#### **Data Requirement**

EPA OPPTS 870.3550 OECD 421

STUDY NO. 03-4246

# PETROLEUM COKE: REPRODUCTION/DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### **Final Report**

#### **VOLUME I OF II**

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1220 L Street, Northwest

Washington, D.C. 20005-4070

Attn:

Date: 3 April 2009

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#### STATEMENT OF COMPLIANCE

This study was conducted in compliance with the United States Environmental Protection Agency's Good Laboratory Practices as set forth in 40 CFR Part 792 (TSCA) and the Organization for Economic Cooperation and Development (OECD) Good Laboratory Practices as set forth in ENV/MC/CHEM/(98)17, with the following exception:

The Supplier was responsible for the characterization and stability of the test substance and those tests were not performed at a GLP compliant laboratory nor were conducted under GLP regulations.



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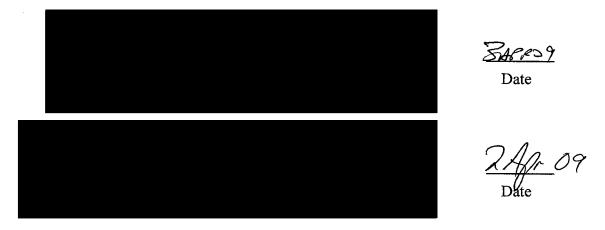
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#### SIGNATURE PAGE

#### **SCIENTISTS**

The following Scientists were responsible for the overall conduct of this study. Departmental supervisory personnel are listed on the personnel page of this report (Appendix BB).



#### **SCIENTIFIC REVIEW**

The following Scientist has reviewed and approved this report:



<u>2 APR O</u>9 Date

<sup>&</sup>lt;sup>1</sup> Wanda B. High was the Study Pathologist for this study and for submission of the draft report and is no longer employed at the Testing Facility. Dianne Creasy is assuming responsibility for finalization of the pathology evaluation of this report.

<sup>&</sup>lt;sup>2</sup> Keith P. Hazelden was the original scientific reviewer of this report and is no longer employed at the Testing Facility. Robert M. Parker is assuming responsibility for final review of this report.

#### **QUALITY ASSURANCE STATEMENT**

Listed below are the dates that this study was inspected by the Quality Assurance Unit of Huntingdon Life Sciences, East Millstone, New Jersey, and the dates that findings were reported to the Study Director and Management. This report reflects the raw data as far as can be reasonably established.

Type of Inspection	Date(s) of Inspection	Reported to Study Director and Management
GLP Protocol Review	4 May 04	4 May 04
Exposure, Monitoring & Equipment Records	25 May 04	19 Jul 04
Mating Evaluations	10 Jun 04	10 Jun 04
Terminal Necropsy (Males) & Protocol Amendment No. 1	25 Jun 04	25 Jun 04
Maternal & Pup Necropsy & Training Records	6 Jul 04	7 Jul 04
Final Report & Study Data	27 Sep – 8 Oct 04	12 Oct 04
Additional Pathology Evaluations and Study Data	19 Jan 05	19 Jan 05
Protocol Amendment Nos. 2-5	16 May 08	16 May 08
Final Report Review	29 & 30 Oct 08	30 Oct 08



2 Apr 09
Date

## PETROLEUM COKE: REPRODUCTION/DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### **SUMMARY**

This study was designed to screen possible effects on reproductive performance, in male and female Sprague Dawley CD® rats when petroleum coke was administered as a dust, via nose-only inhalation exposure. It also was designed to detect effects on gonadal function, which may not be evident from histological examination of the reproductive organs. In addition, this study can detect effects on mating behavior, conception, development of the conceptus, parturition, lactation, and pup survival to postnatal day 4.

Male and female Sprague-Dawley CD® rats (12/sex/group) were exposed to petroleum coke once daily (6 hours/day), 7 days/week for 2 weeks prior to mating initiation, at levels of 0 (air only), 30, 100 or 300 mg/m³. In addition, male rats were exposed during the mating and post-mating periods for a minimum exposure of 28 days until euthanized and necropsied. Female rats continued to be treated once daily (6 hours/day) during the mating period. Once mated, female rats were treated once daily (6 hours/day) during gestation days 0 through 19, and euthanized on lactation day 4 and necropsied.

The following parameters were evaluated in all animals: viability, clinical observations, body weights, feed consumption, organ weights, and macroscopic observations. Macroscopic postmortem examinations (external only) were performed on all surviving  $F_1$  pups on postnatal day 4. Histopathological evaluations were conducted on all air control and test substance exposed adult animals. Exposure levels were determined using a gravimetric sampling procedure four times per chamber per day. Particle size distribution measurements were also made once per chamber per week.

The mean ( $\pm$  standard deviation) exposure concentrations of petroleum coke were determined to be  $31.2 \pm 4.6$ ,  $99.4 \pm 13.9$ , and  $300.7 \pm 34.7$  mg/m³ for the three exposed groups, respectively. Chamber environmental conditions averaged 20°C temperature and 44% relative humidity. The average mass median diameter was determined to be 2.287  $\mu$ m with an average geometric standard deviation of 2.848 indicating that the particles for the test substance exposed groups were highly respirable to the test animals.

There was no effect of treatment on survival. All animals survived until the termination of the study. The test animals were generally unremarkable during the non-exposure period. There were no exposure-related differences in absolute body weights, body weight changes or feed consumption in the remaining test substance exposed animals, compared to the air control animals.

Mating, fertility, and gestation indices were unaffected by the exposures for the lower two exposure groups. In the 300 mg/m<sup>3</sup> group, four pairings either did not result in pregnancy (3/12) or did not result in delivery of viable fetuses (1/12). Of the three females that were not pregnant, one was acyclic (one control female was also acyclic).

#### **SUMMARY**

Both of the other non-pregnant dams mated but neither had corpora lutea or implantations. Consequently, the overall fertility index for the 300 mg/m<sup>3</sup> group was slightly decreased when compared with control values ([75% [9/12] versus 91.7% [11/12]), however the difference was not statistically significant. A fourth dam was pregnant, but had only two corpora lutea, two implantation sites, and no viable fetuses. The gestation index at 300 mg/m<sup>3</sup> (88.9% [8/9]) was reduced but not statistically different from the controls (100% [11/11]). However the fertility index observed in the 300 mg/m<sup>3</sup> group was outside the testing facility's historical control data minimum of 87.5% (maximum of 100% with a mean of 93.7%; based on nine studies between 2001 and 2002) and therefore the decreased fertility was considered exposure-related. There were no exposure-related inter-group differences for delivery parameters, including the duration of gestation and the proportion with live litters and/or with stillborn pups. Parturition data for the female rats treated with the test substance were comparable to the air control group. The pups were unremarkable during the early postnatal period until termination at postnatal day 4. There were no meaningful differences in pup body weights or weight gains, up to postnatal day 4, in the pups feeding from dams exposed to test substance during gestation compared to the pups feeding from air control dams. The decreased fertility and gestation indices in the 300 mg/m<sup>3</sup> coupled with the single female with a low number of implantation sites and no viable fetuses were considered exposurerelated.

Except for the low exposure males, there were exposure-related increases (up to 37% in males and 58% in females) in absolute lung weights compared to the air control animals. Lungs from all test substance-treated rats were slightly to severely discolored black. Inhalation of petroleum coke was associated with the presence of pigment deposits, probably representing test substance, in the lungs, mediastinal lymph nodes and nasal olfactory epithelium of most male and female rats, and in the lumens of the nasal turbinates and pharynx of male rats. Test substance-related changes characterized by proliferative and/or inflammatory responses were observed in the lungs at all exposure levels. In the mediastinal lymph nodes draining the lungs of the animals at all exposure levels, hyperplasia of the paracortical T lymphocyte population accompanied the deposition of pigment. In the larynx, minimal squamous metaplasia of the respiratory epithelium occurred and was considered to be an adaptive response to inhalation of particulates. These effects were considered to be in response to inhalation of particulate matter, and histological findings were considered to be adaptive. There were no exposure-related differences in the incidence of macroscopic postmortem evaluations in the pups from test substance exposed animals as compared to the pups from air control animals.

In conclusion, exposure of male and female rats to target concentrations of 30, 100 or 300 mg/m<sup>3</sup> of petroleum coke by nose-only inhalation for 4-6 weeks resulted in discolored lungs, increased lung weight, and proliferative and/or inflammatory responses in the lungs and mediastinal lymph nodes, in all test substance exposed groups. Decreased fertility and gestation indices coupled with the single female with a low

#### **SUMMARY**

number of implantation sites and no viable fetuses were observed in the 300 mg/m³ exposure group. There were no effects observed on offspring survival and weight development up to postnatal day 4. Therefore, the no-observed-adverse-effect level (NOAEL) for adult males and females for systemic toxicity was 300 mg/m³. A NOAEL for the portal of entry was not established for females; the female lowest-observed-adverse-effect level (LOAEL), based on lung weight increases, was 30 mg/m³. The portal of entry NOAEL for males, based on increased lung weights, was 100 mg/m³. Based on the lower fertility and gestational indices, and low number of implantation sites with no viable fetuses for one female in the 300 mg/m³ exposure group, the reproductive NOAEL was 100 mg/m³. The developmental NOAEL was 300 mg/m³.

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#### 1. INTRODUCTION

This study was designed to screen possible effects on reproductive performance, in male and female Sprague Dawley CD® rats when petroleum coke was administered by nose-only inhalation exposure. It also was designed to detect effects on gonadal function, which may not be evident from histological examination of the reproductive organs. In addition, this study can detect effects on mating behavior, conception, development of the conceptus, parturition and pup survival to postnatal day 4. Since all aspects of reproduction and development were not examined in this study, definitive claims of "no reproductive/developmental effects" cannot be made.

#### 2. MATERIALS AND METHODS

#### 2.1. STUDY MANAGEMENT

#### **2.1.1. SPONSOR**

American Petroleum Institute (API) 1220 L Street, Northwest Washington, D.C. 20005-4070

#### 2.1.2. SPONSOR REPRESENTATIVE

#### 2.1.3. TESTING FACILITY

Huntingdon Life Sciences (HLS) 100 Mettlers Road East Millstone, New Jersey 08875-2360

#### 2.1.4. STUDY DIRECTOR

#### 2.2. STUDY DATES

#### 2.2.1. STUDY INITIATION

11 May 2004 (Date study director signed the protocol)

#### 2.2.2. DATE OF ANIMAL RECEIPT

11 May 2004 (Experimental start date, per OECD GLP's)

#### 2.2.3. EXPOSURE INITIATION

25 May 2004 (Experimental start date, per EPA GLP's)

#### 2.2.4. MATING INITIATION

08 June 2004

#### 2.2.5. MATING TERMINATION

22 June 2004

#### 2.2.6. EXPOSURE TERMINATIONS

24 June 2004 (Males)11 July 2004 (Females)

#### 2.2.7. TERMINAL SACRIFICE

25 June 2004 (Males)5-16 July 2004 (Females)

#### 2.2.8. EXPERIMENTAL TERMINATION

2 April 2009 (Date of last data collection = date final report is signed by the study pathologist)

#### 2.2.9. STUDY COMPLETION

3 April 2009 (Date final report is signed by the study director)

#### 2.3. EXPERIMENTAL OUTLINE

			Treatment Schedule Pre-mating Period		Number of	Animals
Group	Group Designation	Exposure Levels (mg/m³)	Male Rats <sup>b</sup>	Female Rats <sup>c</sup>	Male Rats <sup>b</sup>	Female Rats <sup>c</sup>
1	Air Control <sup>a</sup>	0	2 weeks	2 weeks	12	12
2	Low	30	2 weeks	2 weeks	12	12
3	Mid	100	2 weeks	2 weeks	12	12
4	High	300	2 weeks	2 weeks	12	12

<sup>&</sup>lt;sup>a</sup> Control animals were exposed to air only with the same treatment regimen as the test substance exposed groups.

The first day of exposures was defined as day 0 of the study. The day of detection of mating was designated as gestation day 0. The day of birth of the litter was designated as lactation Day 0 (post-natal day 0).

Male rats (12/group) were exposed once daily (6 hours/day), seven days/week for 2 weeks prior to mating initiation. Exposure of male rats continued during the mating and post-mating periods until euthanized on the day after a minimum exposure of 28 days.

Female rats (12/group) were exposed once daily (6 hours/day), seven days/week for at least two weeks prior to mating initiation. Female rats continued to be treated once daily (6 hours/day) during the mating period, but were separated from their male partners during exposure. Once mated, female rats were treated once daily (6 hours/day) during gestation (days 0-19). Sacrifice was on lactation day 4 (post-natal day 4). Female rats without evidence of mating continued to be treated for up to 19 days (6 hours/day) following completion of the mating period and then held for up to an additional 7 days prior to sacrifice. In the event that female rats without evidence of mating appeared pregnant (based on observations and body weights), exposure was terminated on the estimated gestation day 19 with sacrifice 7 days later.

#### 2.4. JUSTIFICATIONS

### 2.4.1. ROUTE, DURATION AND FREQUENCY OF ADMINISTRATION

The inhalation route is one of the potential routes of human exposure to this test substance. The duration of the study and frequency of exposures were as recommended in the referenced guidelines. Daily exposure for 6 hours per day provided an adequate model for potential human exposure during a typical work-day, while continuous (7 days per week) exposure was necessary to maximize the likelihood of detecting effects within a relatively short exposure period and was essential for proper evaluation of effects on the process of development. combination of a pre-mating exposure period of 2 weeks with an overall exposure period of at least 4 weeks, with mating/fertility assessments in both sexes and detailed histopathology of the male gonads, was considered sufficient for detection of most effects on fertility and gametogenesis. The 2-week pre-mating exposure period, continuing for females through gestation, also allowed for evaluation of possible effects on the estrous cycle, implantation and development of the conceptus, on subsequent parturition and early offspring viability and growth.

#### 2.4.2. EXPOSURE LEVEL SELECTION

The exposure levels were based primarily upon findings in a twoweek range-finding study (HLS Study No. 03-6147, see Appendix X range finding study) in which exposure to petroleum coke at exposure levels of 25, 75 and 200 mg/m<sup>3</sup> resulted in discolored lungs, increased lung weights, and alveolar and/or bronchiolar epithelial hyperplasia/hypertrophy. Based on increased lung weights, the local site of administration LOAEL for males was 25 mg/m<sup>3</sup> and the NOAEL for females was 75 mg/m<sup>3</sup>. There were no systemic effects observed, consequently the systemic NOAEL for both males and females was 200 mg/m<sup>3</sup>. The local effects were considered to be a result of generic inhalation of particulate matter rather than compound specific effects. Consequently, higher exposure levels of 30, 100 and 300 mg/m<sup>3</sup> were selected for the definitive OECD 421 screening study to maximize the likelihood of systemic effects at the highest exposure level.

#### 2.4.3. TEST ANIMAL SELECTION

The rat is a rodent animal model acceptable under OECD and EPA testing guidelines for reproductive toxicity studies. In addition, an historical database for this strain of rat is available in the testing facility for comparative evaluation.

#### 2.4.4. NUMBER OF ANIMALS

The number of animals in this study was considered the minimum necessary to allow for meaningful interpretation of the data, as required by OECD and EPA guidelines. Eight-10 pregnancies per group was considered an adequate number for screening for reproductive and developmental toxicities. The group size of 12 males and 12 females used in this study, retaining a one male to one female pairing ratio, with expected pregnancy rates of 80-90%, was anticipated to provide at least 8-10 pregnancies per group for evaluation.

#### 2.5. TEST SUBSTANCE

Petroleum Coke [3.3 micron mean petroleum coke (as per label information); see Aveka milling report in Appendix Y]

#### 2.5.1. TEST SUBSTANCE CATEGORY

Residual product from petroleum refining

#### 2.5.2. SUPPLIER

EPL Archives, Inc. 45610 Terminal Drive Sterling, VA 20166

#### 2.5.3. LOT NUMBER

M05369A

#### 2.5.4. PURITY AND STABILITY

See Appendix Y (COA)

#### 2.5.5. DESCRIPTION

Black powder

#### 2.5.6. DATE RECEIVED

22 October 2003

#### 2.5.7. EXPIRATION DATE

Not available, but stable as per COAs (see Appendix Y).

#### 2.5.8. ANALYSIS

The identity, strength, purity, composition, stability, and method of synthesis, fabrication and/or derivation of each batch of the test substance and the maintenance of these records was the responsibility of the sponsor. The test substance was stored (ambient conditions) in the inhalation laboratory and handled routinely while wearing gloves, dust-mask and lab-coat.

A 200 gram sample of the test substance was shipped for analysis to ChevronTexaco Energy Research and Technology Corp., 100 Chevron Way, Richmond, CA 94802, attn: Patrick Beatty on 8 November 2004.

#### **2.5.9. STORAGE**

Room temperature (ambient)

#### 2.5.10. ARCHIVAL SAMPLE

Since multiple studies were conducted with the same test substance, a common archival sample of the test substance was taken, appropriately labeled, and shipped to the archives of the sponsor (EPL Archives, Inc., 45610 Terminal Drive, Sterling, VA, attn: Sam Busey).

#### 2.5.11. DISPOSITION

The unused portion of test substance as well as any empty test substance containers will be returned to the archives of the sponsor (EPL Archives, Inc., 45610 Terminal Drive, Sterling, VA) following completion of the study.

#### 2.6. TEST ANIMALS

#### **2.6.1. SPECIES**

Albino Rats (Outbred) VAF/Plus<sup>®</sup> Sprague-Dawley Derived (CD<sup>®</sup>) Crl:CD<sup>®</sup> (SD) IGS BR

#### 2.6.2. SUPPLIER

Charles River Laboratories Kingston, NY 12484

#### 2.6.3. NUMBER OF ANIMALS

Received:

102 total (51 males, 51 females)

Placed on test:

96 total (48 males, 48 females)

Female rats were nulliparous and non-pregnant and were from a separate colony area than the male rats to ensure that there would be no sibling matings.

#### 2.6.4. AGE AT RECEIPT

Approximately 6 weeks

#### 2.6.5. AGE AT INITIATION OF EXPOSURES

Approximately 8 weeks

#### 2.6.6. WEIGHT AT INITIATION OF EXPOSURES (GRAMS)

	Mean	Range
Male:	258	235-280
Female:	216	199-232

Individual weights of animals placed on test were within  $\pm 20\%$  of the mean weight for each sex.

#### 2.6.7. ACCLIMATION PERIOD

Animals were acclimated for approximately 2 weeks. All animals were checked for viability twice daily. Prior to assignment to study, all animals were examined to ascertain suitability for study.

#### 2.7. ANIMAL ASSIGNMENT

More animals than required for the study were purchased and acclimated. Animals considered suitable for study on the basis of pretest physical examinations and body weight data were randomly assigned by sex, to control or treated groups by a computerized random sort program, in an attempt to equalize mean group body weights. Disposition of all animals not utilized in the study will be maintained in the study file.

