEGATIVE
27506	NO SIGNIFICANT CHANGES OBSERVED
27522	NO SIGNIFICANT CHANGES OBSERVED
27530	NO SIGNIFICANT CHANGES OBSERVED
27532	NO SIGNIFICANT CHANGES OBSERVED
27541	PLACENTAE: ENLARGED SITES #5 AND #7
27545	NO SIGNIFICANT CHANGES OBSERVED
27550	NO SIGNIFICANT CHANGES OBSERVED
27553	NO SIGNIFICANT CHANGES OBSERVED
27570	NO SIGNIFICANT CHANGES OBSERVED

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TABLE A10
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL MATERNAL MACROSCOPIC FINDINGS

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DAMS FROM GROUP 5: 600 MG/KG/DAY	MATERNAL GROSS OBSERVATION
27423	NO SIGNIFICANT CHANGES OBSERVED
27438	NO SIGNIFICANT CHANGES OBSERVED
27439	NO SIGNIFICANT CHANGES OBSERVED
27440	NO SIGNIFICANT CHANGES OBSERVED
27442	NO SIGNIFICANT CHANGES OBSERVED
27455	NO SIGNIFICANT CHANGES OBSERVED
27457	NO SIGNIFICANT CHANGES OBSERVED
27461	NO SIGNIFICANT CHANGES OBSERVED
27472	NO SIGNIFICANT CHANGES OBSERVED
27476	NO SIGNIFICANT CHANGES OBSERVED
27480	NO SIGNIFICANT CHANGES OBSERVED
27483	NO SIGNIFICANT CHANGES OBSERVED
27484	NO SIGNIFICANT CHANGES OBSERVED
27485	NO SIGNIFICANT CHANGES OBSERVED
27488	NO SIGNIFICANT CHANGES OBSERVED
27496	LIVER: MASS 10 X 7 X 2 MM, TAN, CAUDATE LOBE, FIRM, MASS #1
27511	NO SIGNIFICANT CHANGES OBSERVED
27514	NO SIGNIFICANT CHANGES OBSERVED
27518	NO SIGNIFICANT CHANGES OBSERVED
27534	NO SIGNIFICANT CHANGES OBSERVED
27535	NO SIGNIFICANT CHANGES OBSERVED
27539	NO SIGNIFICANT CHANGES OBSERVED
27551	NO SIGNIFICANT CHANGES OBSERVED
27557	NO SIGNIFICANT CHANGES OBSERVED
27568	NO SIGNIFICANT CHANGES OBSERVED

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TABLE A11
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS [G]

PAGE 1

FEMALE GROUP:0 MG/KG/DAY SHAM

ANIMAL	PREGNANCY STATUS	BRAIN	LIVER	THYMUS
27507	G	1.93	14.80	0.2041
27435	G	1.95	15.29	0.2077
27512	G	1.99	15.54	0.2469
27428	G	1.91	17.41	0.2134
27471	G	1.95	15.76	0.2196
27424	NG	1.93	12.56	0.4212
27490	G	1.91	16.26	0.3507
27546	G	1.94	15.68	0.2568
27481	G	1.94	17.03	0.2348
27497	G	1.88	15.06	0.3104
27451	G	2.00	15.73	0.2598
27523	NG	2.01	10.85	0.3118
27493	G	1.89	15.56	0.1065
27468	G	1.85	14.98	0.2937
27437	G	1.79	16.23	0.2718
27561	G	1.80	16.40	0.2680
27564	G	1.79	17.25	0.3541
27544	G	1.84	15.78	0.2178
27510	G	1.98	18.39	0.2587
27528	G	1.82	17.53	0.2793
27500	G	1.87	17.95	0.2182
27558	NG	1.94	12.23	0.3391
27459	G	1.91	17.64	0.2355
27552	G	1.88	16.85	0.3158
27508	G	1.91	14.79	0.1985
MEAN		1.90	16.27	0.2510
S.D.		0.063	1.082	0.05547
S.E.		0.013	0.231	0.01183
N		22	22	22

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

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TABLE A11
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS [G]

PAGE 2

FEMALE GROUP:0 MG/KG/DAY VEH.

ANIMAL	PREGNANCY STATUS	BRAIN	LIVER	THYMUS
27516	G	1.88	14.13	0.1465
27473	G	1.89	15.51	0.1392
27498	NG	1.76	10.45	0.4042
27515	G	1.94	15.69	0.2103
27504	G	1.86	17.08	0.2583
27477	G	1.77	15.20	0.1627
27419	G	1.89	17.07	0.1485
27429	G	1.94	14.59	0.2392
27531	G	2.00	17.95	0.2059
27482	G	1.88	17.29	0.2362
27475	G	1.78	16.64	0.1253
27450	G	1.89	17.28	0.2062
27519	G	1.77	17.51	0.3006
27432	NG	1.84	12.01	0.3563
27547	G	1.93	16.45	0.3545
27560	NG	1.78	11.18	0.3134
27536	NG	2.00	13.85	0.3889
27431	G	2.11	19.69	0.2553
27458	G	2.04	16.06	0.2148
27521	G	1.92	18.04	0.1654
27479	G	1.75	15.12	0.1836
27563	G	1.82	17.47	0.3207
27422	G	1.79	14.73	0.1579
27467	G	1.82	14.47	0.2044
27527	G	1.84	16.12	0.2377
MEAN		1.88	16.39	0.2130
S.D.		0.093	1.420	0.06147
S.E.		0.020	0.310	0.01341
N		21	21	21

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

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TABLE A11
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS [G]

PAGE 3

FEMALE GROUP: 100 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	BRAIN	LIVER	THYMUS
27494	G	2.01	17.33	0.2077
27517	G	1.81	17.46	0.2360
27454	G	1.82	17.38	0.1787
27460	G	1.78	17.10	0.2704
27463	G	1.98	15.96	0.2238
27505	G	1.86	14.43	0.1723
27474	G	1.99	19.08	0.2827
27486	G	1.99	17.67	0.2596
27543	G	1.88	16.42	0.1338
27478	G	1.90	15.12	0.2533
27425	G	1.80	15.75	0.2291
27548	G	1.99	17.46	0.1257
27466	G	1.90	15.42	0.2641
27538	G	2.00	15.79	0.2093
27525	G	1.83	17.59	0.2787
27465	G	1.89	17.63	0.3250
27430	G	1.93	15.88	0.2376
27470	G	2.02	16.93	0.1993
27524	G	2.06	18.65	0.3128
27420	G	1.91	16.83	0.1355
27509	G	1.80	16.28	0.2169
27469	G	1.96	17.17	0.1984
27572	G	2.09	16.33	0.2085
27502	G	1.98	17.28	0.2074
27495	G	2.05	17.09	0.1615
MEAN		1.93	16.80	0.2211
S.D.		0.091	1.068	0.05289
S.E.		0.018	0.214	0.01058
N		25	25	25

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE A11
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS [G]

FEMALE GROUP: 300 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	BRAIN	LIVER	THYMUS
27452	G	1.90	15.51	0.1969
27443	G	1.78	14.14	0.1982
27447	G	2.04	15.26	0.1315
27506	G	1.89	15.15	0.1347
27448	G	1.92	14.78	0.1540
27427	NG	1.92	13.50	0.4523
27530	G	2.19	19.12	0.2733
27532	G	1.98	18.73	0.2637
27503	NG	1.90	10.74	0.2865
27444	G	1.93	18.59	0.2673
27499	G	1.87	16.62	0.2222
27545	G	1.81	16.55	0.3064
27522	G	1.79	15.18	0.2197
27489	G	1.94	14.30	0.1599
27550	G	1.89	14.57	0.2570
27446	G	1.96	18.02	0.2490
27501	G	1.97	16.58	0.1906
27441	G	2.01	19.38	0.2948
27487	G	1.93	16.76	0.2112
27491	G	1.90	18.81	0.2373
27541	G	2.02	17.46	0.2201
27570	G	1.86	17.10	0.1951
27449	NG	1.91	12.78	0.4218
27553	G	2.02	17.41	0.2505
27426	G	1.93	17.43	0.1807
MEAN		1.93	16.70	0.2188
S.D.		0.092	1.655	0.04911
S.E.		0.020	0.353	0.01047
N		22	22	22

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A11
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS [G]

PAGE 5

FEMALE GROUP: 600 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	BRAIN	LIVER	THYMUS
27514	G	1.82	11.81	0.1318
27439	G	1.79	15.18	0.1433
27488	G	1.91	16.45	0.2766
27511	G	1.87	15.15	0.1753
27496	G	1.85	16.99	0.1719
27440	G	2.07	18.15	0.1730
27423	G	1.94	18.14	0.1742
27535	G	1.85	14.93	0.2523
27485	G	1.83	17.22	0.1920
27539	G	1.99	18.07	0.2459
27476	G	1.88	15.51	0.0829
27461	G	1.90	18.46	0.2979
27457	G	2.06	19.39	0.2166
27518	G	1.81	14.13	0.2921
27484	G	1.91	17.33	0.2154
27551	G	1.80	19.04	0.2868
27568	G	1.93	18.20	0.2174
27472	G	1.91	18.09	0.2558
27534	G	2.10	19.01	0.4709
27442	G	1.97	17.95	0.1541
27455	G	1.95	16.65	0.2445
27557	G	1.69	16.85	0.2497
27483	G	1.78	17.69	0.1926
27480	G	1.95	18.92	0.3046
27438	G	1.90	16.94	0.2260
MEAN		1.90	17.05	0.2257
S.D.		0.096	1.785	0.07630
S.E.		0.019	0.357	0.01526
N		25	25	25

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

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PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A12
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS RELATIVE TO BRAIN WEIGHTS [G/100 G]

PAGE 1

FEMALE GROUP:0 MG/KG/DAY SHAM

ANIMAL	PREGNANCY STATUS	BRAIN WT (GRAMS)	LIVER	THYMUS
27507	G	1.93	766.839	10.570
27435	G	1.95	784.103	10.667
27512	G	1.99	780.905	12.412
27428	G	1.91	911.518	11.152
27471	G	1.95	808.205	11.282
27424	NG	1.93	650.777	21.813
27490	G	1.91	851.309	18.377
27546	G	1.94	808.247	13.247
27481	G	1.94	877.835	12.113
27497	G	1.88	801.064	16.489
27451	G	2.00	786.500	13.000
27523	NG	2.01	539.801	15.522
27493	G	1.89	823.280	5.661
27468	G	1.85	809.730	15.892
27437	G	1.79	906.704	15.196
27561	G	1.80	911.111	14.889
27564	G	1.79	963.687	19.777
27544	G	1.84	857.609	11.848
27510	G	1.98	928.788	13.081
27528	G	1.82	963.187	15.330
27500	G	1.87	959.893	11.658
27558	NG	1.94	630.412	17.474
27459	G	1.91	923.560	12.356
27552	G	1.88	896.277	16.809
27508	G	1.91	774.346	10.419
MEAN		1.90	858.850	13.283
S.D.		0.063	67.4103	3.1238
S.E.		0.013	14.3719	0.6660
N		22	22	22

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A12
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS RELATIVE TO BRAIN WEIGHTS [G/100 G]

PAGE 2

FEMALE GROUP:0 MG/KG/DAY VEH.

ANIMAL	PREGNANCY STATUS	BRAIN WT (GRAMS)	LIVER	THYMUS
27516	G	1.88	751.596	7.819
27473	G	1.89	820.635	7.354
27498	NG	1.76	593.750	22.955
27515	G	1.94	808.763	10.825
27504	G	1.86	918.280	13.871
27477	G	1.77	858.757	9.209
27419	G	1.89	903.175	7.884
27429	G	1.94	752.062	12.320
27531	G	2.00	897.500	10.300
27482	G	1.88	919.681	12.553
27475	G	1.78	934.831	7.022
27450	G	1.89	914.286	10.899
27519	G	1.77	989.266	17.006
27432	NG	1.84	652.717	19.348
27547	G	1.93	852.332	18.394
27560	NG	1.78	628.090	17.584
27536	NG	2.00	692.500	19.450
27431	G	2.11	933.175	12.085
27458	G	2.04	787.255	10.539
27521	G	1.92	939.583	8.594
27479	G	1.75	864.000	10.514
27563	G	1.82	959.890	17.637
27422	G	1.79	822.905	8.827
27467	G	1.82	795.055	11.209
27527	G	1.84	876.087	12.935
MEAN		1.88	871.386	11.324
S.D.		0.093	68.2739	3.2680
S.E.		0.020	14.8986	0.7131
N		21	21	21

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE A12
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS RELATIVE TO BRAIN WEIGHTS [G/100 G]

FEMALE GROUP: 100 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	BRAIN WT (GRAMS)	LIVER	THYMUS
27494	G	2.01	862.189	10.348
27517	G	1.81	964.641	13.039
27454	G	1.82	954.945	9.835
27460	G	1.78	960.674	15.169
27463	G	1.98	806.061	11.313
27505	G	1.86	775.806	9.247
27474	G	1.99	958.794	14.221
27486	G	1.99	887.940	13.065
27543	G	1.88	873.404	7.128
27478	G	1.90	795.789	13.316
27425	G	1.80	875.000	12.722
27548	G	1.99	877.387	6.332
27466	G	1.90	811.579	13.895
27538	G	2.00	789.500	10.450
27525	G	1.83	961.202	15.246
27465	G	1.89	932.804	17.196
27430	G	1.93	822.798	12.332
27470	G	2.02	838.119	9.851
27524	G	2.06	905.340	15.194
27420	G	1.91	881.152	7.120
27509	G	1.80	904.445	12.056
27469	G	1.96	876.020	10.102
27572	G	2.09	781.340	10.000
27502	G	1.98	872.727	10.455
27495	G	2.05	833.659	7.902
MEAN		1.93	872.133	11.501
S.D.		0.091	60.6532	2.8403
S.E.		0.018	12.1306	0.5681
N		25	25	25

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE A12
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS RELATIVE TO BRAIN WEIGHTS [G/100 G]

FEMALE GROUP: 300 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	BRAIN WT (GRAMS)	LIVER	THYMUS
27452	G	1.90	816.316	10.368
27443	G	1.78	794.382	11.124
27447	G	2.04	748.039	6.471
27506	G	1.89	801.587	7.143
27448	G	1.92	769.792	8.021
27427	NG	1.92	703.125	23.542
27530	G	2.19	873.059	12.466
27532	G	1.98	945.960	13.333
27503	NG	1.90	565.263	15.105
27444	G	1.93	963.213	13.834
27499	G	1.87	888.770	11.872
27545	G	1.81	914.365	16.906
27522	G	1.79	848.045	12.291
27489	G	1.94	737.113	8.247
27550	G	1.89	770.899	13.598
27446	G	1.96	919.388	12.704
27501	G	1.97	841.624	9.695
27441	G	2.01	964.179	14.677
27487	G	1.93	868.394	10.933
27491	G	1.90	990.000	12.474
27541	G	2.02	864.356	10.891
27570	G	1.86	919.355	10.484
27449	NG	1.91	669.110	22.094
27553	G	2.02	861.881	12.426
27426	G	1.93	903.109	9.378
MEAN		1.93	863.810	11.333
S.D.		0.092	73.1112	2.5330
S.E.		0.020	15.5874	0.5400
N		22	22	22

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A12
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL ORGAN WEIGHTS RELATIVE TO BRAIN WEIGHTS [G/100 G]

PAGE 5

FEMALE GROUP: 600 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	BRAIN WT (GRAMS)	LIVER	THYMUS
27514	G	1.82	648.901	7.253
27439	G	1.79	848.045	7.989
27488	G	1.91	861.257	14.503
27511	G	1.87	810.160	9.358
27496	G	1.85	918.378	9.297
27440	G	2.07	876.812	8.357
27423	G	1.94	935.052	8.969
27535	G	1.85	807.027	13.622
27485	G	1.83	940.984	10.492
27539	G	1.99	908.040	12.362
27476	G	1.88	825.000	4.415
27461	G	1.90	971.579	15.684
27457	G	2.06	941.262	10.534
27518	G	1.81	780.663	16.133
27484	G	1.91	907.330	11.257
27551	G	1.80	1057.778	15.944
27568	G	1.93	943.005	11.244
27472	G	1.91	947.120	13.403
27534	G	2.10	905.238	22.429
27442	G	1.97	911.168	7.817
27455	G	1.95	853.846	12.564
27557	G	1.69	997.041	14.793
27483	G	1.78	993.820	10.843
27480	G	1.95	970.256	15.641
27438	G	1.90	891.579	11.895
MEAN		1.90	898.054	11.872
S.D.		0.096	83.8993	3.7872
S.E.		0.019	16.7799	0.7574
N		25	25	25

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

POFBWv4.29
11/15/2011

TABLE A13
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 1: 0 MG/KG/DAY SHAM

DAM#	SEX		VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	M	F	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT OVARY	RIGHT OVARY	TOTAL
27424	NONGRAVID																			
27428	10	4	7	7	14	0	0	0	1	0	1	0	0	0	8	7	15	8	7	15
27435	5	9	5	9	14	0	0	0	0	1	1	0	0	0	5	10	15	6	10	16
27437	11	6	6	11	17	0	0	0	0	0	0	0	0	0	6	11	17	6	11	17
27451	4	8	2	10	12	0	0	0	0	0	0	0	0	0	2	10	12	2	10	12
27459	8	4	6	6	12	0	0	0	0	0	0	0	0	0	6	6	12	6	7	13
27468	6	10	10	6	16	0	0	0	1	1	2	0	0	0	11	7	18	11	8	19
27471	10	5	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	6	9	15
27481	8	6	8	6	14	0	0	0	0	0	0	0	0	0	8	6	14	8	6	14
27490	8	7	5	10	15	0	0	0	1	0	1	0	0	0	6	10	16	6	10	16
27493	10	8	11	7	18	0	0	0	0	0	0	0	0	0	11	7	18	11	7	18
27497	9	7	7	9	16	0	0	0	1	0	1	0	0	0	8	9	17	8	10	18
27500	10	9	6	13	19	0	0	0	1	0	1	0	0	0	7	13	20	7	14	21
27507	7	9	8	8	16	0	0	0	0	0	0	0	0	0	8	8	16	8	8	16
27508	10	6	9	7	16	0	0	0	1	0	1	0	0	0	10	7	17	10	7	17
27510	9	6	5	10	15	0	0	0	1	1	2	0	0	0	6	11	17	6	11	17
27512	9	6	4	11	15	0	0	0	0	0	0	0	0	0	4	11	15	4	11	15
27523	NONGRAVID																			
27528	4	11	8	7	15	0	0	0	0	0	0	0	0	0	8	7	15	8	7	15
27544	8	6	8	6	14	0	0	0	0	0	0	0	0	0	8	6	14	10	9	19
27546	9	5	7	7	14	0	0	0	0	1	1	0	0	0	7	8	15	7	8	15
27552	5	11	6	10	16	0	0	0	0	0	0	0	0	0	6	10	16	6	10	16
27558	NONGRAVID																			
27561	7	9	9	7	16	0	0	0	0	0	0	0	0	0	9	7	16	9	7	16
27564	5	10	8	7	15	0	0	0	0	1	1	0	0	0	8	8	16	8	8	16
TOTAL	172	162	151	183	334	0	0	0	7	5	12	0	0	0	158	188	346	161	195	356
MEAN	7.8	7.4	6.9	8.3	15.2	0.0	0.0	0.0	0.3	0.2	0.5	0.0	0.0	0.0	7.2	8.5	15.7	7.3	8.9	16.2
S.D.	2.15	2.15	2.05	1.99	1.65	0.00	0.00	0.00	0.48	0.43	0.67	0.00	0.00	0.00	2.13	1.97	1.86	2.17	1.93	2.04
S.E.	0.46	0.46	0.44	0.42	0.35	0.00	0.00	0.00	0.10	0.09	0.14	0.00	0.00	0.00	0.45	0.42	0.40	0.46	0.41	0.43
N =	22																			

TABLE A13
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 2: 0 MG/KG/DAY VEH.

DAM#	SEX		VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	M	F	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT OVARY	RIGHT OVARY	TOTAL
27419	9	8	10	7	17	0	0	0	0	0	0	0	0	0	10	7	17	10	7	17
27422	8	7	10	5	15	0	0	0	0	0	0	0	0	0	10	5	15	10	5	15
27429	5	10	7	8	15	0	0	0	0	1	1	0	0	0	7	9	16	7	9	16
27431	6	8	5	9	14	0	0	0	0	2	2	0	0	0	5	11	16	5	11	16
27432	NONGRAVID																			
27450	8	4	6	6	12	0	0	0	1	1	2	0	0	0	7	7	14	7	7	14
27458	8	7	6	9	15	0	0	0	1	0	1	0	1	1	7	10	17	7	10	17
27467	9	6	5	10	15	0	0	0	1	0	1	0	0	0	6	10	16	7	10	17
27473	5	6	2	9	11	0	0	0	0	1	1	0	0	0	2	10	12	3	10	13
27475	5	10	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	10	10	20
27477	8	7	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	6	9	15
27479	9	8	7	10	17	0	0	0	0	0	0	0	0	0	7	10	17	7	10	17
27482	10	4	3	11	14	0	0	0	0	1	1	0	0	0	3	12	15	3	12	15
27498	NONGRAVID																			
27504	11	6	9	8	17	0	0	0	0	1	1	0	0	0	9	9	18	9	9	18
27515	4	10	7	7	14	0	0	0	0	0	0	0	0	0	7	7	14	7	7	14
27516	10	4	9	5	14	0	0	0	0	0	0	0	0	0	9	5	14	10	5	15
27519	5	5	1	9	10	0	0	0	0	0	0	0	0	0	1	9	10	5	9	14
27521	7	10	9	8	17	0	0	0	2	0	2	0	0	0	11	8	19	11	8	19
27527	1	7	5	3	8	0	0	0	1	0	1	0	0	0	6	3	9	7	9	16
27531	12	5	10	7	17	0	0	0	0	0	0	0	0	0	10	7	17	10	8	18
27536	NONGRAVID																			
27547	9	7	4	12	16	0	0	0	1	0	1	0	0	0	5	12	17	5	12	17
27560	NONGRAVID																			
27563	9	5	4	10	14	0	0	0	0	0	0	0	0	0	4	10	14	4	10	14
TOTAL	158	144	131	171	302	0	0	0	7	7	14	0	1	1	138	179	317	150	187	337
MEAN	7.5	6.9	6.2	8.1	14.4	0.0	0.0	0.0	0.3	0.3	0.7	0.0	0.0	0.0	6.6	8.5	15.1	7.1	8.9	16.0
S.D.	2.64	2.01	2.62	2.15	2.42	0.00	0.00	0.00	0.58	0.58	0.73	0.00	0.22	0.22	2.69	2.32	2.47	2.43	1.92	1.83
S.E.	0.58	0.44	0.57	0.47	0.53	0.00	0.00	0.00	0.13	0.13	0.16	0.00	0.05	0.05	0.59	0.51	0.54	0.53	0.42	0.40
N =	21																			

TABLE A13
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 3: 100 MG/KG/DAY

DAM#	SEX		VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	M	F	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT OVARY	RIGHT OVARY	TOTAL
27420	10	6	6	10	16	0	0	0	0	1	1	0	0	0	6	11	17	6	11	17
27425	6	5	3	8	11	0	0	0	5	0	5	0	0	0	8	8	16	8	8	16
27430	6	10	4	12	16	0	0	0	1	0	1	0	0	0	5	12	17	5	12	17
27454	7	6	7	6	13	0	0	0	0	1	1	0	0	0	7	7	14	7	7	14
27460	4	8	5	7	12	0	0	0	1	1	2	0	0	0	6	8	14	7	8	15
27463	4	10	8	6	14	0	0	0	0	1	1	0	0	0	8	7	15	8	7	15
27465	5	9	9	5	14	0	0	0	1	0	1	0	0	0	10	5	15	10	8	18
27466	12	3	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	6	9	15
27469	9	8	10	7	17	0	0	0	0	0	0	0	0	0	10	7	17	13	8	21
27470	6	9	6	9	15	0	0	0	1	0	1	0	0	0	7	9	16	13	13	26
27474	6	9	8	7	15	0	0	0	2	0	2	0	0	0	10	7	17	13	7	20
27478	5	7	2	10	12	0	0	0	2	1	3	0	0	0	4	11	15	4	11	15
27486	4	11	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	6	9	15
27494	5	8	6	7	13	0	0	0	2	0	2	0	0	0	8	7	15	8	7	15
27495	7	7	5	9	14	0	0	0	0	2	2	0	0	0	5	11	16	5	13	18
27502	9	6	6	9	15	0	0	0	2	0	2	0	0	0	8	9	17	8	9	17
27505	8	9	10	7	17	0	0	0	1	0	1	0	0	0	11	7	18	11	8	19
27509	9	5	5	9	14	0	0	0	1	1	2	0	0	0	6	10	16	9	10	19
27517	8	7	5	10	15	0	0	0	0	1	1	0	0	0	5	11	16	5	11	16
27524	8	12	7	13	20	0	0	0	0	0	0	0	0	0	7	13	20	7	13	20
27525	5	10	7	8	15	0	0	0	3	0	3	0	0	0	10	8	18	10	8	18
27538	9	8	9	8	17	0	0	0	0	0	0	0	0	0	9	8	17	9	9	18
27543	7	9	8	8	16	0	0	0	0	1	1	0	0	0	8	9	17	9	9	18
27548	11	3	7	7	14	0	0	0	0	0	0	0	0	0	7	7	14	8	8	16
27572	7	6	4	9	13	0	0	0	0	1	1	0	0	0	4	10	14	4	10	14
TOTAL	177	191	159	209	368	0	0	0	22	11	33	0	0	0	181	220	401	199	233	432
MEAN	7.1	7.6	6.4	8.4	14.7	0.0	0.0	0.0	0.9	0.4	1.3	0.0	0.0	0.0	7.2	8.8	16.0	8.0	9.3	17.3
S.D.	2.20	2.29	2.04	1.82	1.93	0.00	0.00	0.00	1.24	0.58	1.18	0.00	0.00	0.00	1.98	1.94	1.49	2.65	1.95	2.67
S.E.	0.44	0.46	0.41	0.36	0.39	0.00	0.00	0.00	0.25	0.12	0.24	0.00	0.00	0.00	0.40	0.39	0.30	0.53	0.39	0.53
N =	25																			

TABLE A13
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 4: 300 MG/KG/DAY

DAM#	SEX		VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	M	F	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT OVARY	RIGHT OVARY	TOTAL
27426	9	5	4	10	14	0	0	0	0	1	1	0	0	0	4	11	15	4	11	15
27427	NONGRAVID																			
27441	8	8	9	7	16	0	0	0	0	0	0	0	0	0	9	7	16	10	9	19
27443	6	7	9	4	13	0	0	0	2	1	3	0	0	0	11	5	16	11	5	16
27444	5	8	9	4	13	0	0	0	1	0	1	0	0	0	10	4	14	10	4	14
27446	10	11	9	12	21	0	0	0	0	0	0	0	0	0	9	12	21	11	14	25
27447	7	9	5	11	16	0	0	0	0	0	0	0	0	0	5	11	16	6	13	19
27448	12	6	11	7	18	0	0	0	0	0	0	0	0	0	11	7	18	11	7	18
27449	NONGRAVID																			
27452	6	10	6	10	16	0	0	0	0	1	1	0	0	0	6	11	17	7	11	18
27487	8	8	8	8	16	0	0	0	0	0	0	1	0	1	9	8	17	9	10	19
27489	6	8	5	9	14	0	0	0	0	0	0	0	0	0	5	9	14	5	9	14
27491	5	8	4	9	13	0	0	0	0	0	0	0	0	0	4	9	13	4	9	13
27499	6	8	5	9	14	0	0	0	0	1	1	0	0	0	5	10	15	5	10	15
27501	7	8	8	7	15	0	0	0	0	0	0	0	0	0	8	7	15	10	8	18
27503	NONGRAVID																			
27506	7	8	5	10	15	0	0	0	0	0	0	0	0	0	5	10	15	5	12	17
27522	8	7	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	6	9	15
27530	7	11	8	10	18	0	0	0	0	0	0	0	0	0	8	10	18	8	10	18
27532	13	9	10	12	22	0	0	0	0	0	0	0	0	0	10	12	22	10	12	22
27541	5	5	3	7	10	0	0	0	3	4	7	0	0	0	6	11	17	8	12	20
27545	9	5	6	8	14	0	0	0	1	0	1	0	0	0	7	8	15	7	8	15
27550	5	10	5	10	15	0	0	0	1	0	1	0	0	0	6	10	16	7	10	17
27553	6	6	3	9	12	0	0	0	0	2	2	0	0	0	3	11	14	4	14	18
27570	7	3	5	5	10	0	0	0	1	3	4	0	0	0	6	8	14	6	11	17
TOTAL	162	168	143	187	330	0	0	0	9	13	22	1	0	1	153	200	353	164	218	382
MEAN	7.4	7.6	6.5	8.5	15.0	0.0	0.0	0.0	0.4	0.6	1.0	0.0	0.0	0.0	7.0	9.1	16.0	7.5	9.9	17.4
S.D.	2.17	2.04	2.35	2.24	2.94	0.00	0.00	0.00	0.80	1.10	1.72	0.21	0.00	0.21	2.38	2.16	2.21	2.46	2.56	2.79
S.E.	0.46	0.43	0.50	0.48	0.63	0.00	0.00	0.00	0.17	0.23	0.37	0.05	0.00	0.05	0.51	0.46	0.47	0.53	0.55	0.59
N =	22																			

TABLE A13
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 5: 600 MG/KG/DAY

DAM#	SEX		VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	M	F	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT HORN	RIGHT HORN	TOTAL	LEFT OVARY	RIGHT OVARY	TOTAL
27423	9	9	9	9	18	0	0	0	0	0	0	0	0	0	9	9	18	9	9	18
27438	9	8	6	11	17	0	0	0	0	0	0	0	0	0	6	11	17	6	11	17
27439	9	3	7	5	12	0	0	0	1	3	4	0	0	0	8	8	16	8	8	16
27440	7	7	5	9	14	0	0	0	0	2	2	0	0	0	5	11	16	5	11	16
27442	11	6	7	10	17	0	0	0	1	0	1	0	0	0	8	10	18	8	12	20
27455	8	7	3	12	15	0	0	0	0	0	0	0	0	0	3	12	15	3	12	15
27457	9	5	3	11	14	0	0	0	0	2	2	0	0	0	3	13	16	7	14	21
27461	8	8	8	8	16	0	0	0	0	0	0	0	0	0	8	8	16	8	8	16
27472	10	10	9	11	20	0	0	0	1	0	1	0	0	0	10	11	21	12	11	23
27476	9	6	7	8	15	0	0	0	0	0	0	0	0	0	7	8	15	7	8	15
27480	8	8	7	9	16	0	0	0	0	0	0	0	0	0	7	9	16	7	10	17
27483	9	5	5	9	14	0	0	0	1	1	2	0	0	0	6	10	16	6	10	16
27484	3	10	5	8	13	0	0	0	0	0	0	0	0	0	5	8	13	6	8	14
27485	9	8	7	10	17	0	0	0	0	0	0	0	0	0	7	10	17	7	10	17
27488	7	6	4	9	13	0	0	0	0	0	0	0	0	0	4	9	13	4	9	13
27496	7	8	8	7	15	0	0	0	0	0	0	0	0	0	8	7	15	8	7	15
27511	2	7	3	6	9	0	0	0	0	0	0	0	0	0	3	6	9	5	8	13
27514	6	7	5	8	13	0	0	0	0	2	2	0	0	0	5	10	15	6	10	16
27518	6	10	6	10	16	0	0	0	0	0	0	0	0	0	6	10	16	6	11	17
27534	7	9	8	8	16	0	0	0	0	1	1	0	0	0	8	9	17	8	9	17
27535	8	4	5	7	12	0	0	0	0	2	2	0	0	0	5	9	14	6	12	18
27539	7	9	9	7	16	0	0	0	0	0	0	0	0	0	9	7	16	9	7	16
27551	8	7	10	5	15	0	0	0	0	0	0	0	0	0	10	5	15	10	6	16
27557	8	6	8	6	14	0	0	0	0	0	0	0	0	0	8	6	14	9	6	15
27568	11	6	8	9	17	0	0	0	0	0	0	0	0	0	8	9	17	10	12	22
TOTAL	195	179	162	212	374	0	0	0	4	13	17	0	0	0	166	225	391	180	239	419
MEAN	7.8	7.2	6.5	8.5	15.0	0.0	0.0	0.0	0.2	0.5	0.7	0.0	0.0	0.0	6.6	9.0	15.6	7.2	9.6	16.8
S.D.	2.06	1.84	2.02	1.87	2.28	0.00	0.00	0.00	0.37	0.92	1.07	0.00	0.00	0.00	2.10	1.91	2.18	2.02	2.08	2.50
S.E.	0.41	0.37	0.40	0.37	0.46	0.00	0.00	0.00	0.07	0.18	0.21	0.00	0.00	0.00	0.42	0.38	0.44	0.40	0.42	0.50
N =	25																			

DAMS FROM GROUP 1:0 MG/KG/DAY SHAM

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
	#	#	%	%	%	%	%	%	%	%	%
27428	15.0	15.0	93.3	0.0	6.7	0.0	6.7	0.0	6.7	71.4	28.6
27435	16.0	15.0	93.3	0.0	6.7	0.0	6.7	6.3	6.7	35.7	64.3
27437	17.0	17.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	64.7	35.3
27451	12.0	12.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	66.7
27459	13.0	12.0	100.0	0.0	0.0	0.0	0.0	7.7	0.0	66.7	33.3
27468	19.0	18.0	88.9	0.0	11.1	0.0	11.1	5.3	11.1	37.5	62.5
27471	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	33.3
27481	14.0	14.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	57.1	42.9
27490	16.0	16.0	93.8	0.0	6.3	0.0	6.3	0.0	6.3	53.3	46.7
27493	18.0	18.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	55.6	44.4
27497	18.0	17.0	94.1	0.0	5.9	0.0	5.9	5.6	5.9	56.3	43.8
27500	21.0	20.0	95.0	0.0	5.0	0.0	5.0	4.8	5.0	52.6	47.4
27507	16.0	16.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	56.3
27508	17.0	17.0	94.1	0.0	5.9	0.0	5.9	0.0	5.9	62.5	37.5
27510	17.0	17.0	88.2	0.0	11.8	0.0	11.8	0.0	11.8	60.0	40.0
27512	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	40.0
27528	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	73.3
27544	19.0	14.0	100.0	0.0	0.0	0.0	0.0	26.3	0.0	57.1	42.9
27546	15.0	15.0	93.3	0.0	6.7	0.0	6.7	0.0	6.7	64.3	35.7
27552	16.0	16.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	31.3	68.8
27561	16.0	16.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	56.3
27564	16.0	16.0	93.8	0.0	6.3	0.0	6.3	0.0	6.3	33.3	66.7
MEAN	16.2	15.7	96.7	0.0	3.3	0.0	3.3	2.5	3.3	51.5	48.5
S.D.	2.04	1.86	3.97	0.00	3.98	0.00	3.98	5.90	3.98	13.49	13.49
S.E.	0.43	0.40	0.85	0.00	0.85	0.00	0.85	1.26	0.85	2.88	2.88
N	22	22	22	22	22	22	22	22	22	22	22

TABLE A14
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

DAMS FROM GROUP 2:0 MG/KG/DAY VEH.