#### 2.8. ANIMAL IDENTIFICATION

Each animal was assigned a temporary identification number upon receipt, and after selection for the study, each animal was tail-tattooed with a number assigned by the testing facility. The assigned animal number plus the study number comprised the unique animal number for each animal. In addition, each cage was provided with a cage card, which was color-coded for exposure level identification and contained study number and animal number information.

#### 2.9. VETERINARY CARE

Animals were monitored by the technical staff for any conditions requiring possible veterinary care.

#### 2.10. ANIMAL HUSBANDRY DURING NON-EXPOSURE PERIODS

#### 2.10.1. FACILITIES MANAGEMENT/ANIMAL HUSBANDRY

Currently acceptable practices of good animal husbandry were followed e.g., *Guide for the Care and Use of Laboratory Animals*; National Academy Press, 1996. Huntingdon Life Sciences, East Millstone, New Jersey is fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC).

#### **2.10.2. HOUSING**

All animals were housed individually in stainless steel suspended cages with wire mesh floors and fronts except for the mating period when one male and one female rat were housed together. Cages were arranged in such a way that possible effects due to placement were minimized. During cohabitation (when female rats were brought to the male rats' cages), male and female rats were then housed in stainless steel cages of appropriate size for group housing animals. Each cage was fitted to secure a glass feeder jar with a stainless steel lid. Clean feeder jars and fresh feed were provided at least weekly. From gestation day 18 and during lactation, the dam was housed with her litter in plastic "shoebox" cages with bedding. Clean feed jars and fresh feed was provided at least weekly for periods when feed consumption was not being recorded and at each interval when feed consumption was recorded.

#### 2.10.3. FEED

Certified Rodent Diet, No. 5002; (Meal) (PMI Nutrition International, St. Louis, Missouri) was available without restriction (except during exposure periods).

#### 2.10.4. FEED ANALYSIS

Analysis of each feed lot used during this study was performed by the manufacturer. Results are maintained on file at the testing facility (see Appendix Z). There were no known contaminants in the feed which were expected to interfere with the results of this study.

#### 2.10.5. WATER

Water (Elizabethtown Water Company, Westfield, New Jersey) was available without restriction (except during exposure periods) via an automated watering system.

#### 2.10.6. WATER ANALYSIS

Water analyses are conducted by Elizabethtown Water Company, Westfield, New Jersey (Raritan-Millstone Plant) to ensure that water meets standards specified under the EPA Federal Safe Drinking Water Act Regulations (40 CFR Part 141). In addition, water samples are collected biannually from representative rooms in the testing facility; chemical and microbiological water analyses are conducted on these samples by a subcontract laboratory (Benchmark Analytics, Center Valley, PA) of all water analyses are maintained on file at the testing facility. Results are maintained on file at the testing facility (see Appendix Z). There were no known contaminants in the water that were expected to interfere with the results of this study.

#### 2.10.7. BEDDING SUBSTANCE

Ground corncob bedding (Bed-O'-Cobs<sup>®</sup> ¼ inch irradiated, The Andersons, Maumee, Ohio) was provided for each mated female rat on day 18 of gestation. Fresh bedding was provided weekly or as needed throughout lactation.

#### 2.10.8. BEDDING ANALYSIS

Analyses for each batch of bedding used on study were provided by the supplier. Results are maintained on file at the testing facility (see Appendix Z). There were no known contaminants in the bedding that were expected to interfere with the results of this study.

#### 2.10.9. ENVIRONMENTAL CONDITIONS

#### Light/Dark Cycle

A twelve-hour light/dark cycle controlled via an automatic timer was provided.

#### **Temperature**

Temperature was monitored in accordance with testing facility SOPs and maintained within the specified range to the maximum extent possible.

Desired Range:

18 to 26°C

Actual Range:

20 to 23°C

Daily Average Range:

20 to 22°C

#### **Relative Humidity**

Relative humidity was monitored in accordance with testing facility SOPs and maintained within the specified range to the maximum extent possible. Excursions above the desired range were not considered of impact to the study.

Desired Range:

30 to 70%

Actual Range:

34 to 81%

Daily Average Range:

44 to 58%

## 2.11. TEST SUBSTANCE ADMINISTRATION AND CHAMBER OPERATION

See Appendix W, Inhalation Report.

#### 2.12. MATING PROCEDURE

Within each treatment group, the male and female rats were co-housed (1:1 in the male's cage) until evidence of mating was seen or for 14 consecutive days. Female rats were observed at approximately the same time each morning for the presence of a vaginal plug or sperm in the vaginal smear. If not mated, the stage of the estrous cycle was recorded instead. The day on which evidence of mating was observed was defined as gestation day 0. Once mated, the female rat was removed from the mating cage and housed individually for the remainder of the study. After the mating period was over, female rats without evidence of copulation were removed from the mating cage and housed individually for the remainder of the study (up to 26 days) and monitored for visible signs of pregnancy with corresponding body weight gain.

#### 2.13. EXPERIMENTAL EVALUATIONS

#### 2.13.1. VIABILITY EXAMINATION (CAGESIDE)

Observations for mortality and general condition were made at least twice daily (once in the morning and once in the afternoon).

#### 2.13.2. DETAILED PHYSICAL EXAMINATIONS

Each animal was removed from its cage and a detailed physical observation performed prior to randomization. Male rats had a

detailed physical observation performed once weekly beginning during the premating period and continuing through euthanasia.

Female rats had a detailed physical observation performed weekly during the premating period and on gestation days 0, 7, 14, 20 and lactation days 0 (except if parturition did not complete on the same day as it initiated), 1 and 4.

Female rats without evidence of mating continued to be observed weekly during the mating and post-mating period until euthanized.

All animals were observed as a group at least once during each exposure. This was routinely performed near the middle of each exposure.

Examinations during non-exposure periods included observations of general condition, skin and fur, eyes, nose, oral cavity, abdomen and external genitalia, occurrence of secretions and excretions. and autonomic activity (e.g., lacrimation. piloerection, pupil size, unusual respiratory pattern). Changes in gait, posture and response to handling as well as the presence of clonic or tonic movements, stereotypy (e.g., excessive grooming, repetitive circling) or bizarre behavior (e.g., self-mutilation, walking backward) was recorded. Pertinent behavioral changes, signs of difficult or prolonged parturition and all signs of toxicity, including mortality, were recorded. These records included, as appropriate, time of onset, degree and duration.

#### 2.13.3. BODY WEIGHTS

Body weights of the male rats and the female rats were recorded at the time of randomization into test groups, on the day treatment was initiated and at least weekly thereafter throughout the study until euthanized. Mated female rats were weighed on gestation days 0, 7, 14 and 20 and female rats that delivered litters were weighed on Lactation Days 1 and 4. Female rats without evidence of mating continued to be weighed weekly during the mating and post-mating period until euthanized. A terminal body weight was also recorded for each animal.

#### 2.13.4. FEED CONSUMPTION

Feed consumption for the male rats and the female rats were measured pretest and weekly during the pre-mating treatment period. Feed consumption was not measured during the mating period when male rats were being co-housed with female rats. Feed consumption for the male rats was measured weekly, and if not mated, for the female rats, during the post-mating period. For pregnant or confirmed mated female rats, feed consumption was measured on gestation days 0-7, 7-14 and 14-20 and on lactation days 1-4.

Feed was available without restriction, except during exposures and at terminal fasting for the animals. Animals were presented with full feeders of known weight. After 7 days (pre-mating), 6 or 7 days (gestation) or 3 days (lactation), the feeders were reweighed and the resulting weight subtracted from the initial feeder weight to obtain the grams of feed consumed per animal over the 7, 6 or 3-day period. Feed consumption was measured (weighed) weekly, beginning one week prior to treatment.

#### Calculation

Feed consumption (g/kg/day) =

grams of feed consumed ÷ # days body weight (kg)<sup>a</sup>

<sup>a</sup>For days 42 and 49, the current weight was used. For all other intervals, the average of the current and previous weight was used.

#### 2.13.5. PARTURITION AND LACTATION

On Gestation Day 18, several days prior to expected parturition, female rats were transferred to solid, plastic cages with bedding article provided. Thereafter, examinations for signs of parturition were made twice daily (morning and afternoon). The duration of gestation was calculated. Evidence of difficult or prolonged parturition was recorded. The day on which parturition initiated was defined as lactation day 0. When parturition began on day 0 and ended on day 1, the lactation day 0 observations were actually reported on lactation day 0. Litters were observed as soon as

possible after parturition completion for the number of live and dead pups, runts and pup abnormalities. Each pup was sexed. Thereafter, litters were observed twice daily (morning and afternoon). All pups in the litter were uniquely identified by toe tattoo after parturition completion. The presence of dead pups was recorded, and these were removed from the litter as found and necropsied. Unusual observations and the absence of milk in the stomach were noted. Any abnormalities observed in maternal behavior (particularly relating to maternal care of the litter) were recorded.

#### 2.13.6. F, PUP EVALUATIONS

#### **Physical Examinations**

Each F<sub>1</sub> pup was given a gross examination on lactation days 0 and 4. Pups were also observed for any abnormal behavior.

#### **Body Weight**

Individual F, pup weights were recorded on lactation days 1 and 4.

#### Sexing

Pups were sexed on lactation day 0 and sex verified on lactation day 4.

In cases where parturition occurred over a two day period, these evaluations would have occurred on lactation day 1 after all pups had been delivered (lactation day 0 being defined as the day that parturition initiated).

#### 2.14. POSTMORTEM EVALUATIONS

#### 2.14.1. METHOD OF EUTHANASIA

All animals (except lactation day 4 pups) were euthanized by exsanguination following an overexposure of carbon dioxide inhalation. Lactation day 4 pups were euthanized using an intraperitoneal injection of sodium pentobarbital.

#### 2.14.2. EUTHANASIA SCHEDULE

#### Male Rats

Male rats were euthanized after at least 28 days of exposure. Necropsy schedules were established in order to assure that approximately equal numbers from each group were examined at similar times of each day of necropsy.

#### **Female Rats**

Mated female rats were euthanized on lactation day 4. Female rats in which evidence of mating was detected but failed to deliver were sacrificed 24-27 days after evidence of mating. Female rats where no evidence of mating was detected and who failed to deliver a litter were euthanized 24 days after the completion of the mating period. Female rats with total litter loss (all pups found dead prior to scheduled sacrifice) were euthanized on lactation day 4.

#### 2.14.3. MACROSCOPIC EXAMINATION

Macroscopic postmortem examinations were performed on all animals. Postmortem examinations included examination of external surface, all orifices, cranial cavity, nasal cavity (external examination), neck and its associated tissues and organs, thoracic, abdominal and pelvic cavities and their associated tissues and organs, and external surfaces of the brain. Special attention was paid to the organs of the reproductive system.

#### **Adult Male Rats**

All protocol required tissues (including gross lesions) were preserved in 10% neutral buffered formalin with the exception of testes and epididymides which were preserved in a modified Davidson's fixative for at least 24 hours and then stored in 10% neutral buffered formalin. If lesions were saved, corresponding tissues from several control animals were also saved for comparative purposes.

#### **Adult Female Rats**

The number of implantation sites and corpora lutea were recorded for each female rat. The uteri of any apparently non-pregnant females were stained with ammonium sulphide (Salewski, 1964), to confirm non-pregnant status. Gross lesions were preserved in 10% neutral buffered formalin and corresponding tissues from several control animals were saved for comparative purposes.

#### 2.14.4. ORGAN WEIGHTS

Organs indicated in Table I (Page 28) were taken at the scheduled necropsy, weighed wet, recorded and organ/body weight ratios and organ/brain weight ratios calculated for all animals. Prior to weighing, all organs were carefully dissected and properly trimmed to remove fat and other contiguous tissue in a uniform manner. Organs were weighed as soon as possible after dissection to avoid drying. Paired reproductive organs were weighed separately.

## 2.14.5. TISSUES PRESERVED AND EXAMINED HISTOLOGICALLY

Tissues listed in Table I (page 28) were obtained at necropsy for all male and all female rats from each exposure group and preserved in 10% neutral buffered formalin with the exception of testes and epididymides which were preserved in a modified Davidson's fixative for at least 24 hours and then stored in 10% neutral buffered formalin. Lungs (gravity method) were infused with 10% neutral buffered formalin for optimal preservation.

Microscopic examinations for all exposure group male and female animals were performed on tissues and organs as designated in Table I. During the microscopic examination of the testes, special emphasis was placed on the stages of spermatogenesis and the interstitial testicular cell structure. Histopathological examination of the ovary was intended to detect any possible qualitative depletion of the primordial follicle population but none were seen and therefore not further discussed in this report. Any abnormalities not noted during macroscopic postmortem examinations that were seen during histological processing were recorded.

#### **Processing**

After fixation, the tissues and organs from exposure animals were routinely processed, embedded in paraffin, cut at a microtome setting of 4-7 microns, mounted on glass slides and stained with hematoxylin and eosin.

After decalcification, the skull was serially sectioned transversely at approximately one centimeter intervals. All sections were examined, post-fixation, for the presence of macroscopically visible morphologic abnormalities. Four sections per animal, described as follows, were processed, embedded in paraffin, cut at 4-7 microns, mounted on glass slides, stained with hematoxylin and eosin and examined by light microscopy. The first section included the area between the upper incisor tooth and incisive papilla. The second section included the area between the incisive papilla and the first palatal ridge. The third section included the area between the second palatal ridge and first upper molar tooth. The fourth section included the area between the first upper molar tooth and nasopharynx.

Larynx sections were prepared from two sites; one was the area of the ventral diverticulum and the other was the area of the ventral seromucous glands at the base of the epiglottis. These were classified as Larynx: Ventral Diverticulum (V-DVTC) and Larynx: Ventral Seromucous Glands (V-SM GLND), respectively, for the purposes of data entry. In a few instances, sections of larynx were not from the aforementioned planes of section. These were classified simply as Larynx for the purposes of data entry.

ORGAN NAME	WEIGHED	PRESERVED	EXAMINED MICROSCOPICALLY	
			Groups 1 and 4 a	Groups 2 and 3 a
Adrenal glands	X	X		
Brain (medulla/pons, cerebrum and cerebellum)	X	X		
Epididymides	X	X	X	
Larynx <sup>b</sup>		X	X	X
Lungs (with mainstem bronchi)	X	X	X	X
Lymph node (mediastinal)		X	X	X
Nasopharynx <sup>c</sup>		X	X	X
Ovaries (with oviducts)	X	X	X	
Pituitary	X	X		
Prostate	X	X	X	
Seminal vesicles (with coagulating gland)	X	X	X	
Testes	X	X	X	
Thymus	X	X		
Trachea		X	X	X
Uterus with vagina	X	X	X	
All macroscopic lesions		X	X	

<sup>&</sup>lt;sup>a</sup>The respiratory tract (nasopharynx, larynx, trachea and lungs) and mediastinal lymph nodes were examined for all test animals based on treatment-related findings in the high-exposure group.

## 2.14.6. MACROSCOPIC POSTMORTEM EXAMINATION - $F_1$ PUPS

Macroscopic post-mortem examinations (internal and external) were performed on all  $F_1$  pups found dead during lactation. Unusual observations, including gross abnormalities and the absence of milk in the stomach, were noted and then the carcasses discarded. The day of death of any pup found dead was recorded. Intact  $F_1$  pups found dead on the day of birth were identified by the

<sup>&</sup>lt;sup>b</sup>The laryngeal mucosa was examined. Sections of the larynx examined included the epithelium covering the base of the epiglottis, the ventral pouch and the medial surfaces of the vocal processes of the arytenoid cartilages.

Four sections of the nasopharyngeal tissue were examined. This included sections through the nasal cavity and examinations of the squamous, transitional, respiratory and olfactory epithelia.

lung floatation test, examination of the lungs or ductus arteriosus, or other appropriate method as stillborn or alive at birth. F<sub>1</sub> pups found dead on the day of birth that were autolyzed, partially cannibalized or otherwise unsuitable for this determination were so noted and reported. Macroscopic post-mortem examinations (external only) were performed on all F<sub>1</sub> pups on lactation day 4 for pups surviving to that interval. Unusual observations, including gross abnormalities, were noted and then the carcasses were discarded.

#### 2.15. STATISTICAL ANALYSIS

#### 2.15.1. CONTINUOUS DATA

The following parameters were analyzed statistically:

Body weights

Body weight changes

Feed consumption values

Gestation length

Number of implantation sites and corpora lutea

Pre- and post-implantation loss

F, pup weights (each weighing interval during lactation)

Number of pups per litter

Number of male and female pups

Pup weight distinguished by sex and as a composite for both sexes (litter as experimental unit)

Absolute organ weights, organ weight to body weight ratios and organ weight to brain weight ratios

#### Method of Analysis

Mean values of all exposure groups were compared to the mean value for the control group at each time interval.

Evaluation of equality of group means were made by the appropriate statistical method. For all parameters except for organ weights, the standard one-way analysis of variance (ANOVA) using the F ratio to assess significance was used (Dunlap and Duffy, 1975; Armitage, 1971). If significant differences among the means were indicated, additional testing was performed using

Dunnett's t-test to determine which means were significantly different from the control (Dunlap et al., 1981). Organ weight data was analyzed only by parametric methods. Bartlett's test (Bartlett, 1937; Sokal and Rohlf, 1995) was performed to determine if groups had equal variances. The standard one-way analysis of variance (ANOVA) using the F ratio to assess significance was used (Dunlap and Duffy, 1975). If significant differences among the means were indicated, additional tests were used to determine which means were significantly different from the control: Dunnett's t-test (Dunlap et al., 1981; Dunnett, 1955, 1964) for homogeneous data, or Cochran and Cox's modified t-test (Cochran and Cox, 1959) for non-homogeneous data. Bartlett's test for equality of variance was conducted at the 1% significance level; all other statistical tests were conducted at the 5% and 1% significance levels.

#### **Exceptions**

Statistical evaluations were not performed when the standard deviation for the control group was 0 and/or N (number of animals) in the control group was less than or equal to two.

#### 2.15.2. INCIDENCE DATA

The following parameters were analyzed statistically:

Mortality rate
Mating indices, pregnancy rates, male fertility indices
Litter survival indices
Gestation indices
Incidence of dams with no viable pups
Mean pup survival indices (days 0 and 4)

#### **Incidence Data Analysis**

A Fisher Exact Test with Bonferonni correction was performed to identify differences between the control and treatment groups (Siegel, 1956). All statistical tests were conducted at the 5% and 1%, two-sided risk levels.

#### 2.16. DATA STORAGE

All raw data, preserved specimens and retained samples, as well as the original study protocol (and any amendments) and the original final report are to be maintained in the archives of the testing facility upon completion of the study. The sponsor will determine the final disposition of these materials.

#### 2.17. REGULATORY REFERENCES

#### 2.17.1. TEST GUIDELINE

This study complied with the Organization for Economic Cooperation and Development (March 22, 1996) OECD Guidelines for Testing of Chemicals; OECD Guideline 421: Reproduction/Developmental Toxicity Screening Test, pp. 1-10 and the EPA Health Effects Test Guidelines (July 2000) OPPTS 870.3550:Reproduction/Developmental Toxicity Screening Test, pp. 1-11.

#### 2.17.2. GOOD LABORATORY PRACTICES

This study was conducted in compliance with EPA Good Laboratory Practices as set forth in 40 CFR Part 792 (TSCA) and Organization for Economic Cooperation and Development (OECD) Good Laboratory Practices as set forth in ENV/MC/CHEM(98)17 with the exceptions that the supplier was responsible for the identity and stability of the test substance and those tests were not performed in a certified GLP laboratory; however, all procedures and methods were documented in the spirit of the current GLP regulations.

#### 2.17.3. ANIMAL WELFARE ACT COMPLIANCE

This study complied with all appropriate parts of the Animal Welfare Act regulations: 9 CFR Parts 1 and 2 Final Rules, Federal Register, Volume 54, No. 168, August 31, 1989, pp. 36112-36163, effective October 30, 1989 and 9 CFR Part 3 Animal Welfare Standards; Final Rule, Federal Register, Volume 56, No. 32, February 15, 1991, pp. 6426-6505, effective March 18, 1991.

#### 2.18. PROTOCOL DEVIATIONS

The following protocol deviations occurred during this study but did not impact the validity or integrity of the study:

- 1. Due to technician oversight, animal nos. 4503, 4504 and 4510 were not transferred to fetal pathology for sacrifice on their proposed gestation day 26 as per protocol, but were transferred on gestation days 28, 27 and 27, respectively.
- 2. For logistical reasons, non-pregnant animal nos. 1504 and 4509 were transferred to necropsy 24 days after completion of mating rather than the protocol suggested period of 26 days following mating.
- 3. Due to technician oversight, macroscopic observations for animal no. 2011, sacrificed on 25 June 2004, were not recorded.
- 4. Due to technician oversight, organ weights were recorded for those female rats (nos. 1504, 4503, 4509 and 4510) that did not deliver pups, although not required by the protocol.
- 5. Due to an oversight, a clinical observation was taken for Animal No. 1502 on lactation day 2. Clinical observations were only required on lactation days 1 and 4.
- 6. Salewski's test was performed to confirm status of apparently non-pregnant animals though it was not required by the protocol.

#### 3. RESULTS AND DISCUSSION

#### 3.1. CHAMBER MONITORING

#### (Appendix W)

Prestudy chamber distribution analyses showed the test substance was evenly distributed within each chamber.

The target and mean gravimetric and nominal concentrations are summarized as follows:

Group	Target Concentration (mg/m³)	Gravimetric Concentration (mg/m³)	Nominal Concentration (mg/m³)
1	Ô	$0.001 \pm 0.01$	-
2	30	$31.2 \pm 4.6$	56 ± 9
3	100	99.4 ± 13.9	131 ± 10
4	300	$300.7 \pm 34.7$	$798 \pm 218$

The achieved mean gravimetric exposure concentration for the test substance groups were acceptably close in the opinion of the study director to the target concentrations. The differences between measured and nominal concentrations were typical for this type of dust exposure and were considered to represent deposition of test substance on surfaces within the exposure delivery system as well as on fur of exposed animals.

Chamber environmental conditions averaged 20°C temperature and 44% relative humidity.

Particle size distribution measurements for the test substance exposures are summarized as follows:

Group	Mass Median Aerodynamic Diameter	Geometric Standard Deviation	% of Particles		
	(μ <b>m</b> )		≤ 1.0 µm	≤ 3.0 µm	≤ 10 µm
2	2.197	2.902	23.67	62.08	92.34
3	2.034	2.767	23.77	65.46	94.22
4	2.630	2.875	17.81	55.11	90.10
Mean	2.287	2.848	21.75	60.88	92.22

These results indicated that the particles for the test substance exposed groups were highly respirable to the test animals.

#### 3.2. MORTALITY

#### Males and Females (Table 1 and Appendix A)

There was no effect of treatment on survival. All animals survived until the termination of the study.

#### 3.3. PHYSICAL OBSERVATIONS

## Males (Table 2; Appendix B); Females (Tables 2, 3 and 4; Appendices B, C and D)

The test animals were generally unremarkable during the non-exposure periods. This included the premating, mating, gestation and lactation periods for the females. Scattered observations such as chromodacryorrhea and alopecia were noted, but were not attributed to treatment. Black test substance on fur was also frequently noted in the test substance exposed groups, but this was considered an artifact of the exposure regime.

#### 3.4. BODY WEIGHTS

## Males (Tables 5 and 6; Appendices E and F); Females (Tables 5-10; Appendices E-J)

There were no exposure-related differences in absolute body weights or in body weight changes in the test substance exposed animals, compared to the air control animals. This included the premating, mating, gestation and lactation periods for the females. At terminal sacrifice, the 30mg/m<sup>3</sup> females weighed significantly more than controls, but this was not attributed to treatment due to lack of an exposure-level-related response.

#### 3.5. FEED CONSUMPTION

## Males (Table 11; Appendix K); Females (Tables 11, 12 and 13; Appendices K, L and M)

There were no exposure-related differences in feed consumption in the test substance exposed animals, compared to the air control animals. This included the premating, gestation and lactation periods for the females.

#### 3.6. MATING AND FERTILITY

#### (Tables 14 and 15; Appendices N, O and P)

Mating and fertility indices for both sexes were considered unaffected for the lower two exposure groups.

All of the pairings that resulted in pregnancy in the study, except for one in the 300 mg/m³ group, mated at the first opportunity (first available estrus). The mating index was 91.7, 100, 100 and 91.7% in the 0, (air control), 30, 100 and 300 mg/m³ exposure groups, respectively.

One female in the air control group and 3 females in the 300mg/m³ group did not become pregnant. Of the latter 3, two pairings had shown normal mating signs (in situ copulatory plugs), while the third pairing showed no evidence of mating and this female appeared to be acyclic (persistent diestrus). A female in the air control group also showed no evidence of mating and was observed to be in persistent diestrus. One female (#3505) in the 100 mg/m³ group was initially considered non-pregnant (no evidence of mating was observed), however it was in fact pregnant and did deliver pups. The fertility index was reduced in the 300 mg/m³ exposure group (9/12 [75%] versus 11/12 [91.7%] in the air control group, but was

not significantly different from air control group. However the fertility index observed in the 300 mg/m³ group was outside the testing facility's historical control data minimum of 87.5% (maximum of 100% with a mean of 93.7%; based on nine studies between 2001 and 2002) and therefore the decreased fertility was considered exposure-related.

#### 3.7. GESTATION, PARTURITION AND LITTER SURVIVAL

#### (Table 15; Appendices P and Q)

The gestation index was considered unaffected for the lower two exposure groups. The duration of gestation and the proportion with live litters and/or with any stillborn pups, pre-implantation loss (the difference between the number of corpora lutea and the number of implantations detected), post-implantation loss (the difference between the number of live pups born and the number of implantations, thus including any stillborn pups), pup viability (4-day post-natal survival), and live litter size were similar among treated and control groups. The statistically significant decrease in the sex ratio in the 30 mg/m³ group was considered incidental.

In the 300 mg/m<sup>3</sup> group, one of the pregnancies did not result in delivery of viable fetuses (relatively rare event in reproduction studies and therefore considered to be treatment related). This dam (animal #4504) had only two corpora lutea, two implantation sites with no viable fetuses. The gestation index at 300 mg/m<sup>3</sup> (88.9% [8/9]) was not significantly reduced when compared with the air control (100% [11/11]). However the gestation index observed in the 300 mg/m<sup>3</sup> group was outside the testing facility's historical control data (minimum and maximum of 100%) and therefore the decreased gestational indices coupled with the low number of implantation sites with no viable fetuses for one female in the 300 mg/m<sup>3</sup> exposure group were considered exposure-related.

#### 3.8. PUP DATA

#### 3.8.1. PHYSICAL OBSERVATION DATA

#### (Table 16; Appendix R)

The pups were unremarkable during the early lactation period until termination at postnatal day 4.

#### 3.8.2. BODY WEIGHTS

#### (Tables 17 and 18; Appendix S)

There were no meaningful differences in body weights or weight gains, up to postnatal day 4, in the pups from test substance exposed animals as compared to the pups from air control animals.

#### 3.9. TERMINAL EVALUATIONS

#### 3.9.1. ORGAN WEIGHTS (ADULTS)

(Table 19; Appendix T)

Except for the low exposure males, there were exposure-related increases (up to 37% in males and 58% in females) in absolute lung weights compared to the air control animals. Similar increases relative to body weight or brain weight were seen in the test substance exposed animals (41% in males and 63% in females). No significant differences were seen at the 30 mg/m³ exposure level in either sex.

A statistically significant increase occurred in right ovary weight in the test substance exposed female animals (300 mg/m³ group; absolute and relative to brain weight) and (30 mg/m³ group; relative to brain weight), compared to the air control animals, but in the absence of any corresponding microscopic postmortem findings in either ovary, and considering that the difference was only unilateral, these weight differences were not attributed to exposure.

Female low-exposure adrenal- and brain-to-body weight ratios were significantly lower than air control, but this was probably an artifact of the significantly higher terminal body weights of the pregnant low-exposure group animals.

# 3.9.2. MACROSCOPIC POSTMORTEM EVALUATIONS (ADULTS)

(Table 20; Appendix U)

Lungs from all petroleum coke-treated rats were slightly to severely discolored black. The severity of the finding showed an exposure related trend (not statistically evaluated). In addition, there was an exposure related incidence (not statistically evaluated) of discoloration and enlargement of the mediastinal lymph nodes. All other findings were incidental and/or sporadic changes frequently seen in animals of this species, strain and age.

#### 3.9.3. HISTOPATHOLOGICAL EVALUATIONS (ADULTS)

(Table 21; Appendix U)

Initial examination of control and high exposure animals identified test substance related changes in the lungs, mediastinal lymph nodes, nasal turbinates and larynx of male and female rats administered 300 mg/m³ of petroleum coke. On the basis of this initial examination, nasal turbinates, lungs, trachea and larynx were also examined from the intermediate (100 mg/m³) and low (30 mg/m³) exposure groups to establish the exposure relationship of the findings.

#### Lungs

The lungs of all petroleum coke-treated animals contained brown-black pigment deposits in the alveolar macrophages and in the prominent bronchiolar associated lymphoid tissue (BALT). The severity ranged from slight to marked and showed an exposure-related increase. In the 300 and 100 mg/m³ exposure groups, the pigment was generally distributed equally in all lung lobes, but in the 30 mg/m³ exposure level the distribution was regional. Hyperplasia/hypertrophy of the bronchiolo-alveolar epithelium was present in most animals exposed to the test substance and showed an exposure related severity ranging from minimal to moderate. In animals exposed to the 30 mg/m³ exposure level, the severity of the hyperplastic/hypertrophic epithelial response was only minimal and was generally associated with areas having the greatest amount of brown-black pigment deposits. Compared to controls, there was

an exposure related increase in the severity of subacute/chronic (perivascular and/or interstitial) inflammation in animals exposed to the test substance. The inflammatory reaction was often conspicuously associated with the proliferative change. In addition, the amount of bronchial associated lymphoid tissue (BALT) was increased in all exposure groups compared with controls.

#### Larynx

Minimal squamous epithelial metaplasia of the pseudostratified columnar epithelium (overlying the ventral serous mucous glands) of the larynx was observed in one or more animals from each of the groups including one male from the control group. Although the incidence was increased in the 300 and 100 mg/m³ groups, there was no obvious exposure relationship. In affected epithelium, this change was characterized by the presence of 1-3 cell layers of squamous epithelium. This laryngeal epithelial site is a very common target site for substance-induced metaplastic change following inhalation exposure to particulates. However, at this minimal severity level, the changes are considered to be adaptive rather than adverse.

#### Nasal Turbinates

In the nasal turbinates, minimal to moderate brown-black pigment was present on the mucosal epithelial (olfactory, respiratory and/or transitional) surface/lumen in 12/12 males and 12/12 females administered 300 mg/m<sup>3</sup>, 7/12 males and 3/12 females administered 100 mg/m³, and 1/11 males and 1/12 females administered the 30 mg/m<sup>3</sup> exposure levels of petroleum coke. Although these findings were not associated with any alteration in the (olfactory or transitional) cellular epithelium, compared to controls, there was an increase in the incidence of minimal to slight respiratory mucosal epithelial-goblet cell hypertrophy/hyperplasia in males and females exposed to the 300 and 100 mg/m<sup>3</sup> exposure levels. In addition, minimal to slight brown-black pigment was present in the lumen of the nasal sinus of 1/12 males and in the pharyngeal lumen in 2/12 males given the 300 mg/m<sup>3</sup> exposure and in 2/12 females of the 100 mg/m<sup>3</sup> exposure-level. Some nasal turbinates from the 30 mg/m<sup>3</sup> animals contained lymphoid aggregates that were associated with minimal brown-black pigment, but since this lymphoid tissue was not consistently present in all animals, the comparative incidence across groups cannot be ascertained. Compared to controls, there was a non exposure-related increase in the incidence of minimal to slight mixed inflammation with or without lymphoid aggregates at the respiratory/vestibular junction in males and females at all exposure levels.

#### Mediastinal Lymph Nodes

There was an exposure-related incidence and severity of brownblack pigment deposits in the mediastinal nodes of males and females in all exposed groups. This was associated with increased size and cellularity of the paracortical area containing T lymphocytes. Compared with controls there was an exposurerelated increase in the incidence and severity of this finding in all dosage groups of test substance.

#### **Incidental Findings**

All other microscopic findings occurred at a similar incidence in the control and test substance treated group and were considered unrelated to treatment. There was no evidence of test substance related effects in the male or female reproductive systems.

Overall, inhalation of petroleum coke at 30, 100 or 300 mg/m<sup>3</sup> exposure levels in male and female rats was associated with the presence of pigment deposits (presumed to be test article) in the lungs and mediastinal lymph nodes as well as on the mucosal (epithelial) surfaces/lumens of the nasal turbinates, sinus and Exposure-level-dependent, test substance-related pharynx. proliferative and/or inflammatory responses were observed in the lungs. In the mediastinal lymph nodes draining the lungs, compared to controls there was an exposure-related increase in the size and cellularity of the paracortical [T-lymphocyte] area in all exposure groups of petroleum coke. This finding was generally associated with the deposition of pigment. An increase in the incidence of minimal squamous metaplasia of respiratory epithelium in the larynx, and of minimal to slight epithelial-goblet cell hypertrophy/hyperplasia of respiratory epithelium in the nasal turbinates occurred and were considered to be an adaptive response to inhalation of particulate material.

# 3.9.4. MACROSCOPIC POSTMORTEM EVALUATIONS (F, PUPS)

(Table 22; Appendix V)

There were no exposure-related differences in the incidence of macroscopic postmortem evaluations in the pups from test substance exposed animals as compared to the pups from air control animals. Scattered observations, such as no milk in stomach, were noted but were not considered exposure-related.

#### 4. CONCLUSION

Exposure of male and female rats to target concentrations of 30, 100 or 300 mg/m<sup>3</sup> of petroleum coke by nose-only inhalation for 4-6 weeks resulted in discolored lungs, increased lung weight, and proliferative and/or inflammatory responses in the lungs and mediastinal lymph nodes, in all test substance exposed groups. Decreased fertility and gestation indices coupled with the single female with a low number of implantation sites and no viable fetuses were observed in the 300 mg/m<sup>3</sup> exposure group. There were no effects observed on offspring survival and weight development up to postnatal day 4. Therefore, the no-observedadverse-effect level (NOAEL) for adult males and females for systemic toxicity was 300 mg/m<sup>3</sup>. A NOAEL for the portal of entry was not established for females; the female lowest-observed-adverse-effect level (LOAEL), based on lung weight increases, was 30 mg/m<sup>3</sup>. The portal of entry NOAEL for males, based on increased lung weights, was 100 mg/m<sup>3</sup>. Based on the lower fertility and gestational indices, and low number of implantation sites with no viable fetuses for one female in the 300 mg/m<sup>3</sup> exposure group, the reproductive NOAEL was 100 mg/m<sup>3</sup>. The developmental NOAEL was 300 mg/m<sup>3</sup>.

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#### **CALCULATIONS**

### Female Mating Index:

no. of females with confirmed mating (sperm and/or vaginal plug) plus no. of pregnant females without evidence of mating (no sperm or vaginal plug)/no. of females placed with males

### Female Fertility Index:

no. of females pregnant/no. of females placed with males

### **Male Mating Index:**

no. of males with confirmed mating with a female or pregnancy for females without evidence of mating/no. of males placed with females

#### Male Fertility Index:

no. of males mating and impregnating a female plus the no. of males with a pregnant female without evidence of mating/no. of males placed with females

#### **Gestation Index:**

no. of females with liveborn/no. of females with confirmed pregnancy

#### Viability Index:

no. of pups alive Day 4/no. of liveborn pups

#### **Live Birth Index:**

total no. of liveborn pups/total no. of pups born

#### **Pregnancy Index:**

total no. of females pregnant/total no. of females mated

#### **Pre-implantation Loss:**

No. of corpora lutea – no. of implantation sites

#### **Post-implantation Loss:**

total no. of implantation sites – no. of live pups

General Preface	
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#### **General Notes**

- 1. Individual animal data values presented in this report may be rounded. Unrounded individual animal data values are used to calculate the reported mean and standard deviation values. Therefore, use of the reported individual values to reproduce means, standard deviations and/or to perform any subsequent calculations may produce minor discrepancies between the calculated values and those presented in this report.
- 2. Animal No. 3505 did not have a mating date (a positive mating sign was not detected) and it was treated as non-pregnant throughout gestation as far as body weight, feed consumption and clinical observation data collection was concerned. However, this animal did deliver pups and her pregnancy and lactation data have been presented and included in the evaluation.
- 3. Animal No. 4504 was considered to be pregnant, but with only 2 implantation sites. However, since the fetuses were non-viable, this animal had no reported gestation or lactation results.
- 4. Table 2 summarizes the animals before mating and then only summarizes non-pregnant animals thereafter.
- 5. Tables 5, 6 and 11 only summarizes animals before mating. Individual data for all animals (pregnant and non-pregnant) is found in Appendices E, F and K.