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
	#	#	%	%	%	%	%	%	%	%	%
27419	17.0	17.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	52.9	47.1
27422	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3	46.7
27429	16.0	16.0	93.8	0.0	6.3	0.0	6.3	0.0	6.3	33.3	66.7
27431	16.0	16.0	87.5	0.0	12.5	0.0	12.5	0.0	12.5	42.9	57.1
27450	14.0	14.0	85.7	0.0	14.3	0.0	14.3	0.0	14.3	66.7	33.3
27458	17.0	17.0	88.2	0.0	5.9	5.9	11.8	0.0	11.8	53.3	46.7
27467	17.0	16.0	93.8	0.0	6.3	0.0	6.3	5.9	6.3	60.0	40.0
27473	13.0	12.0	91.7	0.0	8.3	0.0	8.3	7.7	8.3	45.5	54.5
27475	20.0	15.0	100.0	0.0	0.0	0.0	0.0	25.0	0.0	33.3	66.7
27477	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3	46.7
27479	17.0	17.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	52.9	47.1
27482	15.0	15.0	93.3	0.0	6.7	0.0	6.7	0.0	6.7	71.4	28.6
27504	18.0	18.0	94.4	0.0	5.6	0.0	5.6	0.0	5.6	64.7	35.3
27515	14.0	14.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	71.4
27516	15.0	14.0	100.0	0.0	0.0	0.0	0.0	6.7	0.0	71.4	28.6
27519	14.0	10.0	100.0	0.0	0.0	0.0	0.0	28.6	0.0	50.0	50.0
27521	19.0	19.0	89.5	0.0	10.5	0.0	10.5	0.0	10.5	41.2	58.8
27527	16.0	9.0	88.9	0.0	11.1	0.0	11.1	43.8	11.1	12.5	87.5
27531	18.0	17.0	100.0	0.0	0.0	0.0	0.0	5.6	0.0	70.6	29.4
27547	17.0	17.0	94.1	0.0	5.9	0.0	5.9	0.0	5.9	56.3	43.8
27563	14.0	14.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	64.3	35.7
MEAN	16.0	15.1	95.3	0.0	4.4	0.3	4.7	5.9	4.7	51.4	48.6
S.D.	1.83	2.47	5.11	0.00	4.86	1.29	5.11	11.85	5.11	15.43	15.43
S.E.	0.40	0.54	1.12	0.00	1.06	0.28	1.12	2.59	1.12	3.37	3.37
N	21	21	21	21	21	21	21	21	21	21	21

DAMS FROM GROUP 3: 100 MG/KG/DAY

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
#	#	%	%	%	%	%	%	%	%	%	%
27420	17.0	17.0	94.1	0.0	5.9	0.0	5.9	0.0	5.9	62.5	37.5
27425	16.0	16.0	68.8	0.0	31.3	0.0	31.3	0.0	31.3	54.5	45.5
27430	17.0	17.0	94.1	0.0	5.9	0.0	5.9	0.0	5.9	37.5	62.5
27454	14.0	14.0	92.9	0.0	7.1	0.0	7.1	0.0	7.1	53.8	46.2
27460	15.0	14.0	85.7	0.0	14.3	0.0	14.3	6.7	14.3	33.3	66.7
27463	15.0	15.0	93.3	0.0	6.7	0.0	6.7	0.0	6.7	28.6	71.4
27465	18.0	15.0	93.3	0.0	6.7	0.0	6.7	16.7	6.7	35.7	64.3
27466	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	80.0	20.0
27469	21.0	17.0	100.0	0.0	0.0	0.0	0.0	19.0	0.0	52.9	47.1
27470	26.0	16.0	93.8	0.0	6.3	0.0	6.3	38.5	6.3	40.0	60.0
27474	20.0	17.0	88.2	0.0	11.8	0.0	11.8	15.0	11.8	40.0	60.0
27478	15.0	15.0	80.0	0.0	20.0	0.0	20.0	0.0	20.0	41.7	58.3
27486	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	73.3
27494	15.0	15.0	86.7	0.0	13.3	0.0	13.3	0.0	13.3	38.5	61.5
27495	18.0	16.0	87.5	0.0	12.5	0.0	12.5	11.1	12.5	50.0	50.0
27502	17.0	17.0	88.2	0.0	11.8	0.0	11.8	0.0	11.8	60.0	40.0
27505	19.0	18.0	94.4	0.0	5.6	0.0	5.6	5.3	5.6	47.1	52.9
27509	19.0	16.0	87.5	0.0	12.5	0.0	12.5	15.8	12.5	64.3	35.7
27517	16.0	16.0	93.8	0.0	6.3	0.0	6.3	0.0	6.3	53.3	46.7
27524	20.0	20.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	60.0
27525	18.0	18.0	83.3	0.0	16.7	0.0	16.7	0.0	16.7	33.3	66.7
27538	18.0	17.0	100.0	0.0	0.0	0.0	0.0	5.6	0.0	52.9	47.1
27543	18.0	17.0	94.1	0.0	5.9	0.0	5.9	5.6	5.9	43.8	56.3
27548	16.0	14.0	100.0	0.0	0.0	0.0	0.0	12.5	0.0	78.6	21.4
27572	14.0	14.0	92.9	0.0	7.1	0.0	7.1	0.0	7.1	53.8	46.2
MEAN	17.3	16.0	91.7	0.0	8.3	0.0	8.3	6.1	8.3	48.1	51.9
S.D.	2.67	1.49	7.38	0.00	7.39	0.00	7.39	9.33	7.39	13.90	13.90
S.E.	0.53	0.30	1.48	0.00	1.48	0.00	1.48	1.87	1.48	2.78	2.78
N	25	25	25	25	25	25	25	25	25	25	25

DAMS FROM GROUP 4: 300 MG/KG/DAY

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
#	#	%	%	%	%	%	%	%	%	%	%
27426	15.0	15.0	93.3	0.0	6.7	0.0	6.7	0.0	6.7	64.3	35.7
27441	19.0	16.0	100.0	0.0	0.0	0.0	0.0	15.8	0.0	50.0	50.0
27443	16.0	16.0	81.3	0.0	18.8	0.0	18.8	0.0	18.8	46.2	53.8
27444	14.0	14.0	92.9	0.0	7.1	0.0	7.1	0.0	7.1	38.5	61.5
27446	25.0	21.0	100.0	0.0	0.0	0.0	0.0	16.0	0.0	47.6	52.4
27447	19.0	16.0	100.0	0.0	0.0	0.0	0.0	15.8	0.0	43.8	56.3
27448	18.0	18.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	33.3
27452	18.0	17.0	94.1	0.0	5.9	0.0	5.9	5.6	5.9	37.5	62.5
27487	19.0	17.0	94.1	0.0	0.0	5.9	5.9	10.5	5.9	50.0	50.0
27489	14.0	14.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	42.9	57.1
27491	13.0	13.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	38.5	61.5
27499	15.0	15.0	93.3	0.0	6.7	0.0	6.7	0.0	6.7	42.9	57.1
27501	18.0	15.0	100.0	0.0	0.0	0.0	0.0	16.7	0.0	46.7	53.3
27506	17.0	15.0	100.0	0.0	0.0	0.0	0.0	11.8	0.0	46.7	53.3
27522	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3	46.7
27530	18.0	18.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	38.9	61.1
27532	22.0	22.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	59.1	40.9
27541	20.0	17.0	58.8	0.0	41.2	0.0	41.2	15.0	41.2	50.0	50.0
27545	15.0	15.0	93.3	0.0	6.7	0.0	6.7	0.0	6.7	64.3	35.7
27550	17.0	16.0	93.8	0.0	6.3	0.0	6.3	5.9	6.3	33.3	66.7
27553	18.0	14.0	85.7	0.0	14.3	0.0	14.3	22.2	14.3	50.0	50.0
27570	17.0	14.0	71.4	0.0	28.6	0.0	28.6	17.6	28.6	70.0	30.0
MEAN	17.4	16.0	93.3	0.0	6.5	0.3	6.7	7.0	6.7	49.1	50.9
S.D.	2.79	2.21	10.62	0.00	10.72	1.26	10.62	7.91	10.62	10.17	10.17
S.E.	0.59	0.47	2.26	0.00	2.29	0.27	2.26	1.69	2.26	2.17	2.17
N	22	22	22	22	22	22	22	22	22	22	22

DAMS FROM GROUP 5: 600 MG/KG/DAY

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
#	#	%	%	%	%	%	%	%	%	%	%
27423	18.0	18.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0
27438	17.0	17.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	52.9	47.1
27439	16.0	16.0	75.0	0.0	25.0	0.0	25.0	0.0	25.0	75.0	25.0
27440	16.0	16.0	87.5	0.0	12.5	0.0	12.5	0.0	12.5	50.0	50.0
27442	20.0	18.0	94.4	0.0	5.6	0.0	5.6	10.0	5.6	64.7	35.3
27455	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3	46.7
27457	21.0	16.0	87.5	0.0	12.5	0.0	12.5	23.8	12.5	64.3	35.7
27461	16.0	16.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0
27472	23.0	21.0	95.2	0.0	4.8	0.0	4.8	8.7	4.8	50.0	50.0
27476	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	40.0
27480	17.0	16.0	100.0	0.0	0.0	0.0	0.0	5.9	0.0	50.0	50.0
27483	16.0	16.0	87.5	0.0	12.5	0.0	12.5	0.0	12.5	64.3	35.7
27484	14.0	13.0	100.0	0.0	0.0	0.0	0.0	7.1	0.0	23.1	76.9
27485	17.0	17.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	52.9	47.1
27488	13.0	13.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	53.8	46.2
27496	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	46.7	53.3
27511	13.0	9.0	100.0	0.0	0.0	0.0	0.0	30.8	0.0	22.2	77.8
27514	16.0	15.0	86.7	0.0	13.3	0.0	13.3	6.3	13.3	46.2	53.8
27518	17.0	16.0	100.0	0.0	0.0	0.0	0.0	5.9	0.0	37.5	62.5
27534	17.0	17.0	94.1	0.0	5.9	0.0	5.9	0.0	5.9	43.8	56.3
27535	18.0	14.0	85.7	0.0	14.3	0.0	14.3	22.2	14.3	66.7	33.3
27539	16.0	16.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	56.3
27551	16.0	15.0	100.0	0.0	0.0	0.0	0.0	6.3	0.0	53.3	46.7
27557	15.0	14.0	100.0	0.0	0.0	0.0	0.0	6.7	0.0	57.1	42.9
27568	22.0	17.0	100.0	0.0	0.0	0.0	0.0	22.7	0.0	64.7	35.3
MEAN	16.8	15.6	95.7	0.0	4.3	0.0	4.3	6.3	4.3	51.9	48.1
S.D.	2.50	2.18	6.81	0.00	6.81	0.00	6.81	9.05	6.81	12.28	12.28
S.E.	0.50	0.44	1.36	0.00	1.36	0.00	1.36	1.81	1.36	2.46	2.46
N	25	25	25	25	25	25	25	25	25	25	25

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A15
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL WEIGHTS [G]

PAGE 1

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP	1:	0	MG/KG/DAY	SHAM																		
27428	3.9	3.6	3.7	3.9	4.2	3.7	4.2	E	4.3/	3.9	4.0	3.8	4.4	4.3	3.9	3.2							
27435	4.0	3.8	3.9	4.1	4.1	3.3/	4.0	4.1	E	4.4	4.3	4.1	4.1	4.2	3.8	3.6							
27437	3.8	3.4	3.8	4.2	3.9	3.8	4.2/	3.8	3.6	4.0	3.5	4.0	3.7	3.6	4.1	3.6	3.7	3.6					
27451	3.9	3.4	4.4/	3.8	3.8	3.9	4.1	3.7	4.1	3.9	3.7	3.7	3.7										
27459	3.7	3.7	4.0	3.6	4.2	4.0	3.8/	3.5	3.8	3.7	3.8	3.4	3.3										
27468	2.9	2.8	3.0	2.5	2.8	3.6	1.9	3.6	3.1	2.6	3.2	E /	3.5	3.2	2.5	3.1	3.2	E	2.5				
27471	4.2	3.8	4.1	4.4	4.3	4.5	4.2/	4.2	4.0	4.5	4.5	4.6	4.4	4.0	3.9	3.4							
27481	3.8	3.9	3.3	4.2	3.9	3.8	3.7	4.1	3.9/	4.1	4.1	3.7	3.8	3.5	3.5								
27490	4.1	3.9	3.9	3.8	E	4.6	4.2/	3.5	4.3	4.2	4.0	4.3	4.0	4.3	4.5	3.9	3.5						
27493	3.6	3.1	3.1	3.2	3.4	3.4	3.6	3.5	4.2	4.0	4.1	3.3/	4.1	3.7	3.5	3.6	3.7	3.5	2.9				
27497	3.8	4.0	3.7	4.0	2.7	3.8	E	3.7	4.2/	4.0	3.9	3.8	4.0	3.9	3.9	4.0	3.6	3.2					
27500	3.7	3.5	3.9	3.6	3.9	4.0	4.1	E /	4.0	3.4	3.8	4.0	3.8	3.8	3.7	3.8	3.3	3.3	3.1	3.4	3.3		
27507	3.6	3.5	3.6	3.5	3.5	3.8	3.6	3.5	3.9/	3.5	3.9	3.8	3.8	3.8	3.5	3.4	3.6						
27508	3.5	3.4	3.3	E	3.5	3.6	3.7	3.5	3.5	3.7	3.4/	3.6	3.5	3.8	3.4	3.4	3.4	2.8					
27510	4.4	4.0	4.4	4.6	E	5.1	5.2/	4.6	4.6	E	4.9	4.7	4.4	3.2	4.3	4.5	4.4	3.5					
27512	3.8	3.9	4.0	4.1	3.9/	2.4	4.1	4.1	4.0	3.9	4.0	3.9	4.0	3.4	3.8	3.7							
27528	3.8	3.5	3.7	3.9	3.5	4.0	3.8	3.8	4.2/	3.8	3.9	4.1	3.8	3.8	3.9	3.3							
27544	4.0	3.8	3.8	4.0	4.4	3.9	4.0	4.2	4.4/	4.0	4.0	4.1	4.1	4.1	3.7								
27546	3.7	3.2	3.7	3.8	4.1	3.4	3.9	3.9/	E	3.6	4.0	3.6	3.5	3.4	3.7	3.5							
27552	3.7	3.6	3.6	3.7	3.6	4.1	3.8/	4.0	3.5	3.9	3.7	3.5	3.7	3.9	3.5	3.2	3.1						
27561	3.9	3.9	3.9	3.7	4.1	3.7	4.0	3.9	3.8	4.1/	4.2	3.8	4.1	4.4	3.8	3.8	3.4						
27564	3.9	3.6	4.1	4.0	3.9	3.8	4.0	4.1	4.4/	E	4.2	4.3	4.3	3.7	4.2	4.0	1.5						
MEAN	3.8																						
S.D.	0.29																						
S.E.	0.06																						
N	22																						

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

TABLE A15
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL WEIGHTS [G]

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP	2: 0 MG/KG/DAY VEH.																					
27419	3.8	3.9	4.0	3.7	4.1	3.1	3.4	3.8	4.2	3.9	3.9/	4.0	4.0	3.9	4.2	3.9	3.6	3.6					
27422	3.8	3.5	3.7	3.6	3.7	3.4	3.6	3.7	4.0	4.0	4.1/	4.2	4.1	3.9	3.6	3.4							
27429	3.5	3.4	3.5	3.7	3.8	3.6	3.5	3.8/	3.5	3.7	3.5	3.5	3.4	E	3.5	3.4	2.9						
27431	3.9	3.5	3.7	4.1	4.4	4.2/	4.1	4.2	4.0	4.5	3.9	3.6	4.0	E	E	3.6	2.8						
27450	3.9	3.6	4.0	4.0	E	4.0	4.4	4.1/	3.8	3.8	3.9	4.1	3.5	3.7	E								
27458	3.7	3.2	3.8	3.7	3.7	E	3.8	4.2/	4.0	4.0	3.8	3.7	3.7	3.6	L	3.3	3.6	3.3					
27467	3.6	E	3.5	3.5	3.7	3.8	3.8/	3.7	3.7	3.8	3.1	3.5	3.6	3.3	3.6	3.6	3.4						
27473	4.1	4.2	4.0/	4.5	3.9	4.3	4.2	4.2	4.3	4.2	E	4.1	3.6										
27475	3.8	3.1	3.9	4.1	3.6	3.9	3.6/	3.9	4.2	3.7	3.8	4.0	3.5	3.8	3.7	3.7							
27477	4.2	3.9	4.3	3.9	4.3	4.1	4.3/	4.3	3.9	4.3	4.3	4.2	4.2	4.6	4.0	4.0							
27479	3.6	4.0	3.7	3.4	3.5	3.8	3.9	4.0/	3.8	3.7	3.8	3.8	3.5	3.6	3.3	2.7	3.5	3.0					
27482	3.6	3.6	3.8	3.5/	4.0	3.7	3.7	3.8	3.8	3.5	3.5	3.7	3.1	3.4	E	2.9							
27504	3.6	3.2	3.8	3.6	3.2	3.5	3.8	2.8	3.8	4.2/	4.1	3.8	3.7	3.6	E	3.6	3.5	3.7	3.2				
27515	3.8	3.8	3.6	3.6	3.9	3.9	4.2	4.0/	4.1	3.4	3.6	3.7	4.0	4.0	3.4								
27516	3.8	3.4	3.5	4.0	3.8	4.0	3.7	3.9	3.7	3.5/	4.1	3.7	3.9	4.1	3.4								
27519	4.0	4.0/	4.5	4.1	3.9	4.5	4.0	3.9	3.7	3.7	3.8												
27521	3.5	3.2	3.6	3.5	3.5	3.9	E	3.4	E	3.3	3.3	3.4/	3.3	3.6	3.5	3.3	3.8	3.5	3.6	3.4			
27527	3.8	3.4	E	3.4	3.8	4.0	3.9/	4.0	4.0	3.5													
27531	3.9	4.1	3.7	3.9	4.0	4.0	4.0	3.4	3.8	3.9	4.0/	3.9	4.0	4.1	3.9	4.0	3.8	3.8					
27547	3.6	3.5	3.9	3.6	E	3.8/	3.6	3.5	3.5	3.8	3.5	3.6	3.5	3.4	3.8	3.6	3.4	3.1					
27563	4.2	4.3	4.4	4.2	4.1/	4.4	4.3	4.4	3.1	3.9	4.3	4.6	4.0	4.1	4.0								
MEAN	3.8																						
S.D.	0.21																						
S.E.	0.05																						
N	21																						

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

TABLE A15
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL WEIGHTS [G]

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP	3:	100	MG/KG/DAY																			
27420	3.6	3.3	3.4	3.4	3.4	3.1	3.9/	3.9	3.6	4.2	3.9	3.5	4.0	4.0	3.6	E	3.5	3.3					
27425	3.6	E	E	E	E	E	3.6	4.0	4.0/	3.3	3.1	4.0	3.7	3.7	3.6	3.6	3.4						
27430	3.5	E	3.7	3.2	3.7	3.9/	3.5	3.7	4.2	3.9	3.9	3.2	3.2	3.5	3.3	3.2	3.4	3.1					
27454	4.1	3.7	4.3	4.2	4.4	3.9	4.2	4.2/	4.1	4.6	4.2	E	4.1	3.9	3.6								
27460	3.9	4.0	4.2	E	3.9	4.1	4.0/	4.0	3.7	4.2	3.9	3.7	3.7	3.9	E								
27463	3.7	3.3	3.6	3.5	3.6	3.8	3.6	3.9	3.7/	3.9	4.1	3.8	E	3.6	3.8	3.4							
27465	3.3	2.9	3.0	2.2	3.2	3.2	E	3.5	4.0	3.7	3.6/	3.6	3.4	3.2	3.4	2.8							
27466	3.6	3.3	3.9	3.6	3.4	3.9	3.4/	3.8	3.7	3.1	3.6	3.6	3.9	3.7	3.5	3.3							
27469	3.8	3.5	3.7	3.1	3.8	3.8	4.0	4.3	4.1	3.9	4.0/	3.7	4.1	3.9	3.9	3.8	3.6	3.3					
27470	3.3	3.1	3.7	E	3.1	3.1	3.3	3.8/	3.4	3.5	3.5	3.5	3.5	3.4	3.0	3.1	3.2						
27474	3.7	3.2	4.0	E	4.1	3.6	3.9	E	3.8	3.8	3.4/	4.3	3.7	3.6	4.0	3.6	3.4	3.0					
27478	3.8	3.9	E	E	4.3/	3.9	3.6	3.8	3.9	4.0	3.8	4.0	E	3.5	3.4	3.5							
27486	3.8	3.4	3.6	3.6	3.9	4.0	4.1/	4.4	3.7	3.8	3.7	3.9	3.8	3.7	3.7	3.1							
27494	4.0	E	E	4.3	3.0	4.2	4.5	4.2	4.2/	4.3	3.8	4.1	4.2	4.0	4.1	3.3							
27495	3.8	3.6	3.9	3.7	4.3	4.2/	4.1	3.9	3.9	3.9	E	3.8	3.8	3.4	3.6	3.2	E						
27502	3.6	3.2	3.3	E	3.5	3.8	E	3.7	3.9/	3.6	3.4	3.5	3.7	3.8	3.8	3.8	3.8	3.1					
27505	3.4	3.1	2.6	3.1	3.3	3.4	3.3	3.7	E	3.7	3.7	3.6/	3.7	3.7	3.7	3.4	3.5	3.4	3.4				
27509	3.8	3.9	3.7	4.3	3.7	4.2	E /	3.5	3.7	3.8	3.9	E	4.1	3.8	3.6	3.0	3.5						
27517	3.8	3.5	3.7	4.0	4.1	3.7/	4.3	4.2	3.8	4.0	E	4.1	3.9	3.9	3.6	3.1	3.4						
27524	3.4	3.5	3.7	3.6	3.7	3.8	3.3	3.6/	3.4	3.4	3.4	3.7	3.4	3.6	3.3	3.3	3.1	2.9	3.3	3.1	2.5		
27525	3.6	E	3.5	3.5	E	3.8	E	3.5	3.6	4.2	4.1/	4.1	2.9	3.9	3.7	3.7	3.7	3.4	3.0				
27538	3.5	3.1	3.2	3.4	3.7	3.6	3.7	3.6	4.0	3.6/	3.8	3.5	3.6	3.8	3.4	3.7	3.3	3.2					
27543	4.0	3.8	3.7	3.7	4.1	3.9	4.6	4.4	4.6/	4.1	3.6	4.2	E	3.9	4.2	4.1	3.6	3.2					
27548	4.0	3.6	4.3	4.4	4.2	3.7	4.2	3.8/	4.1	4.4	3.6	4.3	3.8	3.8	3.3								
27572	3.3	3.5	3.3	3.5	3.4/	3.3	3.0	3.8	3.6	3.7	E	3.4	3.4	3.0	2.6								
MEAN	3.7																						
S.D.	0.23																						
S.E.	0.05																						
N	25																						