#### **Key to Abbreviations**

M = Male F = Female Gen. = General PG = Pregnant

**Note:** Days 0-14 - Pre-mating; Days 14-28 - Mating; After Day 28 - Post-mating

TABLE 1

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### SUMMARY OF SURVIVAL AND PREGNANCY DOSE GROUP: DOSE LEVEL (MG/M3): 0 100 300 No. of males at start 12 Premating - Died/sacrificed 0 Postmating - Died/sacrificed No. of females at start 12 12 12 No. of females cohabitated 12 12 12 - Without evidence of mating 1 1 1 Pregnant 0 Nonpregnant 1 Pregnant 11 12 - Died/sacrificed 0 0 - Died delivering 0 0 - Died/sacrificed post partum N 0 - Aborted died/sacrificed 0 Nonpregnant - Died/sacrificed Total females died/sacrificed 0 0 0.0 0.0 0.0 Dams delivering 11 12 12 8 - With liveborn pups N 11 12 12

100.0

0

100.0

0.0

100.0

Q

0.0

100.0

0

0.0

No statistically significant differences

- With all pups stillborn

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Summary of Weekly Clinical Observations	
Preface	Table 2

Number of animals examined represents the total number of animals observed and animals which were killed at a scheduled sacrifice for a given interval.

For summarization purposes, descriptive comments [i.e., location of scab(s) and/or sore(s), color of staining, etc.] are not presented in this table. These data are contained in the study raw data if needed.

Total represents a cumulative total of all animals with the indicated observation one or more times during the study.

Corresponding exposure levels for each group were as follows:

Group 1 - 0 mg/m<sup>3</sup>

Group 2 - 30 mg/m<sup>3</sup>

Group 3 - 100 mg/m<sup>3</sup>

Group 4 - 300 mg/m<sup>3</sup>

TABLE 2

MALES				. <b></b>					3KLY CLINICAL OBSERVATIONS
		DA	Y C	F ST	YQU				
	GROUP#	-7	0	8	15	22	29	31	TOTAL
# OF ANIMALS EXAMINED	I	12	12	12	12	12	12	12	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
		12					12	12	
	III	12	12	12	12	12	12	12	
	IV	12	12	12	12	12	12	12	
Normal									
WITHIN NORMAL LIMITS	I	12	12	12	12	12	12	0	12
		12			8	7			12
	III			0		0			
		12		0		0			
Dead									
TERMINAL SACRIFICE	I	0	0	0	0	0	0	12	12
	II	0	0	0	0	0	0	12	12
	III	0	0			0	0	12	12
	IV	0	0	0	0	0	0	12	12
Gen. Appearance									•
TEST MATERIAL ON FUR	I	0	0	0	0	0	0	0	0
(BLACK)	II	0	0	0	3	4	3	0	4
	III	0		12	12	12	12	0	12
	IA	0	0	12	12	12	12	0	12
Ocular									
CHROMODACRYORRHEA -	I	0	0	0	0	0	0	0	0
UNILATERAL	II	0	0		1.		0		2
	III	0	0	2	0	1	'n	0	3

TABLE 2

FEMALES					st	AMMI	Y OF	WEE	KLY	CLIN	ICAI	ов	SERVATIONS
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		ים	AY (	OF ST	TUDY								
	GROUP#					22	29	31	36	43	50	52	TOTAL
# OF ANIMALS EXAMINED	I	12	12	12	11	1	1	0	1	1	1	1	
	II	12	12	12	11	0	0	0.	0	0	0	0	
	III	12	12	12	10	1	1	0	1	0	0	0	
	IV	12	12	12	10	1	1	0	1	1	1	1	
Normal													
WITHIN NORMAL LIMITS	I	12	12	11	10	1	1	0	1	1	1	1	12
			12			0		0	0		0		12
	III	12	12	0	0	0	0	0	0	0	0	0	12
	IV	12	12		0			0	0	0	0	0	12
Dead													
TERMINAL SACRIFICE	I	0	0		0	0	0	0	0	0		1	
	II	0	0	0	0	0	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0	0	0	0	0	0
	ıv	0	0	0	0	0	0	0	0	0	0	1	1
Gen. Appearance													
TEST MATERIAL ON FUR	I	0				0	0	0	0	0	0	0	0
(BLACK)	II	0	0	4	4	0	0	0	0	0	0	0	6
	III	0		12		1	1	0	1	0	0	0	12
	IV	0	0	12	10	1	1	0	1	1	1	1	12
Ocular													
CHROMODACRYORRHEA -	I	0	0	1	0	0	0	0	0	0	0	0	1
BILATERAL	II	0			0	0	0	0		0			
	III	0	0		0	0	0	0		0	0	0	0
	IV	0	0	1	1	0	0	0	0	0	0	0	1

TABLE 2

FEMALES					Şī	UMMAI	RY OF	WE	EKLY	CLIN	VICAL	ь ов	BSERVATIONS
				of Si							:		
	GROUP#	-7 	0		15	22	29	31	36	43	50	52	2 TOTAL
# OF ANIMALS EXAMINED	I	12	12	12	11	1	1	0	1	1	1	1	1
	II	12	12	12	11	0	0	0	0	0	0	0	0 .
	III	12	12	12	10	1	1	0	1	0	0	0	0
	IV	12	12	12	10	1	1	0	1	1	1	1	1
CHROMODACRYORRHEA -	т	0	0	0	1	٥	0	O	0	0	0	0	
UNILATERAL	II	Ô	0	a	Ô	0	0	0	0	0	0	a	· -
	III	0	ō	ō	0	0	0	0	0	0	0	0	· · ·
	T37	٥	0	0	0	٥	٥	0	^	^	^	^	0 0

TABLE 3

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

SUM	MARY OF CLINICAL OBSERVATIONS DU	RING GESTATION - (f	requency/animals)		
DOSE GROUP: DOSE LEVEL (MG/M3):	1 0	2 30	3 100	4 300	
DAY 0 to 20					
Normal					
WITHIN NORMAL LIMITS	42/11	48/12	30/11	6/ 4	
Gen. Appearance	•				
TEST MATERIAL ON FUR (BLACK)	0/ 0	0/ 0	12/8	38/11	
Dermal-General	•				
ALOPECIA - EXTREMITIES/SNOUT	2/ 1	0/ 0	2/ 1	0/ 0	

TABLE 4

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

SUMMARY OF MA	TERNAL CLINICAL OBSERVATI	ONS DURING LACTATION	- (frequency/animals)	
DOSE GROUP: DOSE LEVEL (MG/M3):	1 0	2 30	3 100	4 300
DAY 0 to 4				
Normal				
WITHIN NORMAL LIMITS	28/10	34/12	30/11	22/ 8
TERMINAL SACRIFICE	11/11	12/12	12/12	8/8
Gen. Appearance				
TEST MATERIAL ON FUR (BLACK)	0/ 0	0/ 0	2/ 2	0/ 0
Dermal-General				
ALOPECIA - EXTREMITIES/SNOUT RED/BROWN STAINS - AG AREA ALOPECIA - GENERAL	5/ 3 0/ 0 0/ 0	0/ 0 2/ 2 0/ 0	3/1 1/1 2/1	0/ 0 1/ 1 0/ 0

TABLE 5

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

LES		_	MEAN BODY WE	MEAN BODY WEIGHT VALUES (GRAMS)							
		DOSE GROUP:	1	2	3	4					
	DOSE LEY	TEL (MG/M3):	0	30	100	300					
DAY	-7	MEAN	195	195	195	195					
		S.D.	6.4	5.7	5.9	5.8					
		N	12	12	12	12					
DAY	0	MEAN	260	258	257	257					
		S.D.	12.2	10.8	7.4	11.5					
		И	12	12	12	12					
DAY	7	MEAN	293	289	290						
		S.D.	16.9	16.3	14.0	286					
		N	12	12	12	18.2 12					
DAY	14	MEAN	322	317	•••						
		S.D.	20.6	22.1	319	313					
		N	12	12	21.5 12	25.9 12					
DAY	21	MEAN									
2		S.D.	346	345	345	338					
		N.D.	23.5 12	26.1	24.8	32.5					
		14	12	12	12	12					
DAY	28	MEAN	372	373	371	363					
		S.D.	22.9	27.8	30.5	35.0					
		Ŋ	12	12	12	12					
DAY	31	MEAN	381	381	380	374					
		S.D.	23.3	28.8	31.0	41.0					
		N	12	12	12	12					

TABLE 5

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

MALES			MEAN BODY WE	IGHT VALUES (GRAMS)		
		DOSE GROUP: EL (MG/M3):	1 0	2 30	3 100	4 300
DAY	- 7	MEAN	178	179	179	179
		S.D.	5.5	5.6	6.1	5.4
		N	12	12	12	12
DAY	0	MEAN	214	217	214	217
		S.D.	6.8	9,5	7.5	9.1
		N	12	12	12	12
DAY	7	MEAN	224	231	230	231
		S.D.	9.5	11.5	14.3	9.5
		N	12	12	12	12
DAY	14	MEAN	236	245	244	241
		S.D.	9.3	13.6	15.3	8.4
		N	12	12	12	12

TABLE 6

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

			GROUP:	1	2	3	4
	D(	OSE LEVEL	(MG/M3):	0	30	100	300
	_						
DAY	-7 TO	0	MEAN .	65	63	62	63
			s.D.	6.6	6.3	3.5	6,1
			N	12	12	12	12
DAY	O TO	7	MEAN	33	31	33	29
			S.D.	5.5	7.1	8.2	9.8
			N	12	12	12	12
DAY	7 TO	14	MEAN	29	28	29	27
			S.D.	6.1	6.7	9.4	9.5
			N	12	12	12	12
DAY	14 TO	21	MEAN	24	28	26	24
		•	s.D.	4.9	5.1	4.8	9.1
			N	12	12	12	. 12
DAY	21 TO	28	MEAN	27	28	27	25
			S.D.	5.4	6.6	7.2	5.0
			И	12	12	12	12
DAY	28 TO	31	MEAN	9	8	9	11
	20	- <del>-</del>	S.D.	6.1	4.2	3.3	11
			n N	12	12	3.3 12	7.9 12
DAV	0 50			**-			
DAY	O TO	31	MEAN	121	123	123	117
			s.D.	13.0	19.7	24.8	32.3
			N	12	12	12	12

TABLE 6

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

DOSE GROUP:				1	2	3	4
	DO	SE LEVEI	_ (MG/M3):	0	30	100	300
DAY	-7 TO	0	MEAN	36	39	36	39
			S.D.	6.7	6.4	4.9	6.1
			N	12	12	12	12
DAY	O TO	7	MEAN	10	14	16	14
			S.D.	6.5	4.7	9.6	5.6
			И	12	12	12	12
DAY	7 TO	14	MEAN	12	13	14	10
			S.D.	7.4	7.1	5.9	3.7
			N	12	12	12	12
DAY	0 TO	14	MEAN	22	27	30	24
			S.D.	8.9	7.5	10.0	5.4
			N	12	12	12	12

TABLE 7

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### SUMMARY OF GESTATION BODY WEIGHTS (GRAMS) DOSE GROUP: 2 3 DOSE LEVEL (MG/M3): 0 30 DAY 0 MEAN 238 245 243 S.D. 8.2 11.3 14.8 7.1 N 11 12 11 9 DAY 7 MEAN 267 279 277 275 S.D. 8.8 12.9 18.8 6.4 11 12 11 9 DAY 14 MEAN 301 313 313 308 S.D. 7.9 15.0 23.4 12.8 N 11 12 11 DAY 20 MEAN 369 379 371 365 s.p. 16.2 21.4 37.9 44.2 12 11

TABLE 8

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### SUMMARY OF GESTATION BODY WEIGHT GAIN (GRAMS)

DOSE GROUP: DOSE LEVEL (MG/M3):		1 0	2 30	3 100	4 300
DAYS 0 TO 7	MEAN	30	34	35	34
	s.D.	7.3	6.5	6.3	3.8
	N	11	12	11	9
DAYS 7 TO 14	MEAN	34	34	35	32
	S.D.	4.6	7.4	7.1	8.7
	N	11	12	11	9
DAYS 14 TO 20	MEAN	67	66	59	58
	S.D.	11.1	8.7	19.9	32.8
	N	11	12	11	9
DAYS 0 TO 20	MEAN	131	134	129	124
	S.D.	16.2	15.9	27.0	38.8
	N	11	12	11	9

TABLE 9

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### SUMMARY OF MATERNAL LACTATION BODY WEIGHTS (GRAMS) DOSE GROUP: 3 DOSE LEVEL (MG/M3): 300 DAY 1 MEAN 279 293 289 289 S.D. 11.4 15.6 20.6 11.4 N 12 12 DAY 4 MEAN 301 319 309 314 S.D. 12.6 15.6 23.0 10.5 12 12

TABLE 10

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### SUMMARY OF MATERNAL LACTATION BODY WEIGHT GAIN (GRAMS)

DOSE LEVEL	SE GROUP: (MG/M3):	1 0	2 30	3 100	4 300	
DAYS 1 TO 4	MEAN S.D. N	22 7.3 11	25 7.3 12	20 7.2 12	25 9.1 8	

TABLE 11

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

ALES			MEAN FEED CONSU	MPTION (GRAMS/KG/DAY	)		
		DOSE GROUP: EL (MG/M3):	1	2	3	4	· •
	DOSE 1501		0	30 	100	300	. <b></b> -
DAY	0	MEAN	110	109	109	111	
		S.D.	5.2	3.3	4.1	5.9	
		N	12	12	12	12	
DAY	7	MEAN	91	91	91	90	
		s.D.	4.6	4.2	3.3	6.0	
		N	12	12	12	12	
DAY	14	MEAN	82	81	79	82	
		S.D.	4.3	2.6	3.8	5.6	
		N	12	12	12	12	

TABLE 11

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

		~		MPTION (GRAMS/KG/DAY	, 	
		DOSE GROUP:	ı	2	З	4
	DOSE LEV	EL (MG/M3):	0	30	100	300
DAY	0	MEAN	97	100	98	102*
		S.D.	4.6	4.4	4.0	4.9
		N	10	8	9	11
DAY	7	MEAN	84	87	84	86
		S.D.	3.0	3.7	5.3	4.0
		N	10	8	9	11
DAY	14	MEAN	84	83	78	78*
		S.D.	5.7	2.9	6.3	3.7
		N	10	8	9	11

Statistical key: \* = p<0.05

TABLE 12

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	E GROUP:	1	2	· 3	4
DOSE LEVEL	(MG/M3):	0	30	100	300
DAYS 0 TO 7	MEAN	88	87	85	87
	S.D.	7.3	4.3	4.9	4.1
	Ņ	10	11	9	9
DAYS 7 TO 14	MEAN	84	82	81	81
	S.D.	3.6	4.7	3.5	3.6
	N	11	11	10	9
DAYS 14 TO 20	MEAN	76	72	72	75
	S.D.	3.9	4.2	5.2	4.0
	N	11	12	11	9
DAYS 0 TO 20	MEAN	82	79	78	81
	S.D.	4.6	6.4	5.6	3.3
	N	11	12	11	9

TABLE 13

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### SUMMARY OF LACTATION FEED CONSUMPTION (GRAMS/KG/DAY)

DOSE LEVEL	E GROUP: (MG/M3):	1 0	2 30	3 100	4 300	
DAYS 1 TO 4	MEAN S.D. N	123 13.3 11	129 9.5 12	110 15.3 12	124 26.0 8	

TABLE 14

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### SUMMARY OF COHABITATION DATA DOSE LEVEL (MG/M3): 0 30 100 Females paired with males 12 12 Total number mated 11 12 12 11 female mating index 91.7 100.0 100.0 91.7 pregnant 11 9 ª 12 12 female fertility index 91.7 100.0 100.0 75.0 pregnancy index 100.0 100.0 100.0 81.8 Males placed with females 12 12 12 Total number mated 11 12 12 11 male mating index 100.0 100.0 91.7 with females pregnant 11 12 12 9 male fertility index 91.7 100.0 100.0 75.0 Females with defined day 0 of Gestation N 11 12 11<sup>b</sup> 11 No. of days until Mating MEAN 2.9 2.7 3.0 2.5 S.D. 1.04 0.89 1.34 1.63 Day 1 to 4 12 10 10 100.0 100.0 90.9 90.9 Day 5 to 8 0 1 0.0 0.0 9.1 9.1 Day 9 to 14 0 0 0.0 0.0

<sup>&</sup>lt;sup>a</sup>For the purposes of this summary, Animal No. 4504 was considered pregnant with 2 implantation sites. However, since the fetuses were non-viable, this animal has no reported gestation or lactation results.

balthough Animal No. 3505 delivered pups, it was not included in the gestation period findings as it was originally considered non-pregnant due to the lack of a mating date.

TABLE 15

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### SUMMARY OF DELIVERY AND LITTER DATA DOSE GROUP: DOSE LEVEL (MG/M3): 100 300 Females on Study N 12 12 Females Mated 12 12 11 Mating Index 91.7 100.0 100.0 91.7 Females Pregnant 11 12 12 Female Fertility Index 91.7 100.0 100.0 75.0 Females with Liveborn 11 12 12 Gestation Index 100.0 100.0 100.0 88.9 Females Completing Delivery N 12 12 100.0 100.0 100.0 88.9 with Stillborn Pups N 2 3 18.2 25.0 25.0 50.0 with all Stillborn 0 0 0 0.0 0.0 0.0 0.0 Litters with Liveborn, but no Pups Alive day 4 0 0.0 0.0 Duration of Gestation MEAN 22.0 22.1 22.0 21.9 S.D. 0.63 0.51 0.45 0.35 12

<sup>&</sup>lt;sup>a</sup>For the purposes of this summary, Animal No. 4504 was considered pregnant with 2 implantation sites. However, since the fetuses were non-viable, this animal has no reported gestation or lactation results.