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

TABLE A15
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL WEIGHTS [G]

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP	4:	300	MG/KG/DAY																			
27426	4.1	3.8	4.4	4.4	4.3/	4.0	4.2	4.1	3.7	4.1	4.2	4.5	3.8	3.8	E	3.9							
27441	3.4	3.0	3.2	3.1	3.5	3.6	3.3	3.6	3.4	3.5/	3.8	3.5	3.3	3.7	3.5	3.3	3.4						
27443	3.4	3.4	3.5	3.2	E	3.4	3.4	3.3	E	3.6	3.3	3.2/	4.0	3.7	3.7	E	3.1						
27444	3.7	3.1	3.5	E	3.7	3.6	3.3	3.8	3.7	3.8	4.1/	3.5	4.0	3.9	3.6								
27446	3.6	3.3	3.8	3.6	3.7	3.7	3.7	3.9	3.6	4.2/	4.0	3.8	3.7	3.4	3.7	3.6	3.4	3.5	3.8	3.0	3.4	3.4	
27447	3.9	4.0	4.0	4.1	4.2	4.0/	4.1	3.8	3.9	4.3	3.8	3.9	3.4	3.9	3.8	3.5	3.5						
27448	3.4	3.4	3.3	3.6	3.1	3.4	3.2	2.7	3.4	3.5	3.7	3.8/	3.7	3.6	3.5	3.2	3.0	3.1	3.1				
27452	3.7	4.0	3.6	4.0	3.5	3.7	3.4/	3.5	3.6	3.5	4.2	4.0	4.3	3.5	E	3.7	3.5	3.1					
27487	3.5	3.4	L	3.2	2.8	3.6	3.7	3.4	3.9	3.7/	3.7	3.4	3.8	3.8	3.7	3.6	3.3	3.5					
27489	3.5	3.8	3.6	3.9	3.9	3.8/	3.7	3.0	3.7	3.7	3.6	3.5	3.1	3.1	3.1								
27491	3.8	3.8	4.0	4.0	4.3/	4.1	3.8	3.8	4.0	3.8	3.4	3.7	3.7	3.3									
27499	4.1	3.8	3.8	4.3	4.4	4.7/	4.6	4.3	4.2	E	4.0	3.8	3.9	3.9	3.6	4.0							
27501	3.6	3.4	3.6	3.3	3.7	3.6	3.5	3.5	3.5/	3.9	3.6	4.0	3.6	3.6	3.2	3.3							
27506	4.1	4.0	4.2	4.2	4.8	4.2/	4.2	4.1	3.9	4.2	4.1	4.2	4.0	3.9	4.1	3.6							
27522	3.8	3.8	4.1	4.2	3.7	3.8	3.9/	3.6	3.8	4.0	3.8	3.4	4.1	3.9	3.6	3.5							
27530	3.8	3.8	4.3	3.7	3.8	3.9	3.5	3.8	3.6/	4.1	3.5	4.3	3.9	3.4	3.7	4.1	3.8	4.1	3.4				
27532	4.3	4.5	4.1	4.5	4.4	4.6	4.6	4.5	4.3	4.0	4.2/	4.4	4.6	4.1	4.3	4.3	4.6	4.2	4.5	3.9	3.6	3.8	3.6
27541	3.2	3.2	E	3.8	E	2.9	E /	2.4	E	3.4	E	3.3	3.3	E	3.3	3.1	3.0	E					
27545	3.6	3.1	3.8	3.8	E	3.5	3.6	4.2/	3.6	3.6	3.9	3.7	3.2	3.6	3.5	3.2							
27550	3.5	3.7	E	3.5	3.6	3.8	4.1/	3.2	3.3	3.3	3.5	3.6	3.3	3.7	3.7	3.2	3.1						
27553	3.7	3.8	3.8	4.1/	4.2	3.7	E	3.8	4.0	E	3.9	3.4	3.6	3.6	3.0								
27570	4.0	E	3.8	3.7	4.2	4.3	3.8/	3.7	E	4.3	3.8	E	E	4.1	3.8								
MEAN	3.7																						
S.D.	0.28																						
S.E.	0.06																						
N	22																						

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

TABLE A15
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL WEIGHTS [G]

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP	5:	600	MG/KG/DAY																			
27423	3.8	3.7	3.7	3.6	3.8	3.9	3.7	3.6	3.6	4.0/	4.0	3.8	4.0	4.0	3.9	3.9	3.6	3.4	3.6				
27438	3.5	3.2	3.4	3.8	3.6	3.7	4.1/	3.9	3.5	3.6	3.6	3.6	3.5	3.7	3.4	3.1	3.2	2.5					
27439	4.2	3.9	4.0	4.3	4.1	E	4.0	4.5	4.5/	4.5	3.9	E	4.3	E	4.5	3.7	E						
27440	4.2	4.0	4.4	4.5	4.5	4.2/	4.3	E	4.4	4.1	E	4.5	4.2	3.9	3.9	3.8	3.4						
27442	3.5	3.4	3.5	3.6	3.8	E	3.5	3.6	3.8/	4.0	3.8	3.5	3.9	3.4	3.3	3.1	3.1	3.2	3.7				
27455	3.6	3.4	4.0	3.3/	3.3	3.7	3.7	3.9	3.6	3.9	3.9	3.4	3.6	3.1	3.6	3.5							
27457	3.6	3.4	3.6	3.9/	E	3.5	3.7	4.0	3.9	4.2	3.6	3.2	3.4	3.6	3.4	2.4	E						
27461	4.1	3.9	4.4	3.7	4.2	4.1	4.1	4.1	4.2/	4.4	4.0	4.1	4.1	4.2	4.1	3.5	3.8						
27472	3.1	2.9	2.9	3.2	3.2	3.2	E	3.2	3.4	3.1	3.5/	3.3	3.3	3.2	3.0	3.3	3.3	3.0	3.2	3.0	3.1	2.1	
27476	3.7	3.3	3.8	3.8	3.7	3.8	3.7	3.9/	3.6	4.0	4.0	3.6	4.0	3.5	3.5	3.0							
27480	3.6	3.1	3.2	3.8	3.7	3.8	3.6	4.0/	3.7	3.6	3.8	3.8	3.6	3.8	4.1	3.4	3.0						
27483	3.5	3.4	3.4	E	2.9	3.9	3.7/	3.8	3.5	3.5	E	3.6	3.5	3.6	3.5	3.6	3.4						
27484	3.8	4.1	3.5	4.5	3.9	3.9/	4.5	3.7	3.7	3.9	3.8	3.6	3.3	3.2									
27485	3.5	3.6	3.9	3.8	3.4	3.7	4.1	3.6/	3.8	3.4	3.5	3.7	3.5	3.7	3.3	3.3	3.1	2.8					
27488	3.5	3.4	3.5	3.5	4.0/	3.5	3.7	3.3	3.3	3.6	3.4	3.5	3.4	3.2									
27496	4.0	3.1	4.0	4.2	4.0	4.2	4.2	4.0	4.4/	4.0	4.0	3.9	3.9	4.4	3.4	3.7							
27511	4.0	3.5	3.9	4.1/	4.4	3.9	4.0	4.3	3.9	3.9													
27514	3.5	3.7	3.7	3.7	3.5	3.5/	3.1	3.9	3.9	E	2.6	3.5	3.6	E	3.6	3.4							
27518	3.2	3.2	3.1	3.3	3.5	3.4	3.4/	3.3	3.1	3.1	3.7	3.4	3.4	3.1	3.0	2.7	2.5						
27534	3.9	3.5	3.9	3.8	3.9	3.8	3.6	3.9	3.7/	E	4.0	3.9	4.1	3.6	4.2	4.2	4.0	3.7					
27535	3.9	3.7	3.8	3.7	3.7	4.6/	3.8	4.0	E	4.4	E	4.4	3.8	3.7	3.6								
27539	3.7	3.4	3.7	3.7	3.7	3.6	3.6	3.6	3.9	3.9/	3.8	4.0	3.7	3.8	3.8	3.4	3.4						
27551	3.8	3.6	3.2	3.8	3.7	3.9	4.2	3.8	4.2	3.9	4.2/	4.1	3.8	3.9	3.4	3.5							
27557	3.6	3.3	3.6	3.0	3.3	3.6	3.7	3.7	3.4/	3.7	3.9	3.7	3.9	3.4	3.6								
27568	3.6	3.1	3.3	3.5	3.5	3.8	3.8	3.6	4.1/	4.0	3.9	3.4	3.8	3.4	3.5	3.6	3.4	3.1					
MEAN	3.7																						
S.D.	0.28																						
S.E.	0.06																						
N	25																						

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 1

DAMS FROM GROUP 1:0 MG/KG/DAY SHAM FETUS # GRADE

27428		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
		A	A	A	A	A	A	E	A/	A	A	A	A	A	A	A	
	SEX:	M	M	F	M	F	M	-	M	F	M	F	M	M	M	M	
	CEPHALIC:	1,3,5,8,10,12,14															
	SKELETAL	2	V CERVICAL CENTRUM #1 OSSIFIED														P
	SKELETAL	4	V CERVICAL CENTRUM #1 OSSIFIED														P
	SKELETAL	5	V CERVICAL CENTRUM #1 OSSIFIED														P
	EXTERNAL	7	EARLY RESORPTION														
	SKELETAL	9	V CERVICAL CENTRUM #1 OSSIFIED														P
	SKELETAL	12	V CERVICAL CENTRUM #1 OSSIFIED														P
	SKELETAL	13	V CERVICAL CENTRUM #1 OSSIFIED														P
	SKELETAL	15	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED														P
			#5 AND #6														
			V 7TH CERVICAL RIB(S)														P
			INTERMEDIATE, RIGHT														
			NO REMARKABLE OBSERVATIONS														
	EXTERNAL		1,2,3,4,5,6,8,9,10,11,12,13,14,15														
	VISCERAL		1,2,3,4,5,6,8,9,10,11,12,13,14,15														
	SKELETAL		1,3,6,8,10,11,14														
27435		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
		A	A	A	A	A/	A	A	E	A	A	A	A	A	A	A	
	SEX:	M	F	F	M	M	F	M	-	F	F	F	F	M	F	F	
	CEPHALIC:	2,4,6,9,11,13,15															
	SKELETAL	1	V CERVICAL CENTRUM #1 OSSIFIED														P
	EXTERNAL	8	EARLY RESORPTION														
	SKELETAL	11	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED														P

A = VIABLE FETUS, E = EARLY RESORPTION, L = LATE RESORPTION, D = DEAD FETUS, "/" DENOTES CERVIX POSITION
OBSERVATION CODE: M = MALFORMATION, V = VARIATION GRADE CODE: 1 = SLIGHT, 2 = MODERATE, 3 = MARKED, P = PRESENT
SEX CODE: M = MALE, F = FEMALE, - = NOT APPLICABLE

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 2

DAMS FROM GROUP 1:0 MG/KG/DAY SHAM FETUS # GRADE

27435 (CONTINUED)

#5
NO REMARKABLE OBSERVATIONS
1,2,3,4,5,6,7,9,10,11,12,13,14,15
1,2,3,4,5,6,7,9,10,11,12,13,14,15
2,3,4,5,6,7,9,10,12,13,14,15

27437

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
A A A A A A/ A A A A A A A A A A
SEX: F M M F F M F M M F M M F M M M M
CEPHALIC: 2,4,6,8,10,12,14,16

SKELETAL	1	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
		#4 AND #5	
SKELETAL	2	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	4	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	5	V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
SKELETAL	6	V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
SKELETAL	9	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	11	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	13	V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
SKELETAL	14	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	15	V CERVICAL CENTRUM #1 OSSIFIED	P

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OBSERVATION CODE: M = MALFORMATION, V = VARIATION GRADE CODE: 1 = SLIGHT, 2 = MODERATE, 3 = MARKED, P = PRESENT
SEX CODE: M = MALE, F = FEMALE, - = NOT APPLICABLE

PROJECT NO.: WIL-402014
 SPONSOR: AMERICAN PETROLEUM

TABLE A16
 DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
 INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 3

DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27437	(CONTINUED)		
	SKELETAL	17 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	
	SKELETAL	3, 7, 8, 10, 12, 16	
27451		1 2 3 4 5 6 7 8 9 10 11 12	
		A A/ A A A A A A A A A A	
	SEX:	F M F F F M F M F F F M	
	CEPHALIC:	2, 4, 6, 8, 10, 12	
	SKELETAL	1 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V REDUCED OSSIFICATION OF THE SKULL PARIETAL, RIGHT	1
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	
	SKELETAL	2, 3, 4, 6, 7, 8, 10, 11, 12	
27459		1 2 3 4 5 6 7 8 9 10 11 12	
		A A A A A A/ A A A A A A	
	SEX:	F M F M M F F M M M M M	
	CEPHALIC:	2, 4, 6, 8, 10, 12	
	SKELETAL	1 V 14TH RUDIMENTARY RIB(S) LEFT	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	3 V 14TH RUDIMENTARY RIB(S) #5	P

A = VIABLE FETUS, E = EARLY RESORPTION, L = LATE RESORPTION, D = DEAD FETUS, "/" DENOTES CERVIX POSITION
 OBSERVATION CODE: M = MALFORMATION, V = VARIATION GRADE CODE: 1 = SLIGHT, 2 = MODERATE, 3 = MARKED, P = PRESENT
 SEX CODE: M = MALE, F = FEMALE, - = NOT APPLICABLE

PROJECT NO.:WIL-402014
SPONSOR:AMERICAN PETROLEUM

TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 4

DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27459	(CONTINUED)		
		LEFT	
	SKELETAL	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	6 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	7 V 14TH RUDIMENTARY RIB(S)	P
	SKELETAL	12 BILATERAL V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12	
	SKELETAL	1,2,3,4,5,6,7,8,9,10,11,12 2,5,8,9,10,11	
27468		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 A A A A A A A A A E/ A A A A E A SEX: F F F F M F F M F F - F M F M M - M CEPHALIC: 1,3,5,7,9,12,14,16	
	SKELETAL	1 V 7TH CERVICAL RIB(S) PINPOINT, RIGHT	P
		V UNCO-OSSIFIED VERTEBRAL CENTRA THORACIC #4 THROUGH #6, #8 AND #11	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	2 V 14TH RUDIMENTARY RIB(S) BILATERAL	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 5

DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #		GRADE
27468	(CONTINUED)			
	SKELETAL	3	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	VISCERAL	4	V MAJOR BLOOD VESSEL VARIATION RETROESOPHAGEAL RIGHT SUBCLAVIAN: RIGHT SUBCLAVIAN COURSES RETROESOPHAGEAL AND JOINS AORTIC ARCH ADJACENT TO DUCTUS ARTERIOSUS (NO BRACHIOCEPHALIC TRUNK)	P
	SKELETAL		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	VISCERAL	6	M RIGHT-SIDED AORTIC ARCH AORTIC ARCH AND DESCENDING AORTA COURSE TO THE RIGHT OF THE VERTEBRAL COLUMN; RIGHT CAROTID AND RIGHT SUBCLAVIAN ARISE INDEPENDENTLY FROM THE AORTIC ARCH (NO BRACHIOCEPHALIC TRUNK); LEFT CAROTID AND LEFT SUBCLAVIAN ARISE FROM A COMMON VESSEL FROM THE AORTIC ARCH	P
	SKELETAL		V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES CERVICAL #3 THROUGH #6, BILATERAL	1
			V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	9	#5 AND #6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	10	#5 V 14TH RUDIMENTARY RIB(S) LEFT	P
			V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	EXTERNAL	11	#5 EARLY RESORPTION	
	SKELETAL	12	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	13	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	14	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 6

DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27468	(CONTINUED)		
		#5 AND #6	
SKELETAL		V 14TH RUDIMENTARY RIB(S) LEFT	P
SKELETAL	15	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
SKELETAL	16	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
EXTERNAL	17	#5 EARLY RESORPTION	
SKELETAL	18	V 7TH CERVICAL RIB(S) PINPOINT, RIGHT	P
		V 14TH RUDIMENTARY RIB(S) BILATERAL	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5 V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES CERVICAL #3 THROUGH #6, BILATERAL; #7, RIGHT	1
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,2,3,4,5,6,7,8,9,10,12,13,14,15,16,18	
VISCERAL		1,2,3,5,7,8,9,10,12,13,14,15,16,18	
SKELETAL		5,7,8	
27471		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
		A A A A A A/ A A A A A A A A A	
	SEX:	F M M F M M M F M F M M M F M	
	CEPHALIC:	2,4,6,8,10,12,14	
SKELETAL	1	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	2	V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S) LEFT	P

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DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #		GRADE
27471	(CONTINUED)			
	SKELETAL	4	V CERVICAL CENTRUM #1 OSSIFIED V 14TH RUDIMENTARY RIB(S) LEFT	P P
	SKELETAL	5	V CERVICAL CENTRUM #1 OSSIFIED V 14TH RUDIMENTARY RIB(S) LEFT	P P
	SKELETAL	6	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	7	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8	V CERVICAL CENTRUM #1 OSSIFIED V 14TH RUDIMENTARY RIB(S) RIGHT	P P
	SKELETAL	9	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	10	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	11	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	12	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	13	V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS		
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15		
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15		
	SKELETAL	3,14,15		
27481		1 2 3 4 5 6 7 8 9 10 11 12 13 14		
		A A A A A A A A/ A A A A A A		
	SEX:	M F M M M F M F M F F M F M		
	CEPHALIC:	2,4,6,8,10,12,14		
	SKELETAL	8	V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE) #4 AND #5	1
	SKELETAL	9	V CERVICAL CENTRUM #1 OSSIFIED	P