TABLE 15

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

		SUMMARY OF DELI	VERY AND LITTER DATA			
DOSE G DOSE LEVEL (MG,		1 0	2 30	3 100	4 300	
Litters with Liveborn Pups	N	11	12	12	8	
Pups Delivered (total)	n Mean S.D.	143 13.0 1.10	163 13.6 1.38	138 11.5 3.87	103 12.9 4.36	
Liveborn Live Birth Index	N %	141 98.6	158 96.9	133 96.4	98 95.1	
Stillborn	n %	2	5 3.1	5 3.6	5 4.9	
Liveborn, not culled prior to day 4	N	141	158	133	98	
Pups Dying, Missing, and/or	Cannibalized					
day 0	N %	0 . 0.0	1 0.6	0	0	
days 1-4	N F	0.0	0.6	1 0.8	1	
Pups Surviving 4 days Viability Index	N %	141 100.0	156 98.7	132 99.2	97 99.0	

TABLE 15

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

DOCE	GROUP:					
DOSE LEVEL (	GROUP:	1	2	3	4	
		0	30	100	300	
Implantation Sites	N	152				
per Litter	MEAN	153 13.9	173	150	112	
	S.D.	1.22	14.4	12.5	14.0	
	5.5.	1.22	1.51	4.03	3.85	
orpora Lutea	TOTAL	166	185	173	101	
	MEAN	15.1	15.4	14.4	121	
	S.D.	2.34	1.73	2.11	15.1	
			21.5	2.11	3.40	
reimplantation Loss	MEAN	1.2	1.0	1.9	1.1	
	S.D.	1.8	. 1.6			
			. 1.0	2.9	1.0	
ostimplantation Loss	MEAN	0.9	0.0			
-			0.8	1.0	1.1	
	S.D.	0.8	0.8	1.0	1.4	
ive Pups/Litter						
day 0	MEAN	12.8	13.2	11.1	12.3	
	S.D.	1.17	1.03	3.73	4.13	
	N	11	12	12	8	
day 1	1677.17					
day i	MEAN	12.8	13.1	11.1	12.3	
	S.D. N	1.17	1.00	3.73	4.13	
	W	11	12	12	8	
day 4	MEAN	12.8	13.0	11.0	12.1	
	S.D.	1.17	0.95	3.67	4.19	
	N	11	12	12	8	
ex Ratio - Male Pups:Tota	•					
day 0	N	88	68**	76	53	
	8	62.4	43.0	57.1	54.1	
day 4	N	88	67**	76	53	
	%	62.4	42.9	57.6	54.6	

Statistical key: \*\* = p<0.01

#### TABLE 16

SUMMARY OF PUP	CLINICAL OBSERVATIONS	DURING LACTATION - (	frequency/animals)		
DOSE GROUP:	1	2	3	4	
DOSE LEVEL (MG/M3):	0	30	100	300	
DAY 0 to 4					
Normal					
WITHIN NORMAL LIMITS	282/11	313/12	265/12	195/8	

TABLE 17

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### SUMMARY OF MEAN PUP BODY WEIGHTS (GRAMS) DOSE GROUP: DOSE LEVEL (MG/M3): 0 30 100 300 day 1 males MEAN 7.5 7.6 7.9 7.2 S.D. 0.66 0.77 0.81 0.56 N 11 12 1 females MEAN 7.2 7.3 7.7 6.8 S.D. 0.63 0.68 0.93 0.62 N 1,1 12 12 1 males+females MEAN 7.4 7.4 7.8 7.0 S.D. 0.68 0.71 0.82 0.57 N 11 12 day 4 males MEAN 10.9 11.2 11.4 10.6 S.D. 0.92 0.98 1.43 1.02 N 11 12 12 4 females MEAN 10.6 10.9 11.1 10.2 S.D. 1.03 0.97 1.44 1.14 N 11 12 4 males+females MEAN 10.8 11.0 11.3 10.4 S.D. 0.99 0.96 1.38 1.06

TABLE 18

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

DOSE G DOSE LEVEL (MG		1	2	3	4
DOS LEVEL (MG	/M3/: 	0	30	100	300
ay 1- 4 males	MEAN	3.4	3.6	3.5	3.4
	S.D.	0.46	0.27	0.82	0.55
	N	11	12	12	8
females	MEAN	3.4	3.6	3.5	3.4
	S.D.	0.59	0.37	0.75	0.59
	N	11	12	12	8
males+females	MEAN	3.4	3.6	3.5	3.4
	S.D.	0.49	0.32	0.79	0.56
	N	11	12	12	8

Mean Organ Weights	
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% Organ to Body Weight Ratios	
% Organ to Brain Weight Ratios	

## **Key to Abbreviations:**

g = Grams

semis w/ coag GI = Seminal vesicles with Coagulating gland

observ. = Observed wt. = Weight

## Corresponding exposure levels for each group were as follows:

Group 1 - 0 mg/m³ Group 2 - 30 mg/m³ Group 3 - 100 mg/m³ Group 4 - 300 mg/m³

#### Note:

Ovaries w/Oviduct were weighed together.

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#### Summary statistics for absolute organ weights (g) Study number: 034246

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Group	Terminal		Brain	Epididymis	Right	Pituita	ry gland	
	Body wt. (g)	Adrenal Glands	Epididyn	nis Left		Lungs		Prostate
			Male	Animal	s			
1								
Mean:	381.1	0.0641	2.0049	0.5437	0.5668	1.8946	0.0115	0.8305
tandard deviation:	23.3	0.0076	0.0870	0.0690	0.0395	0.2369	0.0017	0.1992
umber of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
2								
Mean:	381.2	0.0625	1.9897	0.5721	0.5926	2.0350	0.0116	0.8947
tandard deviation:	28.8	0.0076	0.0441	0.0271	0.0318	0.1676	0.0021	0.2051
umber of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3		•						
Mean:	380.1	0.0599	2.0184	0.5750	0.5849	2.2448+	0.0118	0.8200
tandard deviation:	31.0	0.0136	0.0819	0.0394	0.0525	0.2521	0.0018	0.1419
umber of observ. :	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
Mean:	374.0	0.0654	1.9934	0.5562	0.5753	2.6007+	0.0118	0.8358
tandard deviation:	41.0	0.0068	0.0957	0.0425	0.0416	0.2451	0.0017	0.1178
Number of observ. :	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)

<sup>\*(+) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>%(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Huntingdon Life Sciences Princeton Research Center East Millstone, New Jersey Table 19

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Group	Terminal		Testis Left		Thymus	
-	Body wt. (g)	Semis w/Coag Gl	Testi	ls Right		
			Male	Anim	als	 
1						
Mean	: 381.1	1.4912	1.5316	1.6082	0.5263	
Standard deviation	: 23.3	0.2147	0.2580	0.0731	0.0751	
Number of observ.	: (12)	(12)	(12)	(12)	(12)	
2						
Mean	: 381.2	1.5363	1.6694	1.6721	0.4485	
Standard deviation	: 28.8	0.2509	0.0921	0.0860	0.1221	
Number of observ.	: (12)	(12)	(12)	(12)	(12)	
3						
Mean	: 380.1	1.4105	1.6120	1.6327	0.6054	
Standard deviation	: 31.0	0.2747	0.0969	0.0954	0.1269	
Number of observ.	: (12)	(12)	(12)	(12)	(12)	
4						
Mean	: 374.0	1.5183	1.6300	1.6220	0.4982	
Standard deviation	: 41.0	0.3127	0.1105	0.1119	0.1171	
Number of observ.	: (12)	(12)	(12)	(12)	(12)	

<sup>\*(+) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>\*(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Huntingdon Life Sciences Princeton Research Center East Millstone, New Jersey Table 19 (pregnant animals)

### Summary statistics for absolute organ weights (g) Study number: 034246

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Group	Terminal		Brain	07	ary Left	Pituita	ry gland	
	Body wt. (g)	Adrenal Glands		Lungs	Ov	ary Right		Thymus
			Fema	le Ani	imals			
1								
Mean	: 300.6	0.0916	1.9660	1.5069	0.0742	0.0682	0.0163	0.2921
Standard deviation	: 12.6	0.0121	0.1018	0.1875	0.0122	0.0069	0.0032	0.0677
Number of observ.	: (11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
2								
Mean	: 318.9*	0.0848	1.9353	1.6648%	0.0750	0.0756	0.0168	0.3138
Standard deviation	: 15.6	0.0058	0.0578	0.1033	0.0114	0.0102	0.0033	0.0957
umber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
Mean	: 309.5	0.0841	1.9587	1.9869\$	0.0732	0.0737	0.0175	0.3241
tandard deviation	: 23.0	0.0108	0.0676	0.2050	0.0109	0.0100	0.0045	0.0851
Number of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
Mean	: 313.7	0.0996	1.9135	2.3923\$	0.0746	0.0787*	0.0166	0.280
tandard deviation	: 10.5	0.0163	0.0732	0.3519	0.0087	0.0069	0.0031	0.060
Number of observ.	: (8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)

<sup>\*(+) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>\*(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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#### Summary statistics for absolute organ weights (g) Study number: 034246

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Table 19 (pregnant animals)

Group	Terminal Body wt. (g)	Uterus w/vagina	
			Female Animals
1			
Mear	1: 300.6	0.9995	
Standard deviation	1: 12.6	0.1196	
Number of observ.	: (11)	(11)	
2			
Mear	1: 318.9*	0.9571	
Standard deviation	n: 15.6	0.1038	
Number of observ.	: (12)	(12)	
3			
Mear	n: 309.5	0.9757	
Standard deviation	n: 23.0	0.1618	
Number of observ.	: (12)	(12)	
4			
Mear	n: 313.7	1.0076	
Standard deviation	n: 10.5	0.1325	
Number of observ.	: (8)	(8)	

<sup>\*(+)</sup> = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>%(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

Huntingdon Life Sciences Summary Statistics for % Organ to Body Weight Princeton Research Center Study number: 034246 East Millstone, New Jersey

Table 19

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Group	Terminal		Brain		mis Right	Pituita	ry gland	
	Body wt. (g)	Adrenal Glands	Epididym	nis Left		Lungs		Prostate
			Male	Anim	a 1 s	<b></b>		
1								
Mean	: 381.1	0.0169	0.5272	0.1431	0.1492	0.4965	0.0030	0.2182
tandard deviation	: 23.3	0.0025	0.0283	0.0200	0.0140	0.0463	0.0005	0.0520
umber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
2								
Mean	: 381.2	0.0165	0.5244	0.1507	0.1561	0.5349	0.0030	0.2352
tandard deviation	: 28.8	0.0024	0.0377	0.0111	0.0119	0.0398	0.0005	0.0551
umber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
Mean	: 380.1	0.0157	0.5338	0.1520	0.1546	0.5917+	0.0031	0.2162
tandard deviation	: 31.0	0.0030	0.0428	0.0142	0.0166	0.0607	0.0004	0.0375
umber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
Mean	: 374.0	0.0177	0.5383	0.1504	0.1555	0.7010+	0.0032	0.2250
tandard deviation	: 41.0	0.0032	0.0580	0.0199	0.0200	0.0825	0.0004	0.0344
umber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)

<sup>\*(+) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>%(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Huntingdon Life Sciences Princeton Research Center East Millstone, New Jersey Table 19

Summary Statistics for % Organ to Body Weight Study number: 034246

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Group	Terminal	Te	stis Left		Thymus	
	Body wt. (g)	Semis w/Coag Gl	Testi	s Right		
			Male	Anim	als	 
1						
Mean	: 381.1	0.3911	0.4030	0.4231	0.1383	
Standard deviation	: 23.3	0.0499	0.0710	0.0280	0.0196	
Number of observ.	: (12)	(12)	(12)	(12)	(12)	
2						
Mean	: 381.2	0.4070	0.4399	0.4408	0.1180	
Standard deviation	: 28.8	0.0843	0.0375	0.0387	0.0322	
Number of observ.	: (12)	(12)	(12)	(12)	(12)	
3						
Mean	: 380.1	0.3706	0.4255	0.4311	0.1595	
Standard deviation	: 31.0	0.0637	0.0274	0.0292	0.0335	
Number of observ.	: (12)	(12)	(12)	(12)	(12)	
4						
Mean	: 374.0	0.4051	0.4398	0.4378	0.1324	
Standard deviation	: 41.0	0.0677	0.0478	0.0499	0.0256	
Number of observ.	: (12)	(12)	(12)	(12)	(12)	

<sup>\*(+)</sup> = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>\*(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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#### Summary Statistics for % Organ to Body Weight Study number: 034246

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Table 19 (pregnant animals)

Group	Terminal		Brain	07	ary Left	Pituita	ary gland	
	Body wt. (g)	Adrenal Glands		Lungs	07	ary Right		Thymus
			Fema	le Ani	mals			
1								
Mean	300.6	0.0305	0.6548	0.5013	0.0247	0.0227	0.0054	0.0973
tandard deviation	: 12.6	0.0043	0.0388	0.0581	0.0039	0.0026	0.0011	0.0228
umber of observ.	: (11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
2								
Mean	: 318.9*	0.0267*	0.6079*	0.5224	0.0236	0.0237	0.0053	0.0980
tandard deviation	: 15.6	0.0022	0.0303	0.0298	0.0038	0.0026	0.0011	0.0274
umber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
Mean	: 309.5	0.0272	0.6361	0.6445\$	0.0237	0.0238	0.0057	0.1047
tandard deviation	: 23.0	0.0029	0.0520	0.0744	0.0033	0.0029	0.0014	0.0254
umber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
Mean	: 313.7	0.0317	0.6107	0.7647\$	0.0239	0.0251	0.0053	0.0894
tandard deviation	: 10.5	0.0049	0.0322	0.1248	0.0032	0.0024	0.0011	0.0194
Number of observ.	: (8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)

<sup>\*(+) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>%(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Huntingdon Life Sciences Princeton Research Center East Millstone, New Jersey Table 19 (pregnant animals)

#### Summary Statistics for % Organ to Body Weight Study number: 034246

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Group	Terminal		
	Body wt. (g)	Uterus w/vagina	
			Female Animals
1			
Mean	: 300.6	0.3327	
Standard deviation	: 12.6	0.0393	
Number of observ.	: (11)	(11)	
2			
Mean	: 318.9*	0.2996	
Standard deviation	: 15.6	0.0228	
Number of observ.	: (12)	(12)	
3			
Mean	: 309.5	0.3150	
Standard deviation	: 23.0	0.0445	
Number of observ.	: (12)	(12)	
4			
Mean	: 313.7	0.3215	
Standard deviation	: 10.5	0.0424	
Number of observ.	: (8)	(8)	

<sup>\*(+)</sup> = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>%(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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### Summary Statistics for % Organ to Brain Weight Study number: 034246

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Table 19

Group	Terminal	Epidid	lymis Left		Lungs		Prostate	
	Body wt. (g)	Adrenal Glands	Epididy	mis Right	Pituita	ry gland	Semis	w/Coag Gl
			Male	Anim	als			
1								
Mean	: 381.1	3.2023	27.1387	28.3264	94.4790	0.5719	41.4403	74.4402
standard deviation	: 23.3	0.4041	3.4857	2.5454	10.7039	0.0816	9.9661	10.6861
Number of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
2								
Mean	: 381.2	3.1421	28.7651	29.8072	102.3816	0.5830	44.8539	77.3965
Standard deviation	: 28.8	0.3722	1.5287	1.8874	9.5046	0.1021	9.7138	13.6036
Number of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
Mean	: 380.1	2.9691	28.5283	29.0229	111.2866+	0.5842	40.8365	69.8156
Standard deviation	: 31.0	0.6691	2.2558	2.9301	12.4536	0.0845	7.9174	13.0548
Number of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
Mean	: 374.0	3.2896	27.9505	28.9530	130.4524+	0.5904	42.0069	76.1239
Standard deviation	: 41.0	0.3933	2.4176	2.8844	10.4289	0.0744	6.2579	15.3874
Number of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)

<sup>\*(+) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance (5) = 0.05(0.01) with Modified T test of significance

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Table 19

Group	Terminal	Tes	stis Right			
	Body wt. (g)	Testis Left		Thymus		
			Male	Animals		
1						
Mean	: 381.1	76.4657	80.3324	26.2856		
Standard deviation	: 23.3	13.1320	4.7270	3.8446		
Number of observ.	: (12)	(12)	(12)	(12)		
2						
Mean	: 381.2	83.9966	84.1224	22.5807		
Standard deviation	: 28.8	5.9495	5.5650	6.2408		
Number of observ.	: (12)	(12)	(12)	(12)		
3						
Mean	: 380.1	79.9494	80.9426	30.0051		
Standard deviation	: 31.0	5.2395	4.6649	6.2944	•	
Number of observ.	: (12)	(12)	(12)	(12)		
4						
Mean	: 374.0	81.8713	81.4980	25.0312		
Standard deviation	: 41.0	5.8260	6.3075	5.9816		
Number of observ.	: (12)	(12)	(12)	(12)		

<sup>\*(+)</sup> = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>%(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Huntingdon Life Sciences Princeton Research Center East Millstone, New Jersey Table 19 (pregnant animals)

#### Summary Statistics for % Organ to Brain Weight Study number: 034246

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Group	Terminal		Lungs	Ova	ary Right		Thymus	
	Body wt. (g)	Adrenal Glands	Ov	ary Left	Pituita	ry gland	Uterus w/vagina	
			F e m a	le An	i m a l s			
1					+			
Mean	: 300.6	4.6521	76.6167	3.7846	3.4625	0.8277	14.9537	50.9350
Standard deviation:	: 12.6	0.5202	8.1885	0.6646	0.2352	0.1510	3.9154	6.5158
Jumber of observ.	: (11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
2								
Mean	: 318.9*	4.3832	86.0918\$	3.8899	3.9062*	0.8735	16.2155	49.4238
standard deviation	: 15.6	0.2617	5.8919	0.6685	0.4975	0.1884	4.9057	4.7790
umber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
Mean	: 309.5	4.2977	101.3319\$	3.7392	3.7608	0.8958	16.5627	49.8667
Standard deviation	: 23.0	0.5764	8.6343	0.5470	0.4810	0.2277	4.3546	8.3380
Jumber of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
Mean	: 313.7	5.2311	125.1319\$	3.8962	4.1192+	0.8626	14.7045	52.8339
Standard deviation	: 10.5	1.0093	18.5441	0.3781	0.4245	0.1516	3.3928	7.891
Number of observ.	: (8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)

<sup>\*(+) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance

<sup>%(\$) =</sup> mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Incidence Summary Report	
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Preface	Table 20

### **Key to Abbreviations**

LN

Lymph Node

### Corresponding exposure levels for each group were as follows:

Group 1 - 0 mg/m³ Group 2 - 30 mg/m³ Group 3 - 100 mg/m³ Group 4 - 300 mg/m³

### Note:

Macroscopic observations for Animal No. 2011 were not documented due to error and are therefore not reported.

Huntingdon Life Sciences Princeton Research Center East Millstone, New Jersey Table 20 Incidence Summary Report for Gross Necropsy Observations Study number: 034246

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	-	Male	s			Femal	.es		
Group:	1	2	3	4	1	2	3	4	
Number in group:	12	12	12	12	11	12	12	8	
Within normal limits	9	0	0	0	10	0	0	0	
Testes									
Small	1	0	0	0	j o	0	0	0	
Epididymides					i				
Small	1	0	0	0	j o	0	0	0	
Vagina					1				
Mass	0	0	0	0	j o	0	1	0	
Thymus					ĺ				
Discolored	0	0	1	0	j o	0	0	0	
Lungs					1				
Discolored	2	11	12	12	į ı	12	12	8	
Mediastinal LN					1				
Discolored	0	8	11	12	i o	9	12	8	
Enlarged	0	8	11 0	12 3	0	9 0	12 4	6	
Kidneys					1				
Dilated Pelvis	0	0	0	2	0	0	0	0	

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			-		Version 4.2.2
terus Distended 0 0 0 2 Abnormal Contents 0 0 0 1  Ings Discolored 0 0 0 4  rachea Abnormal Contents 0 0 0 1  ediastinal LN Discolored 0 0 0 4  ar(s)					
	Femal	es			
1	2	3	4		
1	0	0	4		
1	0	0	0		
0	0	0	2		
0	0	0	1		
0	0	0	4		
0	0	0	1		
0	0	0	4		
0	0	0	1		
	1 1 0 0 0 0 0 0	Femal 1	Females 1 2 3 1 0 0  1 0 0  0 0 0 0 0 0 0 0 0 0 0 0	Females 1 2 3 4 1 0 0 4  1 0 0 0  0 0 0 2 0 0 0 1  0 0 0 4  0 0 0 1	Females  1

Incidence Summary of	
Microscopic Findings with Severity Levels	
Preface	Table 21

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Pregnant Animals	87
Animals with no viable fetuses or non-pregnant	99

### **Key to Abbreviations**

Ctls = Controls (Group 1) LN = Lymph Node

Nose/Turb Sec 1 = Nose/Turbinates Section 1
Nose/Turb Sec 2 = Nose/Turbinates Section 2
Nose/Turb Sec 3 = Nose/Turbinates Section 3
Nose/Turb Sec 4 = Nose/Turbinates Section 4
Oviducts/Fallop = Oviducts/Fallopian Tubes

V-DVTC = Ventral Diverticlum and Thyroid Cartilage

V-SM-G = Ventral Seromucinous Gland

### Corresponding exposure levels for each group were as follows:

Group 1 - 0 mg/m³ Group 2 - 30 mg/m³ Group 3 - 100 mg/m³ Group 4 - 300 mg/m³

#### Note:

The two sections of the larynx examined included the epithelium covering the base of the epiglottis (V-SM-G), the ventral pouch (V-DVTC) and the medial surfaces of the vocal processes of the arytenoid cartilages (both V-SM-G and V-DVTC).