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DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27481	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	SKELETAL	1,2,3,4,5,6,7,10,11,12,13,14	
27490		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A E A A/ A A A A A A A A A A	
	SEX:	M F F - M F F M F F F M M M M M	
	CEPHALIC:	1,3,6,8,10,12,14,16	
	SKELETAL	1 V 14TH RUDIMENTARY RIB(S) RIGHT	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5 AND #6	P
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P P
	SKELETAL	3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	EXTERNAL	4 EARLY RESORPTION	
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	7 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	10 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P

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PAGE 9

DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27490	(CONTINUED)		
	SKELETAL	12 V 7TH CERVICAL RIB(S) INTERMEDIATE, LEFT	P
	SKELETAL	14 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	16 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,5,6,7,8,9,10,11,12,13,14,15,16	
	SKELETAL	1,2,3,5,6,7,8,9,10,11,12,13,14,15,16 5,8,13,15	
27493		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 A A A A A A A A A A A/ A A A A A A A SEX: M F F F M M M M M M F F F F M M M F CEPHALIC: 2,4,6,8,10,12,14,16,18	
	SKELETAL	6 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	12 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	
	SKELETAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18 1,2,3,4,5,7,8,9,10,11,13,14,15,16,17,18	
27497		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 A A A A A E A A/ A A A A A A A A A SEX: M M M F F - M F F M M M F M M F F CEPHALIC: 2,4,7,9,11,13,15,17	
	SKELETAL	1 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE) #4 AND #5	1

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 10

DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27497	(CONTINUED)		
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	EXTERNAL	6 EARLY RESORPTION	
	SKELETAL	8 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	12 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	15 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	16 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL	3,5,7,9,11,14,17	
27500		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	
		A A A A A A E/ A A A A A A A A A A A A A A	
	SEX:	M M F F M M - M F M F M F F M F F F M M	
	CEPHALIC:	1,3,5,8,10,12,14,16,18,20	
	SKELETAL	3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	EXTERNAL	7 EARLY RESORPTION	
	SKELETAL	14 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	18 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27500	(CONTINUED)		
		#5	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	
VISCERAL		1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	
SKELETAL		1, 2, 5, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 19, 20	
27507		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A A A A A A/ A A A A A A A A	
	SEX:	M M M F M F F F F M M F F F M F	
	CEPHALIC:	2, 4, 6, 8, 10, 12, 14, 16	
SKELETAL		4 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
VISCERAL		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
SKELETAL		1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
27508		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
		A A E A A A A A A A/ A A A A A A A	
	SEX:	M F - F M M F M M F M F M M M F	
	CEPHALIC:	1, 4, 6, 8, 10, 12, 14, 16	
SKELETAL		1 V CERVICAL CENTRUM #1 OSSIFIED	P
EXTERNAL		3 EARLY RESORPTION	
SKELETAL		5 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		7 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		8 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	

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DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #		GRADE
27508	(CONTINUED)			
	SKELETAL	10	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	11	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	13	V CERVICAL CENTRUM #1 OSSIFIED	P
			V 14TH RUDIMENTARY RIB(S)	P
	SKELETAL	17	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			NO REMARKABLE OBSERVATIONS	
	EXTERNAL		1,2,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL		1,2,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL		2,4,6,12,14,15,16	
27510		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
		A A A E A A/ A A E A A A A A A A A		
	SEX:	F F M - M M F M - M M F F F M M M		
	CEPHALIC:	1,3,6,8,11,13,15,17		
	SKELETAL	1	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	2	V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	4	EARLY RESORPTION	
	SKELETAL	7	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8	V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	9	EARLY RESORPTION	
	SKELETAL	10	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	11	V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
			#4	
	SKELETAL	13	V 14TH RUDIMENTARY RIB(S)	P
			LEFT	

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PAGE 13

DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27510	(CONTINUED)		
	SKELETAL	14 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	15 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	16 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	17 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,5,6,7,8,10,11,12,13,14,15,16,17	
	SKELETAL	1,2,3,5,6,7,8,10,11,12,13,14,15,16,17 3,5,6,12	
27512		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 A A A A/ A A A A A A A A A SEX: M M M F F M M F F M M M F M F CEPHALIC: 1,3,5,7,9,11,13,15	
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES CERVICAL #3 THROUGH #7, BILATERAL V STERNEBRA(E) #1,#2,#3 AND/OR #4 UNOSSIFIED #1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5 AND #6 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE) #1 AND #2 V 27 PRESACRAL VERTEBRAE	1 P 1 P
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	SKELETAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15 1,3,4,6,7,8,9,10,11,12,14,15	
27528		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 A A A A A A A A/ A A A A A A A SEX: F F F F M F F M F F M F F M F CEPHALIC: 1,3,5,7,9,11,13,15	

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DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27528	(CONTINUED)		
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	13 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	SKELETAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
27544		1 2 3 4 5 6 7 8 9 10 11 12 13 14	
	SEX:	A A A A A A A/ A A A A A A	
	CEPHALIC:	F F F M F M F M M M F M M M	
		1,3,5,7,9,11,13	
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	6 V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
	SKELETAL	7 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	SKELETAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14	
27546		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
	SEX:	A A A A A A A/ E A A A A A A	
	CEPHALIC:	F M M M F M M - M M F F F M M	
		1,3,5,7,10,12,14	

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DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27546	(CONTINUED)		
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	EXTERNAL	8 EARLY RESORPTION	
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	12 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	13 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,9,10,11,12,13,14,15	
	SKELETAL	1,2,3,4,5,6,7,9,10,11,12,13,14,15	
27552		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
	SEX:	A A A A A A/ A A A A A A A A A	
	CEPHALIC:	F F F M M F M F M F F F M F F F	
	VISCERAL	3 V RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S)	2
	SKELETAL	4 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
	SKELETAL	8 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	15 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	16 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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DAMS FROM GROUP	1:0 MG/KG/DAY SHAM	FETUS #	GRADE
27552	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	VISCERAL	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	SKELETAL	1, 2, 3, 5, 6, 7, 9, 10, 11, 12, 13, 14	
27561		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
	SEX:	A A A A A A A A A/ A A A A A A A	
	CEPHALIC:	M F M F F F F M M F F M M F M F	
		2, 4, 6, 8, 10, 12, 14, 16	
	SKELETAL	9 V CERVICAL CENTRUM #1 OSSIFIED	P
		V HYOID UNOSSIFIED	P
	SKELETAL	14 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	15 V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	SKELETAL	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 16	
27564		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
	SEX:	A A A A A A A A/ E A A A A A A A	
	CEPHALIC:	F M M F F F M F - F F M F M F F	
		1, 3, 5, 7, 10, 12, 14, 16	
	SKELETAL	4 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	7 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#6	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP		1:0 MG/KG/DAY SHAM	FETUS #		GRADE

27564	(CONTINUED)				
	EXTERNAL		9	EARLY RESORPTION	
	SKELETAL		16	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
				#5	
				V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES	1
				CERVICAL #3 THROUGH #6, BILATERAL	
				NO REMARKABLE OBSERVATIONS	
	EXTERNAL			1,2,3,4,5,6,7,8,10,11,12,13,14,15,16	
	VISCERAL			1,2,3,4,5,6,7,8,10,11,12,13,14,15,16	
	SKELETAL			1,2,3,5,6,8,10,11,12,13,14,15	

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DAMS FROM GROUP 2:0 MG/KG/DAY VEH. FETUS # GRADE

27419

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	A	A	A	A	A	A	A	A	A	A/	A	A	A	A	A	A	A
SEX:	M	M	F	M	F	M	F	M	F	F	F	F	M	M	M	F	M
CEPHALIC:	2,4,6,8,10,12,14,16																

SKELETAL	2	V 7TH CERVICAL RIB(S) PINPOINT, LEFT	P
SKELETAL	4	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
SKELETAL	6	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
SKELETAL	7	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
SKELETAL	12	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
SKELETAL	17	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	NO REMARKABLE OBSERVATIONS		
EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17		
VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17		
SKELETAL	1,3,5,8,9,10,11,13,14,15,16		

27422

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	A	A	A	A	A	A	A	A	A/	A	A	A	A	A	A
SEX:	M	M	M	M	F	M	F	F	F	F	M	M	M	F	F
CEPHALIC:	1,3,5,7,9,11,13,15														

SKELETAL	2	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	4	V CERVICAL CENTRUM #1 OSSIFIED	P

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #	GRADE
27422	(CONTINUED)		
	SKELETAL	6 V 14TH RUDIMENTARY RIB(S) BILATERAL	P
	SKELETAL	8 V CERVICAL CENTRUM #1 OSSIFIED NO REMARKABLE OBSERVATIONS	P
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	SKELETAL	1,3,5,7,9,10,11,12,13,14,15	
27429		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 A A A A A A A/ A A A A A E A A A SEX: F F M M M F M F F F F F - F M F CEPHALIC: 2,4,6,8,10,12,15	
	SKELETAL	8 V STERNEBRA(E) #1,#2,#3 AND/OR #4 UNOSSIFIED #2	P
	SKELETAL	11 V STERNEBRA(E) #1,#2,#3 AND/OR #4 UNOSSIFIED #2	P
	SKELETAL	12 V 14TH RUDIMENTARY RIB(S) BILATERAL	P
	EXTERNAL	13 EARLY RESORPTION NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,14,15,16	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,14,15,16	
	SKELETAL	1,2,3,4,5,6,7,9,10,14,15,16	
27431		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 A A A A A/ A A A A A A E E A A SEX: F F M M F F F F M F F M - - M M CEPHALIC: 2,4,6,8,10,12,16	

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OBSERVATION CODE: M = MALFORMATION, V = VARIATION GRADE CODE: 1 = SLIGHT, 2 = MODERATE, 3 = MARKED, P = PRESENT
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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #		GRADE
27431	(CONTINUED)			
	SKELETAL	2	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4	V CERVICAL CENTRUM #1 OSSIFIED	P
			V 7TH CERVICAL RIB(S)	P
			PINPOINT, LEFT	
	SKELETAL	5	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	6	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	7	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8	V 14TH RUDIMENTARY RIB(S)	P
			LEFT	
	SKELETAL	9	V CERVICAL CENTRUM #1 OSSIFIED	P
			V 7TH CERVICAL RIB(S)	P
			PINPOINT, LEFT	
	SKELETAL	10	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	12	V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	13	EARLY RESORPTION	
	EXTERNAL	14	EARLY RESORPTION	
	SKELETAL	15	V CERVICAL CENTRUM #1 OSSIFIED	P
	VISCERAL	16	M LUNGS- LOBULAR DYSGENESIS	P
			ONE LOBE PRESENT, BILATERAL	
			M SITUS INVERSUS	P
			TRACHEA, ESOPHAGUS, HEART, GREAT AND MAJOR VESSELS, LIVER, STOMACH, PANCREAS, SPLEEN, KIDNEYS, ADRENALS, AND INTESTINE LATERALLY TRANSPOSED	
	SKELETAL		M VERTEBRAL ANOMALY WITH OR WITHOUT ASSOCIATED RIB ANOMALY	P
			RIGHT HALF OF THORACIC CENTRUM #13 ABSENT; RIGHT HALVES OF LUMBAR CENTRA #2 AND #3 FUSED; RIGHT HALF OF LUMBAR CENTRUM #1 MALPOSITIONED; RIGHT LUMBAR ARCHES #2 AND #3 LARGER AND LOCATED MORE ANTERIOR THAN NORMAL; RIGHT HALF OF LUMBAR CENTRUM #3 LARGER AND LOCATED MORE ANTERIOR THAN NORMAL	
			V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP 2:0 MG/KG/DAY VEH. FETUS # GRADE

27431 (CONTINUED)

#6
NO REMARKABLE OBSERVATIONS
1,2,3,4,5,6,7,8,9,10,11,12,15,16
1,2,3,4,5,6,7,8,9,10,11,12,15
1,3,11

EXTERNAL
VISCERAL
SKELETAL

27450

1 2 3 4 5 6 7 8 9 10 11 12 13 14
A A A E A A A/ A A A A A A E
SEX: M M M - M M M F F M M F F -
CEPHALIC: 1,3,6,8,10,12

SKELETAL 2 V 14TH RUDIMENTARY RIB(S) P
BILATERAL
EXTERNAL 4 EARLY RESORPTION
SKELETAL 7 V CERVICAL CENTRUM #1 OSSIFIED P
SKELETAL 8 V CERVICAL CENTRUM #1 OSSIFIED P
SKELETAL 9 V CERVICAL CENTRUM #1 OSSIFIED P
SKELETAL 10 V CERVICAL CENTRUM #1 OSSIFIED P
SKELETAL 11 V 14TH RUDIMENTARY RIB(S) P
RIGHT
SKELETAL 13 V CERVICAL CENTRUM #1 OSSIFIED P
EXTERNAL 14 EARLY RESORPTION
NO REMARKABLE OBSERVATIONS
1,2,3,5,6,7,8,9,10,11,12,13
1,2,3,5,6,7,8,9,10,11,12,13
EXTERNAL
VISCERAL
SKELETAL 1,3,5,6,12

27458

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
A A A A E A A/ A A A A A L A A A
SEX: F M M F - F M F F M F M M - M M F
CEPHALIC: 1,3,6,8,10,12,15,17

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #		GRADE
27458	(CONTINUED)			
	EXTERNAL	5	EARLY RESORPTION	
	SKELETAL	8	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	9	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	10	V 14TH RUDIMENTARY RIB(S) RIGHT	P
	EXTERNAL	14	LATE RESORPTION CROWN-RUMP LENGTH: 2.5 CM, SLIGHT AUTOLYSIS, GASTROSCHESIS: PORTION OF LIVER AND STOMACH PROTRUDE THROUGH AN OPENING IN THE VENTRAL MIDLINE, COVERED BY A MEMBRANOUS SAC; BODY SHORTER THAN NORMAL	
	SKELETAL	16	V HYOID UNOSSIFIED V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P P
			V REDUCED OSSIFICATION OF THE SKULL PARIETAL, BILATERAL	1
			NO REMARKABLE OBSERVATIONS	
	EXTERNAL		1,2,3,4,6,7,8,9,10,11,12,13,15,16,17	
	VISCERAL		1,2,3,4,6,7,8,9,10,11,12,13,15,16,17	
	SKELETAL		1,2,3,4,6,7,11,12,13,15,17	
27467		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16		
		E A A A A A/ A A A A A A A A A		
	SEX:	- M M F F F M F M F M F M M M M		
	CEPHALIC:	3,5,7,9,11,13,15		
	EXTERNAL	1	EARLY RESORPTION	
	SKELETAL	6	V REDUCED OSSIFICATION OF THE 13TH RIB(S) RIGHT	1

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #		GRADE
27467	(CONTINUED)			
	SKELETAL	7	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	VISCERAL	10	M SITUS INVERSUS TRACHEA, ESOPHAGUS, HEART, GREAT AND MAJOR VESSELS, LIVER, STOMACH, PANCREAS, SPLEEN, KIDNEYS, ADRENALS AND INTESTINE LATERALLY TRANSPOSED	P
			M LUNGS- LOBULAR DYSGENESIS ONE LOBE PRESENT, BILATERAL	P
	SKELETAL		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	13	#5 AND #6 V REDUCED OSSIFICATION OF THE 13TH RIB(S) LEFT	1
	EXTERNAL		NO REMARKABLE OBSERVATIONS	
	VISCERAL		2,3,4,5,6,7,8,9,10,11,12,13,14,15,16	
	SKELETAL		2,3,4,5,6,7,8,9,11,12,13,14,15,16 2,3,4,5,8,9,11,12,14,15,16	
27473		1 2 3 4 5 6 7 8 9 10 11 12		
		A A/ A A A A A A A E A A		
	SEX:	F F M F M F F M M - M F		
	CEPHALIC:	2,4,6,8,11		
	SKELETAL	1	V HYOID UNOSSIFIED V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P P
	SKELETAL	7	#5 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8	V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	10	EARLY RESORPTION	
	SKELETAL	12	V CERVICAL CENTRUM #1 OSSIFIED	P

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DAMS FROM GROUP 2:0 MG/KG/DAY VEH. FETUS # GRADE

27473 (CONTINUED)

NO REMARKABLE OBSERVATIONS

EXTERNAL 1,2,3,4,5,6,7,8,9,11,12
VISCERAL 1,2,3,4,5,6,7,8,9,11,12
SKELETAL 2,3,4,5,6,9,11

27475

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A A A A A A/ A A A A A A A A A
SEX: F F M F M F M M F F F F F F M
CEPHALIC: 2,4,6,8,10,12,14

SKELETAL 4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5
SKELETAL 6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5
SKELETAL 7 V HYOID UNOSSIFIED P
SKELETAL 9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5
SKELETAL 10 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5
SKELETAL 11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5
SKELETAL 14 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5

NO REMARKABLE OBSERVATIONS

EXTERNAL 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15
VISCERAL 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15
SKELETAL 1,2,3,5,8,12,13,15

27477

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A A A A A A/ A A A A A A A A A
SEX: M F F F M M F F M M F F M M M
CEPHALIC: 2,4,6,8,10,12,14

A = VIABLE FETUS, E = EARLY RESORPTION, L = LATE RESORPTION, D = DEAD FETUS, "/" DENOTES CERVIX POSITION
OBSERVATION CODE: M = MALFORMATION, V = VARIATION GRADE CODE: 1 = SLIGHT, 2 = MODERATE, 3 = MARKED, P = PRESENT
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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #	GRADE
27477	(CONTINUED)		
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#6	
	SKELETAL	2 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#6	
	SKELETAL	7 V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
	SKELETAL	8 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	10 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
		#3 AND #4	
		V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	13 V 7TH CERVICAL RIB(S)	P
		PINPOINT, RIGHT	
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#6	
		V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	SKELETAL	3,5,9,12,14	
27479		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
		A A A A A A A/ A A A A A A A A A	
	SEX:	M F F F F F M F M M M M F M M M F	
	CEPHALIC:	2,4,6,8,10,12,14,16	

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OBSERVATION CODE: M = MALFORMATION, V = VARIATION GRADE CODE: 1 = SLIGHT, 2 = MODERATE, 3 = MARKED, P = PRESENT
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TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #	GRADE
27479	(CONTINUED)		
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V HYOID UNOSSIFIED	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	12 V CERVICAL CENTRUM #1 OSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	14 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
		#2 THROUGH #5	
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	16 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	17 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL	1,3,6,7,10,13	
27482		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
		A A A/ A A A A A A A A A E A	
	SEX:	M M F M M M M M M F M F M - F	
	CEPHALIC:	1,3,5,7,9,11,13	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP 2:0 MG/KG/DAY VEH. FETUS # GRADE

27482 (CONTINUED)

EXTERNAL	14	EARLY RESORPTION	
SKELETAL	15	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5 AND #6	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,2,3,4,5,6,7,8,9,10,11,12,13,15	
VISCERAL		1,2,3,4,5,6,7,8,9,10,11,12,13,15	
SKELETAL		1,2,3,4,5,6,7,8,9,10,11,12,13	

27504

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
	A	A	A	A	A	A	A	A	A/A	A	A	A	A	E	A	A	A	A	
SEX:	F	M	M	F	F	M	M	F	M	M	M	M	F	-	M	M	M	F	
CEPHALIC:	1,3,5,7,9,11,13,16,18																		
SKELETAL	6	V CERVICAL CENTRUM #1 OSSIFIED																	P
SKELETAL	7	V 14TH RUDIMENTARY RIB(S)																	P
		BILATERAL																	
SKELETAL	10	V CERVICAL CENTRUM #1 OSSIFIED																	P
SKELETAL	12	V 14TH RUDIMENTARY RIB(S)																	P
		LEFT																	
EXTERNAL	14	EARLY RESORPTION																	
SKELETAL	17	V 14TH RUDIMENTARY RIB(S)																	P
		LEFT																	
SKELETAL	18	V CERVICAL CENTRUM #1 OSSIFIED																	P
		NO REMARKABLE OBSERVATIONS																	
EXTERNAL		1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18																	
VISCERAL		1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18																	
SKELETAL		1,2,3,4,5,8,9,11,13,15,16																	

27515

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	A	A	A	A	A	A	A/A	A	A	A	A	A	A	A
SEX:	F	F	F	F	F	M	F	M	F	F	F	F	M	M
CEPHALIC:	2,4,6,7,8,10,12,14													

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PAGE 28

DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #	GRADE
27515	(CONTINUED)		
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	12 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	SKELETAL	1,3,5,6,7,10,11,13,14	
27516		1 2 3 4 5 6 7 8 9 10 11 12 13 14	
		A A A A A A A A A/ A A A A	
	SEX:	M F M F M F M M M M F M M M	
	CEPHALIC:	1,3,5,7,9,11,13	
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	6 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
		V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
		#3 AND #4	
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	SKELETAL	1,3,4,5,7,8,11,12,14	
27519		1 2 3 4 5 6 7 8 9 10	
		A/ A A A A A A A A A	
	SEX:	F M F F M F M F M M	
	CEPHALIC:	2,4,6,8,10	

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #	GRADE
27519	(CONTINUED)		
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10	
	VISCERAL	1,2,3,4,5,6,7,8,9,10	
	SKELETAL	1,2,3,4,6,7,8,9,10	
27521		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	
		A A A A A E A E A A A/ A A A A A A A	
	SEX:	F M F F M - F - F M M F M M F M F F F	
	CEPHALIC:	2,4,7,10,12,14,16,18	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	3 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	EXTERNAL	6 EARLY RESORPTION	
	EXTERNAL	8 EARLY RESORPTION	
	SKELETAL	10 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	11 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	18 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,7,9,10,11,12,13,14,15,16,17,18,19	
	VISCERAL	1,2,3,4,5,7,9,10,11,12,13,14,15,16,17,18,19	
	SKELETAL	2,7,9,12,13,14,15,16,17,19	
27527		1 2 3 4 5 6 7 8 9	
		A E A A A A/ A A A	
	SEX:	F - M F F F F F F	
	CEPHALIC:	3,5,7,9	

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #		GRADE
27527	(CONTINUED)			
	SKELETAL	1	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
	EXTERNAL	2	EARLY RESORPTION	
	SKELETAL	3	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
			V 14TH RUDIMENTARY RIB(S)	P
			LEFT	
	SKELETAL	5	V 14TH RUDIMENTARY RIB(S)	P
			RIGHT	
	SKELETAL	6	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
	SKELETAL	9	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
			NO REMARKABLE OBSERVATIONS	
	EXTERNAL		1,3,4,5,6,7,8,9	
	VISCERAL		1,3,4,5,6,7,8,9	
	SKELETAL		4,7,8	
27531		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
		A A A A A A A A A A/ A A A A A A A		
	SEX:	M M M M F M M F F F M F M M M M		
	CEPHALIC:	2,4,6,8,10,12,14,16		
	SKELETAL	8	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
	SKELETAL	12	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	14	V REDUCED OSSIFICATION OF THE 13TH RIB(S)	1
			RIGHT	
	SKELETAL	17	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	

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DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	2:0 MG/KG/DAY VEH.	FETUS #	GRADE
27531	(CONTINUED)		
	SKELETAL	17 V REDUCED OSSIFICATION OF THE 13TH RIB(S) MODERATE, RIGHT; SLIGHT, LEFT	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL	1,2,3,4,5,6,7,9,10,11,13,15,16	
27547		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 A A A E A/ A A A A A A A A A A A SEX: M M M - M M F M M F F F F M F CEPHALIC: 2,5,7,9,11,13,15,17	
	EXTERNAL	4 EARLY RESORPTION	
	SKELETAL	17 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,5,6,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL	1,2,3,5,6,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL	1,2,3,5,6,7,8,9,10,11,12,13,14,15,16	
27563		1 2 3 4 5 6 7 8 9 10 11 12 13 14 A A A A/ A A A A A A A A A A SEX: F F F F M M M M F M M M M M CEPHALIC: 2,4,6,8,10,12,14	
	SKELETAL	4 V 14TH RUDIMENTARY RIB(S) BILATERAL	P
	SKELETAL	5 V 14TH RUDIMENTARY RIB(S) LEFT	P
	SKELETAL	6 V 14TH RUDIMENTARY RIB(S)	P

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DAMS FROM GROUP	2:0 MG/KG/DAY	VEH.	FETUS #	GRADE
27563	(CONTINUED)			
	SKELETAL	8	BILATERAL V 14TH RUDIMENTARY RIB(S)	P
			BILATERAL V 27 PRESACRAL VERTEBRAE	P
			V UNCO-OSSIFIED VERTEBRAL CENTRA THORACIC #9 THROUGH #11	P
			V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5 AND #6	P
	SKELETAL	9	V 14TH RUDIMENTARY RIB(S)	P
	SKELETAL	11	LEFT V 14TH RUDIMENTARY RIB(S)	P
	SKELETAL	12	LEFT V 14TH RUDIMENTARY RIB(S)	P
	SKELETAL	13	LEFT V 14TH RUDIMENTARY RIB(S)	P
	SKELETAL	14	BILATERAL V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
			NO REMARKABLE OBSERVATIONS	
	EXTERNAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	VISCERAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14	
	SKELETAL		1,2,3,7,10	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27420		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 A A A A A A/ A A A A A A A E A A SEX: M F F F F M M M M M F F M M - M M CEPHALIC: 1,3,5,7,9,11,13,16	
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	6 V 14TH RUDIMENTARY RIB(S) LEFT	P
		V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	12 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	14 V HYOID UNOSSIFIED	P
		V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	15 EARLY RESORPTION	
	SKELETAL	16 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17	
	SKELETAL	1,3,5,7,8,11,13,17	
27425		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 E E E E A A A/ A A A A A A A SEX: - - - - M M M F M M F F F M F CEPHALIC: 7,9,11,13,15	
	EXTERNAL	1 EARLY RESORPTION	
	EXTERNAL	2 EARLY RESORPTION	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27425	(CONTINUED)		
EXTERNAL	3	EARLY RESORPTION	
EXTERNAL	4	EARLY RESORPTION	
EXTERNAL	5	EARLY RESORPTION	
SKELETAL	7	V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE) #3 THROUGH #5	1
SKELETAL	8	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	9	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
		V 14TH RUDIMENTARY RIB(S) RIGHT	P
SKELETAL	10	V HYOID UNOSSIFIED	P
		V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	11	V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE) #3 AND #4	1
		V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	13	V 14TH RUDIMENTARY RIB(S) LEFT	P
SKELETAL	14	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	15	V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES SACRAL #2 THROUGH CAUDAL #6, BILATERAL	1
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		6,7,8,9,10,11,12,13,14,15,16	
VISCERAL		6,7,8,9,10,11,12,13,14,15,16	
SKELETAL		6,12,16	
27430		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
		E A A A A/ A A A A A A A A A A A	
SEX:		- F F F M F F M F F M F M F M M F	
CEPHALIC:		2,4,6,8,10,12,14,16	

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TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27430	(CONTINUED)		
EXTERNAL	1	EARLY RESORPTION	
SKELETAL	3	V 14TH RUDIMENTARY RIB(S) LEFT	P
SKELETAL	4	V 14TH RUDIMENTARY RIB(S) RIGHT	P
SKELETAL	7	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
SKELETAL	11	V 14TH RUDIMENTARY RIB(S) LEFT	P
SKELETAL	15	V 14TH RUDIMENTARY RIB(S) RIGHT	P
SKELETAL	16	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
SKELETAL	17	V 14TH RUDIMENTARY RIB(S) LEFT	P
EXTERNAL	NO REMARKABLE OBSERVATIONS		
VISCERAL	2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17		
SKELETAL	2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17 2,5,6,8,9,10,12,13,14		
27454			
	SEX:	1 2 3 4 5 6 7 8 9 10 11 12 13 14 A A A A A A A/ A A A E A A A	
	CEPHALIC:	F M M M F F F F M F - M M M 1,3,5,7,9,12,14	
SKELETAL	4	V 14TH RUDIMENTARY RIB(S) LEFT	P
SKELETAL	10	V 14TH RUDIMENTARY RIB(S) BILATERAL	P
EXTERNAL	11	EARLY RESORPTION	

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DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27454	(CONTINUED)		
	SKELETAL	14 V 7TH CERVICAL RIB(S) PINPOINT, LEFT	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,12,13,14	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,12,13,14	
	SKELETAL	1,2,3,5,6,7,8,9,12,13	
27460		1 2 3 4 5 6 7 8 9 10 11 12 13 14 A A E A A A/ A A A A A A E SEX: F M - F M F F F M F F F M - CEPHALIC: 1,4,6,8,10,12	
	SKELETAL	2 V REDUCED OSSIFICATION OF THE SKULL PARIETAL, RIGHT	2
	EXTERNAL	3 EARLY RESORPTION	
	SKELETAL	9 V 14TH RUDIMENTARY RIB(S) LEFT	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
		V 7TH CERVICAL RIB(S) PINPOINT, LEFT	P
	SKELETAL	12 V 14TH RUDIMENTARY RIB(S) LEFT	P
	EXTERNAL	14 EARLY RESORPTION	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,4,5,6,7,8,9,10,11,12,13	
	VISCERAL	1,2,4,5,6,7,8,9,10,11,12,13	
	SKELETAL	1,4,5,6,7,8,10,13	
27463		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 A A A A A A A A/ A A A E A A A SEX: M F F F M F F F F M F - F M F CEPHALIC: 2,4,6,8,10,13,15	

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DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27463	(CONTINUED)		
	SKELETAL	5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	EXTERNAL	12 EARLY RESORPTION	
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,13,14,15	
	SKELETAL	1,2,3,4,6,7,8,9,10,13,14,15	
27465		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
	SEX:	F F F F F - M M M M M F F F F	
	CEPHALIC:	2,4,7,9,11,13,15	
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		V STERNEBRA(E) #1,#2,#3 AND/OR #4 UNOSSIFIED	P
	EXTERNAL	6 EARLY RESORPTION	
	SKELETAL	9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	15 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,7,8,9,10,11,12,13,14,15	
	VISCERAL	1,2,3,4,5,7,8,9,10,11,12,13,14,15	
	SKELETAL	1,4,5,7,8,10,11,12,13,14	

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DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27466		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 A A A A A A/ A A A A A A A A SEX: M M M F M F M M F M M M M M M CEPHALIC: 1,3,5,7,9,11,13,15	
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	SKELETAL	1,3,5,7,8,9,10,12,13,14,15	
27469		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 A A A A A A A A A A/ A A A A A A A SEX: F F F F F M M M M M M M M M F F F CEPHALIC: 2,4,6,8,10,12,14,16	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
	SKELETAL	3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27469	(CONTINUED)		
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	6 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	13 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	14 V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
	SKELETAL	15 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	16 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	17 V HYOID UNOSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL	7,8,12	
27470		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A E A A A A/ A A A A A A A A A	
	SEX:	F M - F M F M F M F M F M F M F M F	
	CEPHALIC:	1,4,6,8,10,12,14,16	
	EXTERNAL	3 EARLY RESORPTION	
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27470	(CONTINUED)		
	SKELETAL	5 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE) #3 AND #4	1
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,4,5,6,7,8,9,10,11,12,13,14,15,16	
	SKELETAL	1,2,4,5,6,7,8,9,10,11,12,13,14,15,16 1,2,6,7,8,9,10,11,12,13,14,16	
27474		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 A A E A A A E A A A/ A A A A A A SEX: M M - F M F - M F F M F F M F F F CEPHALIC: 1,4,6,9,11,13,15,17	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	EXTERNAL	3 EARLY RESORPTION	
	EXTERNAL	7 EARLY RESORPTION	
	SKELETAL	10 V REDUCED OSSIFICATION OF THE 13TH RIB(S) BILATERAL	2
	SKELETAL	12 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	15 V REDUCED OSSIFICATION OF THE 13TH RIB(S) LEFT	1
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,4,5,6,8,9,10,11,12,13,14,15,16,17	
	SKELETAL	1,2,4,5,6,8,9,10,11,12,13,14,15,16,17 2,4,5,6,8,9,11,13,14,16,17	
27478		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 A E E A/ A A A A A A A E A A A SEX: F - - F F F M F F M M - M F M CEPHALIC: 1,5,7,9,11,14	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27478	(CONTINUED)		
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	EXTERNAL	2 EARLY RESORPTION	
	EXTERNAL	3 EARLY RESORPTION	
	SKELETAL	7 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	12 EARLY RESORPTION	
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,4,5,6,7,8,9,10,11,13,14,15	
	VISCERAL	1,4,5,6,7,8,9,10,11,13,14,15	
	SKELETAL	4,5,6,9,10,11,14,15	
27486		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
		A A A A A A/ A A A A A A A A	
	SEX:	F F F F F F M M M F F F F M F	
	CEPHALIC:	1,3,5,7,9,11,13,15	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#6	
	SKELETAL	7 V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
	SKELETAL	8 V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
	SKELETAL	11 V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27486	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	SKELETAL	2, 3, 4, 5, 6, 9, 10, 12, 13, 14	
27494		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
	SEX:	E E A A A A A A/ A A A A A A A	
	CEPHALIC:	- - M F F M F F M F F M F M F	
	EXTERNAL	1 EARLY RESORPTION	
	EXTERNAL	2 EARLY RESORPTION	
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5 AND #6	
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	11 V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	VISCERAL	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	SKELETAL	3, 5, 6, 7, 8, 9, 12, 14, 15	
27495		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
	SEX:	A A A A A/ A A A A E A A A A A E	
	CEPHALIC:	F M F M F M F M M - F M F M F -	
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P

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DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27495	(CONTINUED)		
	EXTERNAL	10 EARLY RESORPTION	
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	16 EARLY RESORPTION	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,11,12,13,14,15	
	VISCERAL	1,2,3,4,5,6,7,8,9,11,12,13,14,15	
	SKELETAL	1,2,3,6,7,8,9,12,14,15	
27502		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
		A A E A A E A A/ A A A A A A A A A	
	SEX:	M F - F M - M F M F F F M M M M M	
	CEPHALIC:	1,4,7,9,11,13,15,17	
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	EXTERNAL	3 EARLY RESORPTION	
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	EXTERNAL	6 EARLY RESORPTION	
	SKELETAL	7 V CERVICAL CENTRUM #1 OSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	8 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	16 V HYOID UNOSSIFIED	P
	SKELETAL	17 V 14TH RUDDIMENTARY RIB(S)	P
		BILATERAL	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27502	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	
	VISCERAL	1, 2, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	
	SKELETAL	1, 9, 11, 12, 13, 14, 15	
27505		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 A A A A A A A E A A A/ A A A A A A A SEX: M F F F M F M - M M F F F M F F M M CEPHALIC: 2, 4, 6, 9, 11, 13, 15, 17	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE) #2 AND #3	1
	SKELETAL	3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	EXTERNAL	8 EARLY RESORPTION	
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	17 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27505	(CONTINUED)		
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	
VISCERAL		1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	
SKELETAL		7, 9, 11, 12, 13, 14, 16, 18	
27509			
		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A A A E/ A A A A E A A A A A	
	SEX:	M M M F M - F F M F - M M M F M	
	CEPHALIC:	2, 4, 7, 9, 12, 14, 16	
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	EXTERNAL	6 EARLY RESORPTION	
	EXTERNAL	11 EARLY RESORPTION	
	SKELETAL	12 V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
	SKELETAL	13 V HYOID UNOSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16	
	VISCERAL	1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16	
	SKELETAL	1, 3, 5, 7, 8, 9, 10, 14, 15, 16	
27517			
		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A A A/ A A A A E A A A A A	
	SEX:	M M M F F M M F F - F M M F F M	
	CEPHALIC:	2, 4, 6, 8, 11, 13, 15	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27517	(CONTINUED)		
		#6	
SKELETAL	2	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	8	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	9	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
EXTERNAL	10	EARLY RESORPTION	
SKELETAL	11	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	14	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	15	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,2,3,4,5,6,7,8,9,11,12,13,14,15,16	
VISCERAL		1,2,3,4,5,6,7,8,9,11,12,13,14,15,16	
SKELETAL		3,4,5,6,7,12,13,16	
27524		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	
		A A A A A A A/ A A A A A A A A A A A A	
	SEX:	F F F M F F F F M M M F F M M M F F F	
	CEPHALIC:	1,3,5,7,9,11,13,15,17,19	
SKELETAL	4	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	5	V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
SKELETAL	6	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	9	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	10	V HYOID UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27524	(CONTINUED)		
	SKELETAL	10 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	12 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	13 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	14 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	16 V HYOID UNOSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	17 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	18 V HYOID UNOSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	20 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#6	
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20	
	SKELETAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20	
		1,2,3,7,8,19	
27525		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	
		E A A E A E A A A A/ A A A A A A A	
	SEX:	- F F - F - F F M F M M F F M F F M	
	CEPHALIC:	3,7,9,11,13,15,17	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	3: 100 MG/KG/DAY	FETUS #	GRADE
27525	(CONTINUED)		
EXTERNAL	1	EARLY RESORPTION	
SKELETAL	2	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
EXTERNAL	4	EARLY RESORPTION	
EXTERNAL	6	EARLY RESORPTION	
SKELETAL	8	V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
SKELETAL	9	V CERVICAL CENTRUM #1 OSSIFIED	P
VISCERAL	18	V MAJOR BLOOD VESSEL VARIATION	P
		RIGHT CAROTID AND RIGHT SUBCLAVIAN ARISE INDEPENDENTLY FROM THE AORTIC ARCH (NO BRACHIOCEPHALIC TRUNK)	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		2,3,5,7,8,9,10,11,12,13,14,15,16,17,18	
VISCERAL		2,3,5,7,8,9,10,11,12,13,14,15,16,17	
SKELETAL		3,5,7,10,11,12,13,14,15,16,17,18	
27538		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
		A A A A A A A A A/ A A A A A A A	
SEX:	F M F M M M F M M M F F M F M F F		
CEPHALIC:	1,3,5,7,9,11,13,15,17		
SKELETAL	6	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	14	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	17	V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
VISCERAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
SKELETAL		1,2,3,4,5,7,8,9,10,11,12,13,15,16	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP 3: 100 MG/KG/DAY FETUS # GRADE