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

						l s	Affec				
Controls from group(s): 1	Animal sex:		M a						ale	s	
		Ctls	2	3	4		Ctls	2	3	4	
<u>Tissues With Diagnoses</u>		12	12	12	12				12	8	
Ear(s)	mber examined:	0	0	0	0		0	0	0	0	
Epididymides	mber examined:	12	0	0	12	f					
	Nad>	11	0	0	12						
	Marked>	1	0	0	0	Ì					
	ding Observed:	1	0	0	0	j					
SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE											
	Nad>	12	0	0	11						
	Minimal>	0	0	0	1	ĺ					
Total Incidence of Fin	ding Observed:	0	0	0	1	j					
MONONUCLEAR CELL AGGREGATES											
	Nad>	10	0	0	10	- 1					
	Minimal>	2	0	0	2	ĺ					
Total Incidence of Fin	ding Observed:	2	0	0	2	j					
KidneysNu PELVIS: DILATED	mber examined:	0	0	0	2	1	0	0	0	1	
	Nad>	0	0	0	0	1	0	0	0	1	
	Moderate>	0	0	0	1	- 1	0	0	0	0	
	Marked>	0	0	0	1	- 1	0	0	0	0	
Total Incidence of Fin	ding Observed:	0	0	0	2		0	0	0	0	
MONONONUCLEAR CELL AGGREGATES											
	Nad>	0	0	0	1		0	0	0	1	
	Minimal>	0	0	0	1	j	0	0	0	0	
Total Incidence of Fin	ding Observed:	0	0	0	1	j	0	0	0	0	

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

	<b></b>		A n	 i m a l	s	Affec	t e	d	
Controls from group(s): 1 Animal sex:		Ма	l e s		- 1	F	e m	ale	s
Dosage group:	Ctls	2	3	4	Ì	Ctls	2	3	4
Tissues With Diagnoses No. in group:	12	12	12	12	i	11	12	12	88
Larynx: V-DVTC	12	11	12	12	1	11	12	12	8
Nad>	0	6	4	1	1	0	5	8	1
Minimal>	9	4	8	8	Ì	8	4	4	7
Slight>	2	1	0	3	i	3	3	0	0
Moderate>	1	0	0	0	i	0	0	0	0
	12	5	8	11	İ	11	7	4	7
SUBMUCOSAL GLAND: LUMINAL ACUTE INFLAMMATION									
Nad>	12	11	11	12	- 1	11	12	12	8
Slight>	0	0	1	0	i	0	0	0	0
	0	0	1	0	İ	0	0	0	0
GLANDULAR DILATATION									
Nad>	9	11	12	12	- 1	9	12	12	8
Minimal>	3	0	0	0	i	1	0	0	0
Slight>	0	0	0	0	Ì	1	0	0	0
	3	0	0	0	Ì	2	0	0	0
Larynx: V-SM-GNumber examined: MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID -METAPLASIA	12	12	11	12	I	10	12	12	8
Nad>	11	11	4	3	1	10	10	6	6
Minimal>	1	1	7	9	ĺ	0	2	6	2
	1	1	7	9	Ì	0	2	6	2
MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID -AGGREGATES									
Nad>	0	1	0	0		0	1	0	1
Minimal>	9	10	9	7	ĺ	6	8	11	7
Slight>	3	1	2	5	1	4	3	1	0
	12	11	11	12	1	10	11	12	7

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

	<b></b>		7 5	 i m a l	- <i></i> -	Affected	
Controls from group(s): 1 Animal sex:		M a			si I	Females	
J 1 , ,		ма 2			- 1		
Dosage group:	Ctls		3	4			
Tissues With Diagnoses No. in group:	12	12 12	12 11	12	+	11 12 12 8 10 12 12 8	
Larynx: V-SM-G	12	12	11	12	1	10 12 12 8	
Nad>	12	12	11	12		10 11 12 8	
Slight>	0	0	0	0		0 1 0 0	
	0	0	0	0	1	0 1 0 0	
GLANDULAR DILATATION							
Nad>	12	12	11	12		9 12 12 8	
Minimal>	0	0	0	0		1 0 0 0	
	0	0	0	0	-	1 0 0 0	
Lungs	12	12	12	12	1	11 12 12 8	
Nad>	12	0	1	1	- 1	6 0 0 0	
Slight>	0	3	4	2	i	5 5 1 4	
Moderate>	0	9	7	9	i	0 7 11 4	
	0	12	11	11	i	5 12 12 8	
BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK-PIGMENT DEPOSITS							
Nad>	12	0	0	0	- [	11 0 0 0	
Minimal>	0	2	0	0		0 1 0 0	
Slight>	0	8	4	6	- 1	0 8 2 3	
Moderate>	0	2	8	6		0 2 9 4	
Marked>	0	0	0	0		0 1 1 1	
	0	12	12	12	1	0 12 12 8	
ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT							
Nad>	12	0	0	0	1	11 0 0 0	
Slight>	0	11	0	0		0 0 0 0	
Moderate>	0	1	12	1		0 12 10 1	
Marked>	0	0	0	11		0 0 2 7	
	0	12	12	12	I	0 12 12 8	

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

				A n	i m a 1	. s	Affec	t e	d	
ontrols from group(s): 1	Animal sex:		Ма	les			F	e m	a 1 e	s
•	Dosage group:	Ctls	2	3	4	ĺ	Ctls	2	3	4
issues With Diagnoses	No. in group:	12	12	12	12		11	12	12	8
ungsBRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HY		12	12	12	12	1	11	12	12	8
	Nad>	12	6	0	0		11	3	0	0
	Minimal>	0	6	5	0	ĺ	0	9	2	1
	Slight>	0	0	7	9		0	0	. 9	7
	Moderate>	0	0	0	3		0	0	1	0
	inding Observed:	0	6	12	12		0	9	12	8
BRONCHIAL EPITHELIAL HYPERPLASIA										
	Nad>	12	12	11	12	ļ	11	12	12	8
	Slight>	0	0	1	0	ļ	0	0	0	0
	inding Observed:	0	0	1	0	1	0	0	0	0
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATIC										
	Nad>	1	0	0	0		7	0	0	0
	Minimal>	8	7	0	0	-	4	3	0	0
	Slight>	3	5	3	0	- 1	0	9	4	0
	Moderate>	0	0	9	0	ļ	0	0	8	3
	Marked>	0	0	0	12		0	0	0	5
Total Incidence of F	inding Observed:	11	12	12	12	-	4	12	12	8
HEMORRHAGE (S)										
	Nad>	11	12	11	12	ļ	11	12	12	8
	Minimal>	1	0	1	0	ļ	0	0	0	0
Total Incidence of F	inding Observed:	1	0	1	0	ļ	0	0	0	0
ediastinal LN PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] S -CELLULARITY		12	12	12	12	I	10	12	12	8
	Nad>	3	0	1	0		2	2	0	0
	Minimal>	4	0	0	0	ĺ	2	0	0	0
	Slight>	5	11	2	0	į	6	3	1	0
	Moderate>	0	1	4	0	j	0	7	4	1
	Marked>	0	0	5	7	į	0	0	7	1
	Severe>	0	0	0	5	İ	0	0	0	6
Total Incidence of F	inding Observed:	9	12	11	12	i	8	10	12	8

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 25-Jun-04 To 11-Jul-04

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

			Αn	i m a :	l s	Affec	t e	d	
Controls from group(s): 1 Animal sex:		Ма	l e s			F	e m	a 1 e	s
Dosage group:	Ctls	2	3	4	Ì	Ctls	2	3	4
Tissues With Diagnoses No. in group:	12	12	12	12		11	12	12	8
Mediastinal LN	12	12	12	12	ı	10	12	12	8
Nad>	12	1	0	0	1	10	1	0	0
Minimal>	0	11	9	0	ĺ	0	7	3	0
Slight>	0	0	3	7	j	0	4	5	0
Moderate>	0	0	0	4	į	0	0	4	6
Marked>	0	0	0	1	j	0	0	0	2
	0	11	12	12	İ	0	11	12	8
PROMINENT HISTIOCYTES									
Nad>	5	1	1	0		6	6	3	0
Minimal>	5	8	10	12		3	4	8	8
Slight>	2	3	1	0		1	2	1	0
	7	11	11	12	1	4	6	9	8
FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS									
Nad>	8	11	10	10		9	11	10	5
Minimal>	3	1	1	2		1	0	2	3
Slight>	1	0	1	0	1	0	1	0	0
	4	1	2	2	1	1	1	2	3
PROMINENT PLASMA CELLS									
Nad>	6	8	7	8		3	3	3	5
Minimal>	1	3	4	4		1	3	6	0
Slight>	5	1	1	0		6	6	3	2
Moderate>	0	0	0	0		0	0	0	1
	6	4	5	4	ı	7	9	9	3
YELLOW-BROWN PIGMENT									
Nad>	12	12	11	12		10	11	12	8
Minimal>	0	0	1	0	Į	0	0	0	0
Slight>	0	0	0	0		0	1	0	0
	0	0	1	0		0	1	0	0

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

				Αn	i m a	l s	Affec	t e	d		
Controls from group(s): 1	Animal sex:		ма	1 e s			F	e m	ale	s	
1	Dosage group:	Ctls	2	3	4	ĺ	Ctls	2	3	4	
Tissues With Diagnoses 1	No. in group:	12	12	12	12	ĺ	11	12	12	8	
Nose/Turb Sec 1Num	oer examined:	12	11	12	12		11	12	12	8	
NASAL MUCOSA (VESTIBULAR): EPITHELIAL-EROSION(S)											
	Nad>	12	11	12	12	1	10	12	12	8	
	Slight>	0		0	0		1	0	0	0	
Total Incidence of Find:	ing Observed:	0	0	0	0		1	0	0	0	
NASAL MUCOSA (VESTIBULAR EPITHELIUM): MIXED INFLA-CELLS WITH OR WITHOUT LYMPHOID AGGREGATES	AMMATORY										
	Nad>	12	11	12	12		10	12	12	8	
	Moderate>	0	0	0	0	ĺ	1	0	0	0	
Total Incidence of Find:	ing Observed:	0	0	0	0	j	1	0	0	0	
NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CE: -HYPERTROPHY/HYPERPLASIA	LL										
	Nad>	4	4	1	2		6	8	4	1	
,	Minimal>	6	4	8	7		2	2	4	4	
	Slight>	2	3		3		3	2	4	3	
	ing Observed:	8	7	11	10		5	4	8	7	
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT											
	Nad>	12	11	11	11		11	12	12	8	
	Minimal>	0			1		0	0	0	0	
	Slight>	0		1	0		0	0	0	0	
Total Incidence of Find:	ing Observed:	0	0	1	1	!	0	0	0	0	
NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITHOUT LYMPHOID AGGREGATES	TH OR										
	Nad>	11	10	12	12		11	12	12	8	
	Minimal>	1	1	0	0	j	0	0	0	0	
Total Incidence of Find:	ing Observed:	1	1	0	0	İ	0	0	0	0	

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

			 Δ n	i m a '	 1 a	Affec	t e .	 d		
Controls from group(s): 1 Animal sex:								ale	s	
Dosage group:	Ctls			4	i	Ctls	2	3	4	
Tissues With Diagnoses No. in group:	12				i		12	12	8	
Nose/Turb Sec 1	12	11	12	12	İ	11	12	12	8	
Nad>	12	11	12	12		10	12	12	6	
Slight>	0	0	0	0		1	0	0	2	
	0	0	0	0		1	0	0	2	
Nose/Turb Sec 2	12	11	12	12		11	12	12	8	
Nad>	12	11	12	12		11	12	12	8	
	0	0	. 0	0	j	0	0	0	0	
NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED -INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES										
Nad>	10	3	4	7		7	4	6	2	
Minimal>	0	6	5	4	Ĺ	3	6	6	5	
Slight>	2	2	3	1	ĺ	1	2	0	1	
	2	8	8	5	İ	4	8	6	6	
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT										
Nad>	12	11	12	11		11	12	12	8	
Minimal>	0	0	0	1	l	0	0	0	0	
	0	0	0	1		0	0	0	0	
NASAL SINUS: BROWN-BLACK PIGMENT										
Nad>	12	11	12		-	11		12	8	
Minimal>	0	0	0	1		0	0	0	0	
	0	0	0	1		0	0	0	0	

## 

	<b>-</b>									
				i m a 1	s	Affec	t e	d		
Controls from group(s): 1 Animal sex	-	- Ма	l e s			F	e m	a l e	s	
Dosage group	: Ctls	2	3	4		Ctls	2	3	4	
Tissues With Diagnoses No. in group		12	12	12		11	12	12	8	
Nose/Turb Sec 2Number examined	.: 12	11	12	12		11	12	12	8	
NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR										
-WITHOUT LYMPHOID AGGREGATES										
Nac		6	3	7	ļ	3	4	2	2	
Minimal	-		7	0		3	5	9	3	
Slight		3		5	ļ	5	3	1.	2	
Moderate			1	0	ļ	0	0	0	1	
Total Incidence of Finding Observed	.: 8	5	9	5		8	8	10	6	
ODONTOPATHY										
Nac			12	12	ļ	11	12	12	8	
Moderate			0	0	!	0	0	0	0	
	: 1	0	0	0	I	0	0	0	0	
Name / Truck Car 2	: 12	11	12	12	1	11	12	12	8	
Nose/Turb Sec 3	.: 12	TI	12	1.2	1	11	12	12	0	
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT Nad	> 12	11	10	0	- 1	11	12	12	8	
Nad Minimal		0	2	5	-	0	0	0	0	
Slight		0	0	7	!	0	0	0	0	
<u>-</u>		0	2	12		0	0	0	0	
	.: 0	U	2	12	ı	O	v	U	Ū	
NASAL-PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT										
Nad	> 12	11	12	12	t	11	12	11	8	
Minimal	> 0	0	0	0	İ	0	0	1	0	
Total Incidence of Finding Observed	: 0	0	0	0	İ	0	0	1	0	
MAXILLARY GLANDULAR DILATATION										
Nac	> 12	10	12	12		10	12	12	8	
Minimal	> 0	1	0	0	- 1	1	0	0	0	
	.: 0	1	0	0	- 1	1	0	0	0	
PALATE: ECTOPIC SEBACEOUS GLAND										
Nac	> 11	11	12	11	1	10	10	11	7	
Present	> 1	0	0	1	1	1	2	1	1	
	: 1	0	0	1	- 1	1	2	1	1	

## Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

				An:	imals	Affe	cte	d	
Controls from group(s): 1	Animal sex:		Ма	les			Fem	a l e	s
I	Oosage group:	Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses 1	No. in group:	12	12	12	12	11	12	12	88
Nose/Turb Sec 3	oer examined:	12	11	12	12	11	12	12	8
	Nad>	12	11	12	12	10	12	11	8
	Minimal>	0	0	0	0	j 1	0	0	0
	Slight>	0	0	0	0	j 0	0	1	0
Total Incidence of Findi	ing Observed:	0	0	0	0	1	0	1	0
Nose/Turb Sec 4	per examined:	12	11	12	12	11	12	12	8
	Nad>	12	10	5	0	11	11	9	0
	Minimal>	0	1	7	1	0	1	3	6
	Slight>	0	0	0	7	0	0	0	2
	Moderate>	0	0	0	4	j o	0	0	0
	ing Observed:	0	1	7	12	0	1	3	8
NASAL PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT									
	Nad>	12	11	12	10	11	12	10	8
	Minimal>	0	0	0	1	0	0	2	0
	Slight>	0	0	0	1	0	0	0	0
Total Incidence of Findi	ing Observed:	0	0	0	2	0	0	2	0
PERIODONTAL DISEASE									
	Nad>	11	10	8	12	] 10	12	8	8
	Minimal>	0	0	4	0	0	0	2	0
	Slight>	1	1	0	0	1	0	2	0
	ing Observed:	1	1	4	0	1	0	4	0
OvariesNumb	per examined:					11	0	0	8
	Nad>					] 3	0	0	0
	Minimal>					1	0	0	0
	Slight>					7	0	0	8
Total Incidence of Findi	ng Observed:					8	0	0	8

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

			- <b></b>	 А п	 i m a	1 s	Affec	 teo	 1	
Controls from group(s): 1 Ar	nimal sex:		Ma:	les		1	F	e m a	a 1 e	s
<b>9 2</b> · ·	age group:	Ctls	2	3	4	i	Ctls	2		4
Tissues With Diagnoses No.	in group:	12	12	12	12	j	11	12	12	8
Ovaries	examined:					I	11	0	0	8
	Nad>						9	0	0	8
	Slight>					i	2	0	0	0
Total Incidence of Finding	Observed:					İ	2	0	0	0
INTERSTITIAL HEMORRHAGE										
	Nad>						9	0	0	8
	Slight>						1	0	0	0
	Moderate>						1	0	0	0
	Observed:						2	0	0	0
Oviducts/FallopNumber	examined:						11	0	0	8
ProstateNumber MONONUCLEAR CELL AGGREGATES	examined:	12	0	0	12					
	Nad>	11	0	0	10					
	Slight>	1	0	0	1					
	Moderate>	0	0	0	1					
	Observed:	1	0	0	2					
ATROPHY										
	Nad>	12	0	0	11	ļ				
	Slight>	0	0	0	1	ļ				
	Observed:	0	0	0	1					
Seminal vesiclesNumber	examined:	12	0	0	12	-				
TestesNumber  GERM CELL LOSS/DEPLETION	examined:	12	0	0	12	ļ				
Cha. Chil 1000/Dillian	Nad>	10	0	0	12	1				
	Minimal>	1	0	0	0	i	*			
	Marked>	1	0	0	0	į				
Total Incidence of Finding	Observed:	2	0	0	0	j				
ThymusNumber	examined:	0	0	0	0	1	0	0	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 25-Jun-04 To 11-Jul-04