27543

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	A	A	A	A	A	A	A	A/	A	A	A	E	A	A	A	A	A
SEX:	M	M	F	F	M	F	F	M	F	F	M	-	F	M	M	F	F
CEPHALIC:	2,4,6,8,10,13,15,17																
SKELETAL	2	V CERVICAL CENTRUM #1 OSSIFIED															P
SKELETAL	4	V CERVICAL CENTRUM #1 OSSIFIED															P
SKELETAL	7	V CERVICAL CENTRUM #1 OSSIFIED															P
SKELETAL	8	V CERVICAL CENTRUM #1 OSSIFIED															P
		V 14TH RUDIMENTARY RIB(S)															P
		RIGHT															
EXTERNAL	12	EARLY RESORPTION															
SKELETAL	14	V CERVICAL CENTRUM #1 OSSIFIED															P
EXTERNAL	16	M CARPAL AND/OR TARSAL FLEXURE															
		TARSAL, RIGHT															
VISCERAL		CONFIRMATION OF TARSAL FLEXURE															P
SKELETAL		TARSAL FLEXURE- NO APPARENT SKELETAL ORIGIN															P
	NO REMARKABLE OBSERVATIONS																
EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,13,14,15,17																
VISCERAL	1,2,3,4,5,6,7,8,9,10,11,13,14,15,17																
SKELETAL	1,3,5,6,9,10,11,13,15,17																

27548

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	A	A	A	A	A	A	A/	A	A	A	A	A	A	A
SEX:	M	M	M	M	M	M	F	M	M	M	M	F	M	F
CEPHALIC:	1,3,5,7,9,11,13													
SKELETAL	2	V 14TH RUDIMENTARY RIB(S)												P
		LEFT												

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP		3: 100 MG/KG/DAY	FETUS #	GRADE
27548	(CONTINUED)			
	SKELETAL	8	V 14TH RUDIMENTARY RIB(S) LEFT	P
	SKELETAL	13	V 7TH CERVICAL RIB(S) PINPOINT, BILATERAL	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS		
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14		
	SKELETAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14		
27572				
		1 2 3 4 5 6 7 8 9 10 11 12 13 14		
		A A A A/ A A A A E A A A A		
	SEX:	M F M F F F F M F - M M M M		
	CEPHALIC:	1,3,5,7,9,12,14		
	EXTERNAL	10	EARLY RESORPTION	
	SKELETAL	13	V 14TH RUDIMENTARY RIB(S) LEFT	P
	SKELETAL	14	V 14TH RUDIMENTARY RIB(S) BILATERAL	P
			V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5 AND #6	
	EXTERNAL	NO REMARKABLE OBSERVATIONS		
	VISCERAL	1,2,3,4,5,6,7,8,9,11,12,13,14		
	SKELETAL	1,2,3,4,5,6,7,8,9,11,12,13,14		
		1,2,3,4,5,6,7,8,9,11,12		

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27426		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 A A A A/ A A A A A A A A E A SEX: F M M M M M F F F M M F M - M CEPHALIC: 1,3,5,7,9,11,13 SKELETAL 2 V 14TH RUDIMENTARY RIB(S) LEFT P SKELETAL 5 V 14TH RUDIMENTARY RIB(S) LEFT P SKELETAL 7 V CERVICAL CENTRUM #1 OSSIFIED P SKELETAL 10 V CERVICAL CENTRUM #1 OSSIFIED P EXTERNAL 14 EARLY RESORPTION SKELETAL 15 V 14TH RUDIMENTARY RIB(S) BILATERAL P NO REMARKABLE OBSERVATIONS EXTERNAL 1,2,3,4,5,6,7,8,9,10,11,12,13,15 VISCERAL 1,2,3,4,5,6,7,8,9,10,11,12,13,15 SKELETAL 1,3,4,6,8,9,11,12,13	
27441		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 A A A A A A A A/ A A A A A A A SEX: M F F M M F M F F M F F M M F M CEPHALIC: 2,4,6,8,10,12,14,16 SKELETAL 13 V 14TH RUDIMENTARY RIB(S) BILATERAL P	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 52

DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27441	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16	
VISCERAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16	
SKELETAL		1,2,3,4,5,6,7,8,9,10,11,12,14,15,16	
27443		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A E A A A E A A A/ A A A E A	
	SEX:	M M F - F F M - M F F M F M - F	
	CEPHALIC:	2,5,7,9,10,12,14	
SKELETAL		1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
SKELETAL		3 V CERVICAL CENTRUM #1 OSSIFIED	P
EXTERNAL		4 EARLY RESORPTION	
SKELETAL		5 V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES	1
		SACRAL #2 THROUGH CAUDAL #6, BILATERAL	
EXTERNAL		8 EARLY RESORPTION	
SKELETAL		9 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		12 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
SKELETAL		13 V CERVICAL CENTRUM #1 OSSIFIED	P
EXTERNAL		15 EARLY RESORPTION	
SKELETAL		16 V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES	2
		LUMBAR #5, RIGHT AND #6, BILATERAL; SACRAL #1 THROUGH CAUDAL	
		#6, BILATERAL	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,2,3,5,6,7,9,10,11,12,13,14,16	
VISCERAL		1,2,3,5,6,7,9,10,11,12,13,14,16	
SKELETAL		2,6,7,10,11,14	
27444		1 2 3 4 5 6 7 8 9 10 11 12 13 14	
		A A E A A A A A A/ A A A A	
	SEX:	F F - M F M F F F M F M M F	
	CEPHALIC:	1,4,6,8,10,12,14	
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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27444	(CONTINUED)		
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	EXTERNAL	3 EARLY RESORPTION	
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	7 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	8 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	12 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	14 V CERVICAL CENTRUM #1 OSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,4,5,6,7,8,9,10,11,12,13,14	
	VISCERAL	1,2,4,5,6,7,8,9,10,11,12,13,14	
	SKELETAL	5,9,10,13	
27446		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	
		A A A A A A A A A/ A A A A A A A A A A	
	SEX:	F M F F F M M F M F M F M F M F M F M	
	CEPHALIC:	1,3,5,7,9,11,13,15,17,19,21	
	SKELETAL	1 V 14TH RUDIMENTARY RIB(S)	P

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 INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27446	(CONTINUED)		
		BILATERAL	
SKELETAL	6	V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
SKELETAL	11	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	12	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	14	V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
SKELETAL	15	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	17	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	18	V UNCO-OSSIFIED VERTEBRAL CENTRA	P
		THORACIC #4 AND #8 THROUGH #13	
		V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
SKELETAL	21	V 14TH RUDIMENTARY RIB(S)	P
		BILATERAL	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21	
VISCERAL		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21	
SKELETAL		2, 3, 4, 5, 7, 8, 9, 10, 13, 16, 19, 20	
27447		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A A A/ A A A A A A A A A A	
SEX:		F F F M F F M F M F F F M M M M	
CEPHALIC:		2, 4, 6, 8, 10, 12, 14, 16	
SKELETAL	3	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	4	V 27 PRESACRAL VERTEBRAE	P
SKELETAL	5	V CERVICAL CENTRUM #1 OSSIFIED	P

A = VIABLE FETUS, E = EARLY RESORPTION, L = LATE RESORPTION, D = DEAD FETUS, "/" DENOTES CERVIX POSITION
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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27447	(CONTINUED)		
	SKELETAL	5 V 7TH CERVICAL RIB(S) INTERMEDIATE, RIGHT	P
	SKELETAL	9 V CERVICAL CENTRUM #1 OSSIFIED V 14TH RUDIMENTARY RIB(S) LEFT	P P
	SKELETAL	10 V 7TH CERVICAL RIB(S) PINPOINT, LEFT	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
		V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	SKELETAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 1, 2, 6, 7, 8, 12, 13, 14, 15, 16	
27448		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 A A A A A A A A A A/ A A A A A A A SEX: F M M M M M M M F M M M F M F F M F CEPHALIC: 1, 3, 5, 7, 9, 11, 13, 15, 17	
	SKELETAL	7 V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES CERVICAL #5 THROUGH #7, BILATERAL	1
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	
	SKELETAL	1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18	
27452		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 A A A A A A/ A A A A A A E A A A SEX: F F M F F F M M F M F M F - F M F CEPHALIC: 1, 3, 5, 7, 9, 11, 13, 16	

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TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27452	(CONTINUED)		
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	14 EARLY RESORPTION	
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	16 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17	
	SKELETAL	1,2,3,5,6,7,8,9,10,11,12,13,17	
27487		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
		A L A A A A A A A/ A A A A A A A A	
	SEX:	M - F F M F F M F M F M M M F F M	
	CEPHALIC:	3,5,7,9,11,13,15,17	
	SKELETAL	1 V CERVICAL CENTRUM #1 OSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5 AND #6	
	EXTERNAL	2 LATE RESORPTION	
		CROWN-RUMP LENGTH: 1.5 CM, MUMMIFIED	
	SKELETAL	3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5 AND #6	
	SKELETAL	5 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
		V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	6 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27487	(CONTINUED)		
		#5	
SKELETAL	9	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	11	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	12	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	15	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	16	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
VISCERAL		1,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
SKELETAL		7,10,13,14,17	
27489		1 2 3 4 5 6 7 8 9 10 11 12 13 14	
		A A A A A/ A A A A A A A A A	
	SEX:	M M M M F M F F F F F F M F	
	CEPHALIC:	2,4,6,8,10,12,14	
SKELETAL	3	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	5	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	6	V REDUCED OSSIFICATION OF THE 13TH RIB(S)	1
		LEFT	
SKELETAL	14	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	

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TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27489	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	
	SKELETAL	1, 2, 4, 7, 8, 9, 10, 11, 12, 13	
27491		1 2 3 4 5 6 7 8 9 10 11 12 13	
	SEX:	A A A A/ A A A A A A A A A	
	CEPHALIC:	F M M M M F F F M F F F F	
		2, 4, 6, 8, 10, 12	
	SKELETAL	3 V HYOID UNOSSIFIED	P
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	
	SKELETAL	9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	
	SKELETAL	1, 2, 4, 6, 7, 10, 11, 12, 13	
27499		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
	SEX:	A A A A A/ A A A E A A A A A A	
	CEPHALIC:	F F M M M M M F - F F M F F F	
		2, 4, 6, 8, 11, 13, 15	
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V BENT RIB(S)	1
		#5, LEFT	
	EXTERNAL	9 EARLY RESORPTION	

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TABLE A16
 DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
 INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 59

 DAMS FROM GROUP 4: 300 MG/KG/DAY FETUS # GRADE

27499 (CONTINUED)

NO REMARKABLE OBSERVATIONS

EXTERNAL 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15
 VISCERAL 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15
 SKELETAL 1, 2, 3, 4, 6, 7, 10, 11, 12, 13, 14, 15

27501

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 A A A A A A A A/ A A A A A A A
 SEX: M F F F F F M F M F M M F M M
 CEPHALIC: 2, 4, 6, 8, 10, 12, 14

SKELETAL 2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P

SKELETAL 3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P

SKELETAL 4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P

SKELETAL 8 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P

SKELETAL 11 V CERVICAL CENTRUM #1 OSSIFIED P
 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P

SKELETAL 12 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P

NO REMARKABLE OBSERVATIONS

EXTERNAL 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
 VISCERAL 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
 SKELETAL 1, 5, 6, 7, 9, 10, 13, 14, 15

27506

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 A A A A A/ A A A A A A A A A
 SEX: M F F M F F M M M F F F F M M
 CEPHALIC: 1, 3, 5, 7, 9, 11, 13, 15

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TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27506	(CONTINUED)		
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	7 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
		V REDUCED OSSIFICATION OF THE 13TH RIB(S) RIGHT	1
	SKELETAL	13 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	14 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	SKELETAL	1, 2, 3, 5, 6, 8, 9, 10, 12, 15	
27522		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
		A A A A A A/ A A A A A A A A	
	SEX:	M M F F M F F F M M F M M F M	
	CEPHALIC:	1, 3, 5, 7, 9, 11, 13, 15	
	SKELETAL	9 V 14TH RUDIMENTARY RIB(S) LEFT	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	14 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	SKELETAL	1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 15	
27530		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	
		A A A A A A A A/ A A A A A A A A A	
	SEX:	F M F F F M F F M M M F F M F M F F	
	CEPHALIC:	1, 3, 5, 7, 9, 11, 13, 15, 17	

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DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27530	(CONTINUED)		
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	3 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	7 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		V CERVICAL CENTRUM #1 OSSIFIED	P
		V 7TH CERVICAL RIB(S)	P
		PINPOINT, RIGHT	
	SKELETAL	10 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	15 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	16 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	18 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	
	SKELETAL	1,4,5,9,11,12,13,14,17	
27532		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	
		A A A A A A A A A A/ A A A A A A A A A A A A	
	SEX:	M M M M M M M F F F M M F F M M F M F F M F	
	CEPHALIC:	1,3,5,7,9,11,13,15,17,19,21	
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	20 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP 4: 300 MG/KG/DAY FETUS # GRADE

27532 (CONTINUED)

#5
NO REMARKABLE OBSERVATIONS
1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22
1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22
1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,21,22

27541

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
A E A E A E/ A E A E A A E A A A E
SEX: F - F - F - F - M - M F - M M M -
CEPHALIC: 3,7,11,14,16

SKELETAL	1	V CERVICAL CENTRUM #1 OSSIFIED	P
EXTERNAL	2	EARLY RESORPTION	
VISCERAL	3	V RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S) URETER, BILATERAL	1
SKELETAL		V CERVICAL CENTRUM #1 OSSIFIED	P
EXTERNAL	4	EARLY RESORPTION	
VISCERAL	5	V RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S) URETER, BILATERAL	1
EXTERNAL	6	EARLY RESORPTION	
SKELETAL	7	V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE) #2 AND #3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5 AND #6	1 P
EXTERNAL	8	EARLY RESORPTION	
VISCERAL	9	V RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S) URETER, BILATERAL	1
EXTERNAL	10	EARLY RESORPTION	
SKELETAL	11	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	12	V BENT RIB(S)	1

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27541	(CONTINUED)		
		#6 THROUGH #11, RIGHT	
EXTERNAL		13 EARLY RESORPTION	
EXTERNAL		17 EARLY RESORPTION	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1, 3, 5, 7, 9, 11, 12, 14, 15, 16	
VISCERAL		1, 7, 11, 12, 14, 15, 16	
SKELETAL		5, 9, 14, 15, 16	
27545			
		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
		A A A E A A A/ A A A A A A A A	
	SEX:	F F M - M F M M M M F M F M M	
	CEPHALIC:	2, 5, 7, 9, 11, 13, 15	
SKELETAL		1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
SKELETAL		2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
EXTERNAL		4 EARLY RESORPTION	
SKELETAL		8 V 7TH CERVICAL RIB(S)	P
		PINPOINT, RIGHT	
		V REDUCED OSSIFICATION OF THE 13TH RIB(S)	1
		BILATERAL	
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL		11 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		13 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
VISCERAL		14 V MAJOR BLOOD VESSEL VARIATION	P
		RIGHT CAROTID AND RIGHT SUBCLAVIAN ARISE INDEPENDENTLY FROM	
		THE AORTIC ARCH (NO BRACHIOCEPHALIC TRUNK)	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	4: 300 MG/KG/DAY	FETUS #	GRADE
27545	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
EXTERNAL		1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
VISCERAL		1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15	
SKELETAL		3, 5, 6, 7, 9, 10, 12, 14, 15	
27550		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
	SEX:	A E A A A A/ A A A A A A A A A	
	CEPHALIC:	M - F F M M F F F F F F M M F F	
		1, 4, 6, 8, 10, 12, 14, 16	
EXTERNAL		2 EARLY RESORPTION	
EXTERNAL		NO REMARKABLE OBSERVATIONS	
VISCERAL		1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
SKELETAL		1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
27553		1 2 3 4 5 6 7 8 9 10 11 12 13 14	
	SEX:	A A A/ A A E A A E A A A A A	
	CEPHALIC:	M F F F M - F M - F F M M M	
		2, 4, 7, 10, 12, 14	
SKELETAL		1 V HYOID UNOSSIFIED	P
SKELETAL		4 V CERVICAL CENTRUM #1 OSSIFIED	P
EXTERNAL		6 EARLY RESORPTION	
SKELETAL		7 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		8 V HYOID UNOSSIFIED	P
EXTERNAL		9 EARLY RESORPTION	
SKELETAL		11 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		12 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		14 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP 4: 300 MG/KG/DAY		FETUS #	GRADE
27553 (CONTINUED)			
		#6	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,2,3,4,5,7,8,10,11,12,13,14	
VISCERAL		1,2,3,4,5,7,8,10,11,12,13,14	
SKELETAL		2,3,5,10,13	
27570			
		1 2 3 4 5 6 7 8 9 10 11 12 13 14	
		E A A A A A/ A E A A E E A A	
	SEX:	- M F M M M F - M F - - M M	
	CEPHALIC:	2,4,6,9,13	
EXTERNAL		1 EARLY RESORPTION	P
SKELETAL		3 V CERVICAL CENTRUM #1 OSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	
		#5	
SKELETAL		6 V 7TH CERVICAL RIB(S)	P
		PINPOINT, RIGHT	
SKELETAL		7 V CERVICAL CENTRUM #1 OSSIFIED	P
EXTERNAL		8 EARLY RESORPTION	
SKELETAL		9 V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL		10 V CERVICAL CENTRUM #1 OSSIFIED	P
EXTERNAL		11 EARLY RESORPTION	
EXTERNAL		12 EARLY RESORPTION	
SKELETAL		14 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		2,3,4,5,6,7,9,10,13,14	
VISCERAL		2,3,4,5,6,7,9,10,13,14	
SKELETAL		2,4,5,13	

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TABLE A16
DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP			5: 600 MG/KG/DAY		FETUS #																	GRADE	
27423			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
			A	A	A	A	A	A	A	A	A/	A	A	A	A	A	A	A	A	A			
		SEX:	M	M	F	M	F	M	F	F	M	F	F	M	F	M	M	F	F	M			
		CEPHALIC:	2, 4, 6, 8, 10, 12, 14, 16, 18																				
	SKELETAL				3		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
	SKELETAL				5		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
	SKELETAL				6		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
	SKELETAL				7		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
	SKELETAL				8		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
	SKELETAL				9		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
	SKELETAL				12		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
	SKELETAL				14		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
							V	14TH RUDIMENTARY	RIB(S)												P		
							LEFT																
	SKELETAL				15		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
							V	14TH RUDIMENTARY	RIB(S)												P		
							LEFT																
							V	STERNEBRA(E)	MALALIGNED(SLIGHT OR MODERATE)												1		
							#4 AND #5																
	SKELETAL				16		V	CERVICAL	CENTRUM	#1	OSSIFIED										P		
							NO REMARKABLE OBSERVATIONS																
	EXTERNAL						1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18																
	VISCERAL						1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18																
	SKELETAL						1, 2, 4, 10, 11, 13, 17, 18																
27438			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17				
			A	A	A	A	A	A/	A	A	A	A	A	A	A	A	A	A	A	A			
		SEX:	F	F	F	F	M	M	F	F	M	M	M	M	M	F	M	M	F				
		CEPHALIC:	1, 3, 5, 7, 9, 11, 13, 15, 17																				

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27438	(CONTINUED)		
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	3 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	10 V HYOID UNOSSIFIED	P
		V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	14 V HYOID UNOSSIFIED	P
	SKELETAL	15 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	16 V CERVICAL CENTRUM #1 OSSIFIED	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	17 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5 AND #6	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL	1,4,6,7,8,12	
27439		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A A E A A A/ A A E A E A A E	
	SEX:	M M M M - F M M M F - M - M F -	
	CEPHALIC:	2,4,7,9,12,15	
	SKELETAL	1 V 7TH CERVICAL RIB(S)	P
		PINPOINT, LEFT	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

PAGE 68

DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27439	(CONTINUED)		
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	3 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	5 EARLY RESORPTION	
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	8 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	11 EARLY RESORPTION	
	SKELETAL	12 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	13 EARLY RESORPTION	
	EXTERNAL	16 EARLY RESORPTION	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,6,7,8,9,10,12,14,15	
	VISCERAL	1,2,3,4,6,7,8,9,10,12,14,15	
	SKELETAL	4,7,10,14,15	
27440		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A A A/ A E A A E A A A A A A	
	SEX:	M M M M F M - F F - F F F M M F	
	CEPHALIC:	1,3,5,8,11,13,15	
	SKELETAL	1 V BENT RIB(S)	1
		#6 AND #7, BILATERAL; #8 THROUGH #11, LEFT	
	SKELETAL	2 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	3 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V CERVICAL CENTRUM #1 OSSIFIED	P
		V 14TH RUDIMENTARY RIB(S)	P
		RIGHT	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #		GRADE
27440	(CONTINUED)			
	SKELETAL	6	V CERVICAL CENTRUM #1 OSSIFIED V BENT RIB(S) #10 AND #11, BILATERAL	P 1
	EXTERNAL	7	EARLY RESORPTION	
	SKELETAL	8	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9	V CERVICAL CENTRUM #1 OSSIFIED V 7TH CERVICAL RIB(S) INTERMEDIATE, RIGHT	P P
	EXTERNAL	10	EARLY RESORPTION	
	SKELETAL	12	V CERVICAL CENTRUM #1 OSSIFIED V 14TH RUDIMENTARY RIB(S) BILATERAL	P P
	SKELETAL	13	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	14	V CERVICAL CENTRUM #1 OSSIFIED V 14TH RUDIMENTARY RIB(S) BILATERAL	P P
	EXTERNAL	NO REMARKABLE OBSERVATIONS		
	VISCERAL	1,2,3,4,5,6,8,9,11,12,13,14,15,16		
	SKELETAL	1,2,3,4,5,6,8,9,11,12,13,14,15,16 11,15,16		
27442		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18		
		A A A A E A A A/ A A A A A A A A A		
	SEX:	M M M M - F F M M M F M F M M F F M		
	CEPHALIC:	1,3,6,8,10,12,14,16,18		
	SKELETAL	1	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4	V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	5	EARLY RESORPTION	
	SKELETAL	7	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27442	(CONTINUED)		
		#5	
SKELETAL	8	V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
		#3 THROUGH #5	
SKELETAL	10	V CERVICAL CENTRUM #1 OSSIFIED	P
		V REDUCED OSSIFICATION OF THE 13TH RIB(S)	1
		BILATERAL	
SKELETAL	11	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	13	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	14	V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
		#3 THROUGH #5	
SKELETAL	15	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	16	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	18	V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1,2,3,4,6,7,8,9,10,11,12,13,14,15,16,17,18	
VISCERAL		1,2,3,4,6,7,8,9,10,11,12,13,14,15,16,17,18	
SKELETAL		2,3,6,9,12,17	
27455		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
		A A A/ A A A A A A A A A A A A	
	SEX:	M M F F M F M M F M F M F F M	
	CEPHALIC:	2,4,6,8,10,12,14	
SKELETAL	1	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#6	
SKELETAL	14	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27455	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	SKELETAL	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15	
27457		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A/ E A A A A A A A A A A A A E	
	SEX:	M M F - F M M M M M F F M M F -	
	CEPHALIC:	2, 5, 7, 9, 11, 13, 15	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	VISCERAL	2 RENAL PAPILLA(E) NOT FULLY DEVELOPED (WOO AND HOAR GRADE 1)	P
	SKELETAL	RIGHT V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	3 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	EXTERNAL	4 EARLY RESORPTION	
	SKELETAL	5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		5 V 7TH CERVICAL RIB(S)	P
	SKELETAL	PINPOINT, RIGHT	
	SKELETAL	9 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	P
	SKELETAL	#3 THROUGH #5, MODERATE; #2, SLIGHT	
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	#5 AND #6	
	SKELETAL	12 V 7TH CERVICAL RIB(S)	P
	SKELETAL	PINPOINT, LEFT	
	SKELETAL	13 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27457	(CONTINUED)		
		#5 AND #6	
SKELETAL		V 7TH CERVICAL RIB(S)	P
		PINPOINT, RIGHT	
SKELETAL	14	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
SKELETAL	15	V REDUCED OSSIFICATION OF THE VERTEBRAL ARCHES	1
		CERVICAL #3 THROUGH #6, BILATERAL; SACRAL #2 THROUGH	
		CAUDAL #6, BILATERAL	
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5 AND #6	
EXTERNAL	16	EARLY RESORPTION	
		NO REMARKABLE OBSERVATIONS	
EXTERNAL		1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
VISCERAL		1, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
SKELETAL		6, 7, 8, 10	
27461		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		A A A A A A A A/ A A A A A A A A	
	SEX:	F M F F F M M F M F M F M M F M	
	CEPHALIC:	2, 4, 6, 8, 10, 12, 14, 16	
SKELETAL	2	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	5	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	6	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	8	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	11	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	12	V CERVICAL CENTRUM #1 OSSIFIED	P
SKELETAL	16	V CERVICAL CENTRUM #1 OSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27461	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	SKELETAL	1, 3, 4, 7, 9, 10, 13, 14, 15	
27472		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	
	SEX:	A A A A A E A A A A/ A A A A A A A A A A	
	CEPHALIC:	M F F F M - F F F M F M M F F M M M M M F	
		1, 3, 5, 8, 10, 12, 14, 16, 18, 20	
	EXTERNAL	6 EARLY RESORPTION	
	SKELETAL	21 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5 AND #6	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21	
	VISCERAL	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21	
	SKELETAL	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	
27476		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
	SEX:	A A A A A A A/ A A A A A A A A	
	CEPHALIC:	M M M M F F M M M F F M F M F	
		1, 3, 5, 7, 9, 11, 13, 15	
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	3 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	5 V REDUCED OSSIFICATION OF THE 13TH RIB(S)	1
		RIGHT	
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27476	(CONTINUED)		
	SKELETAL	6 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	10 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	11 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	12 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P P
	SKELETAL	14 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
		V CERVICAL CENTRUM #1 OSSIFIED	P
		V REDUCED OSSIFICATION OF THE 13TH RIB(S) BILATERAL	1
	SKELETAL	15 V REDUCED OSSIFICATION OF THE 13TH RIB(S) BILATERAL	1
		V 25 PRESACRAL VERTEBRAE	P
	EXTERNAL	NO REMARKABLE OBSERVATIONS	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	
	SKELETAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15 1,4,7,8,9	
27480		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 A A A A A A A/ A A A A A A A A SEX: F M M M M F F F F M F F M M M F CEPHALIC: 1,3,5,7,9,11,13,15	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P

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DERMAL RAT DEV TOX STUDY OF ULTRA-LOW SULFUR DIESEL FUEL
INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27480	(CONTINUED)		
	SKELETAL	6 V 14TH RUDIMENTARY RIB(S) LEFT	P
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	16 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16	
	VISCERAL	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16	
	SKELETAL	2,3,4,5,7,8,9,10,12,13,14,15	
27483		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 A A E A A A/ A A A E A A A A A A SEX: M F - M M M M F F - F F M M M M CEPHALIC: 2,5,7,9,12,14,16	
	SKELETAL	1 V HYOID UNOSSIFIED	P
	SKELETAL	2 V 14TH RUDIMENTARY RIB(S) LEFT	P
	EXTERNAL	3 EARLY RESORPTION	
	SKELETAL	4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5 AND #6	P
		V STERNEBRA(E) #1,#2,#3 AND/OR #4 UNOSSIFIED #2 AND #4	P
	SKELETAL	9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	EXTERNAL	10 EARLY RESORPTION	
	SKELETAL	12 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	15 V CERVICAL CENTRUM #1 OSSIFIED V 14TH RUDIMENTARY RIB(S)	P P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP 5: 600 MG/KG/DAY FETUS # GRADE

27483 (CONTINUED)

LEFT
NO REMARKABLE OBSERVATIONS
EXTERNAL 1,2,4,5,6,7,8,9,11,12,13,14,15,16
VISCERAL 1,2,4,5,6,7,8,9,11,12,13,14,15,16
SKELETAL 5,6,7,8,11,13,14,16

27484

1 2 3 4 5 6 7 8 9 10 11 12 13
A A A A A/ A A A A A A A A
SEX: M F M F F M F F F F F F F
CEPHALIC: 1,3,5,7,9,11,13

SKELETAL 4 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5

SKELETAL 5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5

SKELETAL 7 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5

NO REMARKABLE OBSERVATIONS
EXTERNAL 1,2,3,4,5,6,7,8,9,10,11,12,13
VISCERAL 1,2,3,4,5,6,7,8,9,10,11,12,13
SKELETAL 1,2,3,6,8,9,10,11,12,13

27485

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
A A A A A A A/ A A A A A A A A A
SEX: F M M F F M M F F F M F M M M F M
CEPHALIC: 2,4,6,8,10,12,14,16

SKELETAL 1 V HYOID UNOSSIFIED P
V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED P
#5

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DAMS FROM GROUP 5: 600 MG/KG/DAY		FETUS #		GRADE
27485	(CONTINUED)			
	SKELETAL	3	V 14TH RUDIMENTARY RIB(S) BILATERAL	P
			V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	7	#5 V 14TH RUDIMENTARY RIB(S) LEFT	P
			V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	10	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	11	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	12	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	14	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	15	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	16	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	17	#5 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			NO REMARKABLE OBSERVATIONS	
	EXTERNAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL		2,4,5,6,8,9,13	
27488			1 2 3 4 5 6 7 8 9 10 11 12 13	
			A A A A/ A A A A A A A A	
	SEX:		M M F M F M F F M F F M M	
	CEPHALIC:		1,3,5,7,9,11,13	

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DAMS FROM GROUP		5: 600 MG/KG/DAY	FETUS #	GRADE
27488	(CONTINUED)			
	SKELETAL	2	V HYOID UNOSSIFIED	P
	SKELETAL	4	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	12	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#6	
	SKELETAL	13	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
			NO REMARKABLE OBSERVATIONS	
	EXTERNAL		1,2,3,4,5,6,7,8,9,10,11,12,13	
	VISCERAL		1,2,3,4,5,6,7,8,9,10,11,12,13	
	SKELETAL		1,3,5,6,7,8,9,10,11	
27496			1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
			A A A A A A A A/ A A A A A A A	
	SEX:	F M M F M F F M F M F F M F M		
	CEPHALIC:	1,3,5,7,9,11,13,15		
	SKELETAL	1	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
	SKELETAL	3	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	4	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
	SKELETAL	5	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	9	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
	SKELETAL	11	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	12	V 7TH CERVICAL RIB(S)	P
			PINPOINT, RIGHT	
	SKELETAL	14	V CERVICAL CENTRUM #1 OSSIFIED	P

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27496	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	SKELETAL	2, 6, 7, 8, 10, 13, 15	
27511		1 2 3 4 5 6 7 8 9	
	SEX:	A A A/ A A A A A A	
	CEPHALIC:	F F F F F M M F F	
		2, 4, 6, 8	
	SKELETAL	6 V 14TH RUDIMENTARY RIB(S) LEFT	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9	
	SKELETAL	1, 2, 3, 4, 5, 7, 8, 9	
27514		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
	SEX:	A A A A A/ A A A E A A A E A A	
	CEPHALIC:	M M F F M F M M - M F F - F F	
		1, 3, 5, 7, 10, 12, 15	
	SKELETAL	3 V 14TH RUDIMENTARY RIB(S) BILATERAL	P
	SKELETAL	4 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	7 V 14TH RUDIMENTARY RIB(S) BILATERAL	P
	EXTERNAL	9 EARLY RESORPTION	
	EXTERNAL	13 EARLY RESORPTION	
	SKELETAL	14 V CERVICAL CENTRUM #1 OSSIFIED	P

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27514	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15	
	SKELETAL	1, 2, 5, 6, 8, 10, 11, 12, 15	
27518		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
	SEX:	M F M F M F F F F M M F F M F F	
	CEPHALIC:	1, 3, 5, 7, 9, 11, 13, 15	
	SKELETAL	2 V 7TH CERVICAL RIB(S) FULL, LEFT	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	5 V 7TH CERVICAL RIB(S) INTERMEDIATE, LEFT	P
		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	8 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
	SKELETAL	10 V 14TH RUDIMENTARY RIB(S) RIGHT	P
	VISCERAL	11 RENAL PAPILLA(E) NOT FULLY DEVELOPED (WOO AND HOAR GRADE 1) RIGHT	P

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27518	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16	
	SKELETAL	1, 3, 4, 7, 11, 12, 13, 14, 15, 16	
27534		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
	SEX:	A A A A A A A A/ E A A A A A A A	
	CEPHALIC:	F F F M M F F F - M F M F M M F M	
		1, 3, 5, 7, 10, 12, 14, 16	
	EXTERNAL	9 EARLY RESORPTION	
	SKELETAL	16 V STERNEBRA(E) MALALIGNED(SLIGHT OR MODERATE)	1
		#5	
	SKELETAL	17 V HYOID UNOSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17	
	SKELETAL	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15	
27535		1 2 3 4 5 6 7 8 9 10 11 12 13 14	
	SEX:	A A A A A/ A A E A E A A A A	
	CEPHALIC:	F F M F M M M - M - M M M F	
		2, 4, 6, 9, 12, 14	
	SKELETAL	1 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	7 V CERVICAL CENTRUM #1 OSSIFIED	P
	EXTERNAL	8 EARLY RESORPTION	
	EXTERNAL	10 EARLY RESORPTION	
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	13 V CERVICAL CENTRUM #1 OSSIFIED	P

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27535	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 9, 11, 12, 13, 14	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 9, 11, 12, 13, 14	
	SKELETAL	2, 3, 4, 5, 6, 9, 12, 14	
27539		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
	SEX:	M M F M F F F M F F M F M M F F	
	CEPHALIC:	2, 4, 6, 8, 10, 12, 14, 16	
	SKELETAL	7 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	9 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	15 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	16 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	
	SKELETAL	1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14	
27551		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
	SEX:	M F M M M M M M F M F F F F F	
	CEPHALIC:	2, 4, 6, 8, 10, 12, 14	

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #		GRADE
27551	(CONTINUED)			
	VISCERAL	2	V RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S)	1
			URETER(S), BILATERAL	
	SKELETAL	4	V 7TH CERVICAL RIB(S)	P
			PINPOINT, LEFT	
	SKELETAL	5	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
			V 7TH CERVICAL RIB(S)	P
			PINPOINT, LEFT	
	VISCERAL	7	V RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S)	3
			URETER, BILATERAL	
			RENAL PAPILLA(E) NOT FULLY DEVELOPED (WOO AND HOAR GRADE 1)	P
			RIGHT	
	SKELETAL		V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
			V 7TH CERVICAL RIB(S)	P
			PINPOINT, RIGHT	
	VISCERAL	8	RENAL PAPILLA(E) NOT FULLY DEVELOPED (WOO AND HOAR GRADE 1)	P
			RIGHT	
			V RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S)	3
			URETER, RIGHT	
	SKELETAL	11	V 7TH CERVICAL RIB(S)	P
			PINPOINT, LEFT	
	VISCERAL	12	V RENAL PAPILLA(E) NOT DEVELOPED AND/OR DISTENDED URETER(S)	2
			URETER, BILATERAL	
	SKELETAL	13	V CERVICAL CENTRUM #1 OSSIFIED	P
	SKELETAL	14	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
			#5	
			V CERVICAL CENTRUM #1 OSSIFIED	P

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INDIVIDUAL FETAL EXTERNAL, VISCERAL AND SKELETAL FINDINGS

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DAMS FROM GROUP	5: 600 MG/KG/DAY	FETUS #	GRADE
27551	(CONTINUED)	NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	
	VISCERAL	1, 3, 4, 5, 6, 9, 10, 11, 13, 14, 15	
	SKELETAL	1, 2, 3, 6, 8, 9, 10, 12, 15	
27557		1 2 3 4 5 6 7 8 9 10 11 12 13 14	
		A A A A A A A A/ A A A A A A	
	SEX:	M F F F M M M F M F M M F M	
	CEPHALIC:	2, 4, 6, 8, 10, 12, 14	
	SKELETAL	6 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	11 V CERVICAL CENTRUM #1 OSSIFIED	P
		NO REMARKABLE OBSERVATIONS	
	EXTERNAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	
	VISCERAL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	
	SKELETAL	1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14	
27568		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
		A A A A A A A A/ A A A A A A A A	
	SEX:	F F M F M M M M M M F M M M F M F	
	CEPHALIC:	1, 3, 5, 7, 9, 11, 13, 15, 17	
	SKELETAL	1 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	2 V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED	P
		#5	
	SKELETAL	6 V 14TH RUDIMENTARY RIB(S)	P
		LEFT	
	SKELETAL	9 V CERVICAL CENTRUM #1 OSSIFIED	P

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DAMS FROM GROUP 5: 600 MG/KG/DAY		FETUS #		GRADE
27568	(CONTINUED)			
	SKELETAL	10	V 14TH RUDIMENTARY RIB(S) LEFT	P
	SKELETAL	11	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
	SKELETAL	12	V STERNEBRA(E) #5 AND/OR #6 UNOSSIFIED #5	P
			NO REMARKABLE OBSERVATIONS	
	EXTERNAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	VISCERAL		1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	
	SKELETAL		3,4,5,7,8,13,14,15,16,17	

A = VIABLE FETUS, E = EARLY RESORPTION, L = LATE RESORPTION, D = DEAD FETUS, "/" DENOTES CERVIX POSITION
OBSERVATION CODE: M = MALFORMATION, V = VARIATION GRADE CODE: 1 = SLIGHT, 2 = MODERATE, 3 = MARKED, P = PRESENT
SEX CODE: M = MALE, F = FEMALE, - = NOT APPLICABLE

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