### Incidence Summary of Microscopic Findings with Severity Levels Terminal Sacrifice

Controls from group(s): 1 Animal sex:			An les	imal	.s A	ffec		d ale	_
Controls from group(s): 1 Animal sex:  Dosage group:	Ctls	ма 2	1 e s	4		Ctls	2	3 I E	9 4
Tissues With Diagnoses No. in group:	12	12	12	12	ł	11	12	12	8
Trachea	12	12	12	12		11	12	12	8
Nad>	11	10	9	11	1	8	11	11	8
Minimal>	1	2	2	1	į	3	1	1	0
Slight>	0	0	1	0	j	0	0	0	0
	1	2	3	1	İ	3	1	1	0
MUCOSA: GLANDULAR DILATATION									
Nad>	12	8	8	6		9	10	9	6
Minimal>	0	3	0	0	1	0	1	0	1
Slight>	0	1	1	4		2	1	3	0
Moderate>	0	0	3	2		0	0	0	1
	0	4	4	6		2	2	3	2
Uterus						11	0	0	8
Nad>						2	0	0	1
Slight>						6	0	0	7
Moderate>						3	0	0	0
						9	0	0	7
HEMORRHAGE									
Nad>						6	0	0	8
Minimal>						1	0	0	0
Slight>						1	0	0	0
Moderate>						3	0	0	0
						5	0	0	0
LUMINAL DILATATION									
Nad>						11	0	0	8
					I	0	0	0	0

#### 

		<b></b>									
					ima	lsį	Affec				
Controls from group(s): 1	Animal sex:		Ма	l e s		ļ			a 1 e	s	
	Dosage group:	Ctls	2	3	4	ļ	Ctls	2	3	4	
Tissues With Diagnoses		12	12	12	12		11	12	12	8	
Uterus	Jumber examined:						11	0	0	8	
	Nad>						11	0	0	8	
	nding Observed:					I	0	0	0	0	
Vagina	Number examined:					1	11	0	0	8	
	Nad>						1	0	0	0	
	Minimal>						2	0	0	0	
	Slight>						8	0	0	8	
Total Incidence of Fi	nding Observed:					[	10	0	0	8	
LUMINAL INFLAMMATORY/CELLULAR DEBRIS							_			_	
· ·	Nad>					ļ	3	0	0	1	
	Minimal>					ļ	2	0	0	2	
	Slight>					ļ	3	0	0	4	
·	Moderate>					ļ	3	0	0	1	
Total Incidence of Fi	nding Observed:					I	8	0	0	7	
MONONUCLEAR CELL AGGREGATES											
	Nad>						9	0	0	8	
	Minimal>					İ	1	0	0	0	
	Slight>					İ	1	0	0	0	
Total Incidence of Fi	nding Observed:					İ	2	0	0	0	
SUPERFICIAL CELLULAR BALLOONING DEGENERATION											
	Nad>					ļ	11	0	0	6	
	Minimal>						0	0	0	1	
	Slight>						0	0	0	1	
	nding Observed:					1	0	0	0	2	

### Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

						ls . 1	Affec			
	nimal sex:		Ma]			ļ	F			
	age group:	Ctls				ļ	Ctls			4
<u>Tissues With Diagnoses</u> No.		0			0		1	0		4
Ear(s)Number	examined:	0	0	0	0	ı	0	0	0	1
Epididymides	examined:	0	0	0	0					
	Observed:	0	0	0	0					
SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE		_								
	Observed:	0	0	0	0	ı				
MONONUCLEAR CELL AGGREGATES	0h d	0	0	0	0	ı				
Total Incidence of Finding	Observed:	0	0	0	0	ı				
Kidneys Number PELVIS: DILATED	examined:	0	0	0	0		0	0	0	0
	Observed:	0	0	0	0	l	0	0	0	0
MONONONUCLEAR CELL AGGREGATES									_	_
	Observed:	0	0	0	0	I	0	0	0	0
Larynx: V-DVTC		0	0	0	0		0	0	0	4
	Nad>	0	0	0	0		0	0	0	2 .
	Minimal>	0	0	0	0	l	0	0	0	2
	Observed:	0	0	0	0	l	0	0	0	2
SUBMUCOSAL GLAND: LUMINAL ACUTE INFLAMMATION										
	Nad>	0	0	0	0	ļ	0	0	0	4
	Observed:	0	0	0	0		0	0	0	0

### Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

Controls from group(s): 1  Animal sex:					Ani	m a 1 s	<u>-</u>	Affec	 t e d		
Tissues With Diagnoses No.ingroup: 0 0 0 0 0 0 0 0 4  Larynx: V-DVTC	Controls from group(s): 1	Animal sex:		Mal	. e s		1	F	e m a	1 e	s
Larynx: V-DVTC	• • •	Dosage group:	Ctls	2	3	4	İ	Ctls	2	3	4
STANDULAR DILATATION	Tissues With Diagnoses	No. in group:	0	0	0	0		11	0_	0	4
Larynx: V-SM-G		ber examined:	0	0	0	0	1	0	0	0	4
Larynx: V-SM-G		Nad>	0	0	0	0	1	0	0	0	4
MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID -METAPLASIA  Nad> 0 0 0 0 0 0 0 0 0 3  Minimal> 0 0 0 0 0 0 0 0 0 0 0 0 1	Total Incidence of Find	ing Observed:	0	0	0	0	İ	0	0	0	0
Minimal> 0 0 0 0 0 0 0 1	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/		0	0	0	0	1	0	0	0	4
		Nad>	0	0	0	0	1	0	0	0	3
MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID -AGGREGATES  Minimal> 0 0 0 0 0 0 0 0 4		Minimal>	0		0	0	ĺ	0	0	0	1
-AGGREGATES  Minimal> 0 0 0 0 0 0 0 4	Total Incidence of Find	ing Observed:	0	0	0	0	Ì	0	0	0	1
		T LYMPHOID									
CHONDROMALACIA   Nad> 0 0 0 0   0 0 4		Minimal>	0	0	0	0	1	0	0	0	4
Nad> 0 0 0 0 0 0 4	Total Incidence of Find	ing Observed:	0	0	0	0	1	0	0	0	4
	CHONDROMALACIA	_				_					
			0			0	!	0	0		
	Total Incidence of Find	ing Observed:	0	0	0	0	1	0	0	0	0
GLANDULAR DILATATION	GLANDULAR DILATATION										
Nad> 0 0 0 0 0 0 4		Nad>	0	0	0	0	1	0	0	0	4
Total Incidence of Finding Observed: 0 0 0 0 0 0 0 0 0	Total Incidence of Find	ing Observed:	0	0	0	0	1	0	0	0	0
Lungs Number examined: 0 0 0 0 1 0 4  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT)			0	0	0	0		1	0	0	4
Nad> 0 0 0 0 1 0 0		Nad>	0	0	0	0	1	1	0	0	0
Slight> 0 0 0 0 0 0 1		Slight>	0	0	0	0	1	0	0	0	1
Moderate> 0 0 0 0 0 0 0 3		Moderate>	0	0	0	0	1	0	0	0	3
	Total Incidence of Find	ing Observed:	0	0	0	0	1	0	0	0	4

### Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

					<b></b>			<b>-</b>		
				Ani	mal	s A	ffec	ted		
	unimal sex:		Mal	. e s		ļ	F		l e	s
	<i>3 3</i> 1	Ctls	2	3	4	ļ	Ctls	2	3	4
Tissues With Diagnoses No.	in group:	0	0	0	0		1	0	0	4
Lungs		0	0	0	0	ł	1	0	0	4
BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROW-PIGMENT DEPOSITS	WN-BLACK									
	Nad>	0	0	0	0	1	1	0	0	1
	Slight>	0	0	0	0	Ì	0	0	0	1
	Moderate>	0	0	0	0	Ì	0	0	0	1
	Marked>	0	0	0	0	Ì	0	0	0	1
Total Incidence of Finding	Observed:	0	0	0	0	İ	0	0	0	3
ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT										
	Nad>	0	0	0	0	1	1	0	0	0
	Moderate>	0	0	0	0	i	0	0	0	1
	Marked>	0	0	0	0	i	0	0	0	3
Total Incidence of Finding	Observed:	0	0	0	0	İ	0	0	0	4
BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTRO	PHY									
BROWCHIODO ANVEODAR BITTEDBINE HITEREDIOTA, HITEREN	Nad>	0	0	0	0	1	1	0	0	0
	Slight>	0	ō	o	0	i	0	0	0	3
	Moderate>	0	0	0	0	i	0	0	0	1
		0	0	0	0	i	0	0	0	4
BRONCHIAL EPITHELIAL HYPERPLASIA										
BRUNCHIAL EPIINELIAL HIPERPLASIA	Nad>	0	0	0	0	1	1.	0	0	4
Total Incidence of Finding		0	ō	Ö	. 0	i	0	0	0	0
Included of finance	, 02001.04.	•	•	•		•				
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION										
	Minimal>	0	0	0	0	ļ	1	0	0	0
	Moderate>	0	0	0	0	ļ	0	0	0	2
	Marked>	0	0	0	0	ļ	0	0	0	2
	Observed:	0	0	0	0		1	0	0	4

### Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

						f f e c			
Controls from group(s): 1 Animal sex:		Ma:			15 . A	F			s
Dosage group:	Ctls	2	3	4	i	Ctls	2	3	4
Tissues With Diagnoses No. in group:	0	0	0	0	i	1	0	0	4
Lungs	0	0	0	0		1	0	0	4
Nad>	0	0	0	0		1	0	0	4
	0	0	0	0	İ	0	0	0	0
Mediastinal LN	0	0	0	0		1	0	0	4
Nad>	0	0	0	0	1	1	0	0	0
Marked>	0	0	0	0		0	0	0	1
Severe>	0	0	0	0		0	0	0	3
	0	0	0	0		0	0	0	4
BROWN-BLACK PIGMENT DEPOSITS									_
Nad>	0	0	0	0	!	1	0	0	0
Moderate>	0	0	0	0		0	0	0	2
Marked>	0	0	0	0	!	0	0	0	2
	0	0	0	0	ı	0	0	0	4
PROMINENT HISTIOCYTES									
Nad>	0	0	0	0		1	0	0	0
Minimal>	0	0	0	0	!	0	0	0	3
Slight>	0	0	0	0	1	0	0	0	1
	0	0	0	0	1	0	0	0	4
FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS									
Nad>	0	0	0	0		1	0	0	2
Minimal>	0	0	0	0		0	0	0	1
Slight>	0	0	0	0		0	0	0	1
	0	0	0	0		0	0	0	2

### Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

						Affec			
Controls from group(s): 1 Animal s	sex:	M			1 1 5		e m a		s
Dosage gro				3 4	i	Ctls	2	3	4
Tissues With Diagnoses No. in gro	-	0	0 (	0 0	i	1	0	0	4
Mediastinal LN		0	0 (	0 0		1	0	0	4
T.	Nad>	0	0 (	0 0		0	0	0	3
Minim	mal>			0 0		0	0	0	1
Slig	ght>	0	0 (	0 0		1	0	0	0
	ved:	0	0 (	0 0	l	1	0	0	1
YELLOW-BROWN PIGMENT									
I and the second	Nad>	0	0 (	0 0	1	1	0	0	4
	ved:	0	0	0 0		0	0	0	0
Nose/Turb Sec 1		-		0 0	1	1	0	0	4
				0 0		1	0	0	4
	ved:	0	0	0 0		0	0	0	0
NASAL MUCOSA (VESTIBULAR EPITHELIUM): MIXED INFLAMMATORY -CELLS WITH OR WITHOUT LYMPHOID AGGREGATES									
	Nad>	0		0 0		1	0	0	4
	ved:	0	0	0 0		0	0	0	0
NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL -HYPERTROPHY/HYPERPLASIA									
1	Nad>	0	0 .	0 0		1	0	0	1
Minim	mal>			0 0		0	0	0	3
	ved:	0	0 (	0 0	1	0	0	0	3
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT		•			ı	4	•	0	4
_	Nad>	U	0 (	0 0	ļ	1	U	0	4
	vea:	0	0 (	0 0	i	0	0	0	0

## Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

					ls.	Affec			
Controls from group(s): 1 Animal sex		M a			!	F		ıle	s
Dosage group		2	3	4	ļ	Ctls	2	3	4
Tissues With Diagnoses No. in group		0	0			1	0	0	4
Nose/Turb Sec 1		0	0	0		1	0	0	4
Nad	_	0	0	0	1	1	0	0	3
Minimal	-		0	0	- 1	0	0	0	1
	. 0	0	0	0	1	0	0	0	1
PERIODONTAL TISSUE (AMELOBLAST EPITHELIUM): CELLULAR -DISORGANIZATION/DEGENERATION									
Nad	> 0	0	0	0	ŀ	1	0	0	4
	: 0	0	0	0	I	0	0	0	0
Nose/Turb Sec 2	0	0	0	0		1	0	0	4
Nad	> 0	0	0	0	ļ	1	0	0	3
Moderate	• 0	0	0	0	1	0	0	0	1
	: 0	0	0	0	I	0	0	0	1
NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED -INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES									
Nad	• 0	0	0	0	1	1	0	0	0
Minimal	• 0	0	0	0	1	0	0	0	2
Slight	0	0	0	0	1	0	0	0	2
	. 0	0	0	0	Ì	0	0	0	4
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT									
Nad:		0	0	0	ļ	1	0	0	4
	. 0	0	0	0		0	0	0	0

### Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

			Ani	mals	Aff	ес	t e d		
Controls from group(s): 1 Animal sex:		Ma1	les		1	F	e m a	l e	s
Dosage group:	Ctls	2	3	4	C	tls	2	3	4
Tissues With Diagnoses No. in group:	0	0	0	0		1	0	0	4
Nose/Turb Sec 2	0	0	0	0	1	1	0	0	4
Nad>	0	0	0	0	1	1	0	0	4
	0	0	0	ō	Ì	0	0	0	0
NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR -WITHOUT LYMPHOID AGGREGATES									
Nad>	0	0	0	0		0	0	0	1
Minimal>	0	0	0	0	j	0	0	0	1
Slight>	0	0	0	0	į	1	0	0	2
	0	0	0	0	İ	1	0	0	3
ODONTOPATHY									
Nad>	0	0	0	0		1	0	0	4
	0	0	0	0		0	0	0	0
Nose/Turb Sec 3	0	0	0	0	1	1	.0	0	4
Nad>	0	0	0	0		1	0	0	3
Minimal>	0	0	0	0		0	0	0	1
	0	0	0	0		0	0	0	1
NASAL-PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT									
Nad>	0	0	0	0		1	0	0	4
	0	0	0	0		0	0	0	0
MAXILLARY GLANDULAR DILATATION									
Nad>	0	0	0	0		1	0	0	4
	0	0	0	0		0	0	0	0
PALATE: ECTOPIC SEBACEOUS GLAND									
Nad>	0	0	0	0	1	1	0	0	4
	0	0	0	0	1	0	0	0	0

## Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

									<b>-</b>
Controls from group(s): 1 Animal sex:			Anı .es		s .	Affec F			g
	Ctls	2				Ctls	2		4
Tissues With Diagnoses No. in group:	0	0	0	0	i	1	0	0	4
Nose/Turb Sec 3	0	0	0	0	İ	1	0	0	4
Nad>	0	0	0	0		1	0	0	4
	0	0	0	0		0	0	0	0
Nose/Turb Sec 4	0	0	0	0	1	1	0	0	4
Nad>	0	0	0	0		1	0	0	0
Minimal>	0	0	0	0		0	0	0	2
Slight>	0	0	0	0		0	0	0	2
	0	0	0	0		0	0	0	4
NASAL PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT									
Nad>	0	0	0	0	l	1	0	0	4
	0	0	0	0	I	0	0	0	0
PERIODONTAL DISEASE									
Nad>	0	0	0	0		1	0	0	4
	0	0	0	0		0	0	0	0
OvariesNumber examined: PROMINENT ATRETIC FOLLICLES					1	1	0	0	4
Nad>						1	0	0	3
Minimal>					Ì	0	0	0	1
					İ	0	0	0	1
FOLLICULAR CYST(S)					,				
Nad>					!	1	0	0	3
Slight>					ļ	0	0	0	1
					1	0	0	0	1

### Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

		Animals					Affec	 t e d				
Controls from group(s): 1	Animal sex:		Males					Females				
	sage group:	Ctls	2	3	4	ì	Ctls	2	3	4		
Tissues With Diagnoses No	. in group:	0	0	0	0	<u>i</u>	11	0	0	4		
Ovaries	r examined:						1	0	0	4		
	Nad>						1	0	0	4		
	g Observed:					Ì	0	0	0	0		
Oviducts/FallopNumbe	r examined:						1	0	0	4		
Prostate	r examined:	0	0	0	0	1						
	g Observed:	0	0	0	0	1						
ATROPHY												
	g Observed:	0	0	0	0	ļ						
Seminal vesiclesNumbe	r examined:	0	0	0	0							
TestesNumbe	r examined:	0	0	0	0	I						
	g Observed:	0	0	0	0	1						
ThymusNumbe	r examined:	0	0	0	0	1	0	0	0	0		
TracheaNumbe	r examined:	0	0	0	0	1	1	0	0	4		
	Nad>	0	0	0	0		0	0	0	4		
	Minimal>	0	0	0	0	j	1	0	0	0		
	g Observed:	0	0	0	0		1	0	0	0		
MUCOSA: GLANDULAR DILATATION												
	Nad>	0	0	0	0	ļ	1	0	0	3		
	Slight>	0	0	0	0		0	0	0	1		
Total Incidence of Finding	g Observed:	0	0	0	0		0	0	0	1		

## Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

					ls	Affected					
Controls from group(s): 1 Animal sex:	M	Mal	e s		1	F		. 1 e	s		
Dosage group:	Ctls	2	3	4	İ	Ctls	2	3	4		
Tissues With Diagnoses No. in group:	0	0	0	0	1	11	0	0	4		
UterusNumber examined: STROMAL HYALINIZATION						1	0	0	4		
Nad>					l	1	0	0	4		
					ı	0	0	0	0		
HEMORRHAGE											
Nad>					ı	1	0	0	4		
					I	0	0	0	0		
LUMINAL DILATATION											
Nad>						1	0	0	3		
Moderate>						0	0	0	1		
						0	0	0	1		
LUMINAL CELLULAR DEBRIS											
Nad>					ł	1	0	0	3		
Slight>						0	0	0	1		
						0	0	0	1		
VaginaNumber examined: ACUTE INFLAMMATORY CELL INFILTRATE					1	1	0	0	4		
Nad>						1	0	0	4		
						0	0	0	0		
LUMINAL INFLAMMATORY/CELLULAR DEBRIS											
Nad>					1	0	0	0	2		
Slight>						1	0	0	1		
Moderate>						0	0	0	1		
					į	1	0	0	2		

# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

# Incidence Summary of Microscopic Findings with Severity Levels Unscheduled Deaths

						<b></b>				
				An:	. m a	l s	Affec	teo	l	
Controls from group(s): 1	Animal sex:		Mal	e s			Females			
	Dosage group:	Ctls	2	3	4	j	Ctls	2	3	4
Tissues With Diagnoses	No. in group:	0	0	0	0		1	0	0	4
Vagina						1	0	0	4	
MONONUCLEAR CELL AGGREGATES										
	Nad>						1	0	0	2
	Minimal>					j	0	0	0	1
	Slight>						0	0	0	1
	Finding Observed:						0	0	0	2
SUPERFICIAL CELLULAR BALLOONING DEGENERATION										
	Nad>						1	0	0	4
Total Incidence of I	Finding Observed:					İ	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 07-Jul-04 To 16-Jul-04

TABLE 22

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### SUMMARY OF PUP NECROPSY OBSERVATIONS

	GROUP:	1	2	3	4	
DOSE LEVEL (M	G/M3):	0	30	100	300	
Litters Evaluated	N	11	12	12	8	· ·
Pups Evaluated	N	143	162	138	103	
Live	N	141	157	133	98	
Stillborn	N	2	5	5	5	
GROSS EXAM						
Litter Incidence	N	1	0	•		
Pup Incidence	N	1	0	0	1	
• .	<del></del>	+	U	0	1	
AUTOLYSIS		•				
Pup Incidence	N	1	0	0	1	
	용	0.7	0.0	0.0	1	
Litter Incidence	N	ī	0	0	1.0	
	8	9.1	0.0	0.0	12.5	
LUNGS						
Litter Incidence	N	1	4	2		
Pup Incidence	N	1	6	3 5	4	
-	<del></del>	<b>-</b>	Ü	Ð	5	
FLOTATION TEST-STILLBORN						
Pup Incidence	N	1	5	5	r	
	ક	0.7	3.1	3.6	5 4.9	
Litter Incidence	N	1	3	3.0	4.9	
	8	9.1	25.0	25.0	50.0	
FLOTATION TEST- FOUND DEAD	D					
Pup Incidence	N	0	1	0	_	
	*	0.0	0.6	0.0	0	
Litter Incidence	N	0	1	0.0	0.0	
·	*	0.0	8.3	0.0	0 0.0	

TABLE 22

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

DOSE	GROUP:	1	2	3	4
DOSE LEVEL (M	IG/M3):	0	30	100	300
itters Evaluated	N	11	12	12	8
Pups Evaluated	N	143	162	138	103
Live	N	141	157	133	98
Stillborn	N	2	5	5	5
STOMACH					
Litter Incidence	N	1	4	4	4
Pup Incidence	И	1	6	6	5
NO MILK IN STOMACH					
Pup Incidence	N	1	5	5	5
	*	0.7	3.1	3.6	4.9
Litter Incidence	N	1	3	3	4
	*	9.1	25.0	25.0	50.0
MILK IN STOMACH	•				
Pup Incidence	N	0	1	1	0
	*	0.0	0.6	0.7	0.0
Litter Incidence	N	0	1	1	0
	*	0.0	8.3	8.3	0.0

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#### APPENDIX A

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	TYPE OF	DATE OF	STUDY
ANIMAL#	DEATH	DEATH	DAY
1001	TERMINAL SACRIFICE	25-JUN-04	31
1002	TERMINAL SACRIFICE	25-JUN-04	31
1003	TERMINAL SACRIFICE	25-JUN-04	31
1004	TERMINAL SACRIFICE	25-JUN-04	31
1005	TERMINAL SACRIFICE	25-JUN-04	31
1006	TERMINAL SACRIFICE	25-JUN-04	31
1007	TERMINAL SACRIFICE	25-JUN-04	31
1008	TERMINAL SACRIFICE	25-JUN-04	31
1009	TERMINAL SACRIFICE	25-JUN-04	31
1010	TERMINAL SACRIFICE	25-JUN-04	31
1011	TERMINAL SACRIFICE	25-JUN-04	31
1012	TERMINAL SACRIFICE	25-JUN-04	31

### APPENDIX A

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY DAY	
2001	TERMINAL SACR	IFICE 25-JUN-04	31	
2002	TERMINAL SACR	IFICE 25-JUN-04	31	,
2003	TERMINAL SACR	IFICE 25-JUN-04	31	
2004	TERMINAL SACR	IFICE 25-JUN-04	31	
2005	TERMINAL SACK	IFICE 25-JUN-04	31	
2006	TERMINAL SACK	IFICE 25-JUN-04	31	
2007	TERMINAL SACR	IFICE 25-JUN-04	31	
2008	TERMINAL SACR	IFICE 25-JUN-04	31	
2009	TERMINAL SACR:	IFICE 25-JUN-04	31	
2010	TERMINAL SACE	IFICE 25-JUN-04	31	
2011	TERMINAL SACR	IFICE 25-JUN-04	. 31	
2012	TERMINAL SACR	IFICE 25-JUN-04	31	

#### APPENDIX A

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

33773.5 T II	TYPE OF	DATE OF	STUDY	
ANIMAL#	DEATH	DEATH	DAY	
3001	TERMINAL SACRIFICE	25-JUN-04	31	 
3002	TERMINAL SACRIFICE	25-JUN-04	31	
3003	TERMINAL SACRIFICE	25-JUN-04	31	
3004	TERMINAL SACRIFICE	25-JUN-04	31	
3005	TERMINAL SACRIFICE	25-JUN-04	31	
3006	TERMINAL SACRIFICE	25~JUN-04	31	
3007	TERMINAL SACRIFICE	25-JUN-04	31	
3008	TERMINAL SACRIFICE	25-JUN-04	31	
3009	TERMINAL SACRIFICE	25-JUN-04	31	
3010	TERMINAL SACRIFICE	25~JUN-04	31	
3011	TERMINAL SACRIFICE	25-JUN-04	31	
3012	TERMINAL SACRIFICE	25~JUN-04	31	

#### APPENDIX A

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY DAY	
4001	TERMINAL SACRIFICE	25-JUN-04	31	
4002	TERMINAL SACRIFICE	25-JUN-04	31	
4003	TERMINAL SACRIFICE	25-JUN-04	31	
4004	TERMINAL SACRIFICE	25-JUN-04	31	
4005	TERMINAL SACRIFICE	25-JUN-04	31	
4006	TERMINAL SACRIFICE	25-JUN-04	31	
4007	TERMINAL SACRIFICE	25-JUN-04	31	
4008	TERMINAL SACRIFICE	25-JUN-04	31	
4009	TERMINAL SACRIFICE	25-JUN-04	31	
4010	TERMINAL SACRIFICE	25-JUN-04	31	
4011	TERMINAL SACRIFICE	25-JUN-04	31	
4012	TERMINAL SACRIFICE	25-JUN-04	31	

#### APPENDIX A

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL ANIMAL TERMINATION HISTORY

ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY DAY	PREGNANCY STATUS
1501	TERMINAL SACRIFICE	8-JUL-04	44	p
1502	TERMINAL SACRIFICE	5-JUL-04	41	P
1503	TERMINAL SACRIFICE	6-JUL-04	42	P
1504	TERMINAL SACRIFICE	16-JUL-04	52	NP
1505	TERMINAL SACRIFICE	7-JUL-04	43	P
1506	TERMINAL SACRIFICE	7-JUL-04	43	P
1507	TERMINAL SACRIFICE	5-JUL-04	41	₽
1508	TERMINAL SACRIFICE	8-JUL-04	44	P
1509	TERMINAL SACRIFICE	8-JUL-04	44	P
1510	TERMINAL SACRIFICE	6-JUL-04	42	P
1511	TERMINAL SACRIFICE	8-JUL-04	44	P
1512	TERMINAL SACRIFICE	8-JUL-04	44	P

#### APPENDIX A

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL ANIMAL TERMINATION HISTORY

FEMALES GI	ROUP 2	: 30	MG/	'M3
------------	--------	------	-----	-----

	TYPE OF	DATE OF	STUDY	PREGNANCY
ANIMAL#	DEATH	DEATH	DAY	STATUS
2501	TERMINAL SACRIFICE	6-JUL-04	42	P
2502	TERMINAL SACRIFICE	7-JUL-04	43	p
2503	TERMINAL SACRIFICE	6-JUL-04	42	P
2504	TERMINAL SACRIFICE	8-JUL-04	44	P
2505	TERMINAL SACRIFICE	8-JUL-04	44	P
2506	TERMINAL SACRIFICE	7-JUL-04	43	P
2507	TERMINAL SACRIFICE	8-JUL-04	44	P
2508	TERMINAL SACRIFICE	5-JUL-04	41	P
2509	TERMINAL SACRIFICE	6-JUL-04	42	P
2510	TERMINAL SACRIFICE	6-JUL-04	42	P
2511	TERMINAL SACRIFICE	8-JUL-04	44	P
2512	TERMINAL SACRIFICE	6-JUL-04	42	P

#### APPENDIX A

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL ANIMAL TERMINATION HISTORY

ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY DAY	PREGNANCY STATUS
3501	TERMINAL SACRIFICE	8-JUL-04	44	P
3502	TERMINAL SACRIFICE	7-JUL-04	43	P
3503	TERMINAL SACRIFICE	9-JUL-04	45	P
3504	TERMINAL SACRIFICE	5-JUL-04	41	P
3505	TERMINAL SACRIFICE	6-JUL-04	42	P
3506	TERMINAL SACRIFICE	8-JUL-04	44	P
3507	TERMINAL SACRIFICE	8-JUL-04	44	P
3508	TERMINAL SACRIFICE	5-JUL-04	41	P
3509	TERMINAL SACRIFICE	5-JUL-04	41	P
3510	TERMINAL SACRIFICE	8-JUL-04	44	P
3511	TERMINAL SACRIFICE	8-JUL-04	44	P
3512	TERMINAL SACRIFICE	6-JUL-04	42	P

### APPENDIX A

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL ANIMAL TERMINATION HISTORY

FEMALES GRO	UP 4 300 MG/M3			MINATION HISTOR	-
ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY DAY	PREGNANCY STATUS	
4501	TERMINAL SACRIFICE	11-JUL-04	47	P	
4502	TERMINAL SACRIFICE	6-JUL-04	42	P	
4503	TERMINAL SACRIFICE	7-JUL-04	43	NP	
4504	TERMINAL SACRIFICE	7-JUL-04	43	P	
4505	TERMINAL SACRIFICE	6-JUL-04	42	P	
4506	TERMINAL SACRIFICE	6-JUL-04	42	P	
4507	TERMINAL SACRIFICE	5-JUL-04	41	₽	
4508	TERMINAL SACRIFICE	7-JUL-04	43	P	
4509	TERMINAL SACRIFICE	16-JUL-04	52	NP	
4510	TERMINAL SACRIFICE	7-JUL-04	43	NP	
4511	TERMINAL SACRIFICE	7~JUL-04	43	P	
4512	TERMINAL SACRIFICE	6-JUL-04	42	P	

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Individual Weekly Clinical Observations	
Preface	Appendix B

Due to computer limitations, if an animal was sacrificed in between two given intervals (Study Day 36 and 43), its day of death (Study Day 40) is presented on the interval prior (Study Day 36).

#### APPENDIX B

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES (	GROUP 1 0 MG/M3		CLINICAL OBSERVATIONS
ANIMAL#	OBSERVATIONS	DAY OF STUDY	- 1223 7085291
1001	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P
1002	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		р р р р р р . · · · · · · · · · · · · ·
1003	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		рррррр
1004	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		рррррр
1005	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P
1006	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P
1007	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P
1008	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P
1009	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P
1010	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P

#### APPENDIX B

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

MALES (	EROUP 1 0 MG/M3	INDIVIDUAL WEEKLY C	LINICAL OBSERVATIONS
ANIMAL#	OBSERVATIONS	DAY OF STUDY	- 1223 7085291
1011	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P
1012	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P P

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

LES .	GROUP 2 30 MG/M3		Y CLINICAL OBSERVATIONS	
NIMAL#	OBSERVATIONS	DAY OF STUDY	- 1223 7085291	
2001	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		PPPPP P	
2002	WITHIN NORMAL LIMITS TERMINAL SACRIFICE CHROMODACRYORRHEA - UNILATERAL		P P P P P P P P	
2003	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK) FACIAL		P P P P P P 1 1	
2004	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P	
2005	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P	
2006	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P	
2007	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK) FACIAL CHROMODACRYORRHEA - UNILATERAL		P P P	
2008	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P	

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES (	GROUP 2 30 MG/M3	TABLUTDOAL WEEL		
ANIMAL#	OBSERVATIONS	DAY OF STUDY	- 1223 7085291	
2009	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK) FACIAL		P P P P P 1 1 1	
2010	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK) FACIAL		P P P P 1 1 1 .	
2011	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P P P P P P	
2012	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		ррррр . Р	

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

#LAMI	OBSERVATIONS		- 1 2 2 3 7 0 8 5 2 9 1	
3001	WITHIN NORMAL LIMITS			
	TERMINAL SACRIFICE		P P	
	TEST MATERIAL ON FUR (BLACK		1	
	DORSAL CERVICAL		-	
	TEST MATERIAL ON FUR (BLACK	:)	1 1 1	
	FACIAL			
3002	WITHIN NORMAL LIMITS		РР	
	TERMINAL SACRIFICE		P .	
	TEST MATERIAL ON FUR (BLACK	:)	2 2 2 2	
	FACIAL			
3003	WITHIN NORMAL LIMITS		рр	
	TERMINAL SACRIFICE		r r P	
	TEST MATERIAL ON FUR (BLACK	)	1 2 2 2	
	FACIAL			
	TEST MATERIAL ON FUR (BLACK	)	2 2 2	
	DORSAL CERVICAL			
3004	WITHIN NORMAL LIMITS		P P	
	TERMINAL SACRIFICE		p	
	TEST MATERIAL ON FUR (BLACK	)	1 2 2 2	
	FACIAL			
3005	WITHIN NORMAL LIMITS		рр	
	TERMINAL SACRIFICE		P	
	TEST MATERIAL ON FUR (BLACK	)	1 2 2 2	
	FACIAL			
	TEST MATERIAL ON FUR (BLACK	)	1	
	DORSAL CERVICAL CHROMODACRYORRHEA - UNILATE		P	

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

ALES (	GROUP 3 100 MG/M3	INDIAIDOUT MEEKDA	
			- 1223
ANIMAL#	OBSERVATIONS	STUDY	7 0 8 5 2 9 1
3006	WITHIN NORMAL LIMITS		РР
	TERMINAL SACRIFICE		P
	TEST MATERIAL ON FUR (BLACK)		1 1 1 1
	FACIAL		
3007	WITHIN NORMAL LIMITS		р р
	TERMINAL SACRIFICE		P
	TEST MATERIAL ON FUR (BLACK)		1 1 1 2
	FACIAL		
	TEST MATERIAL ON FUR (BLACK)		1 1 1 2
	DORSAL CERVICAL		
3008	WITHIN NORMAL LIMITS		P P
	TERMINAL SACRIFICE		P
	TEST MATERIAL ON FUR (BLACK)		1
	FACIAL		
	TEST MATERIAL ON FUR (BLACK)		2 2 2
	DORSAL CERVICAL		
	CHROMODACRYORRHEA - UNILATERAL		P
3009	WITHIN NORMAL LIMITS		р р
	TERMINAL SACRIFICE		P
	TEST MATERIAL ON FUR (BLACK)		1
	DORSAL CERVICAL		
	TEST MATERIAL ON FUR (BLACK)		1 1 2
	FACIAL		_
	CHROMODACRYORRHEA - UNILATERAL		P
3010	WITHIN NORMAL LIMITS		P P
	TERMINAL SACRIFICE		P
	TEST MATERIAL ON FUR (BLACK)		1 2 2 2
	FACIAL		

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

			DAY OF	- 1223	
NIMAL#	OBSERVATIONS		STUDY	7 0 8 5 2 9 1	 
3011	WITHIN NORMAL LIMITS			РР	
3011	TERMINAL SACRIFICE			r r P	
	TEST MATERIAL ON FUR	(BLACK)		1111	
	FACIAL	. ,			
	TEST MATERIAL ON FUR	(BLACK)		2 2 2 3	
	DORSAL CERVICAL				
3012	WITHIN NORMAL LIMITS			рр	
	TERMINAL SACRIFICE			P	
	TEST MATERIAL ON FUR	(BLACK)		3 3 3 3	
	DORSAL CERVICAL				

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

Males (	GROUP 4 300 MG/M3	TIDIVIDORI MBBIDI	CLINICAL OBSERVATIONS
ANIMAL#	OBSERVATIONS		- 1 2 2 3 7 0 8 5 2 9 1
4001	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (B FACIAL	LACK)	P P P 2 2 2 2
4002	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (B FACIAL	LACK)	P P P 2 2 2 3
4003	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (B FACIAL	LACK)	P P P P 2 2 2 2
4004	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (B: FACIAL	LACK)	р р 3 3 3 3
4005	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (B. FACIAL	LACK)	P P P P 2 2 2 2
4006	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (B: FACIAL	LACK)	P P P P 2 2 2 3

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES (	GROUP 4 300 MG/M3	INDIVIDUAL WEEKL	Y CLINICAL OBSERVATIONS
ANIMAL#	OBSERVATIONS	DAY OF STUDY	- 1223 7085291
4007	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK FACIAL	)	P P P 2 3 3 2
4008	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK FACIAL)	)	P P P 3 3 3 3 7
4009	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK FACIAL	)	P P P 2 3 3 3
4010	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK FACIAL	)	P P P 2 2 3 2
4011	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK FACIAL	)	P P P 2 2 3 3
4012	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK FACIAL		P P P 2 2 2 2
	TEST MATERIAL ON FUR (BLACK DORSAL	)	2

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

'EMALES (	GROUP 1 0 MG/M3	 Y CLINICAL OBSERVATIONS
ANIMAL#	OBSERVATIONS	- 1 2 2 3 3 4 5 5 7 0 8 5 2 9 1 6 3 0 2
1501	WITHIN NORMAL LIMITS	PPPP
. 1502	WITHIN NORMAL LIMITS	РРРР
1503	WITHIN NORMAL LIMITS	рррр
1504	WITHIN NORMAL LIMITS TERMINAL SACRIFICE	
1505	WITHIN NORMAL LIMITS CHROMODACRYORRHEA - UNILATERAL	р р р р
1506	WITHIN NORMAL LIMITS	рррр
1507	WITHIN NORMAL LIMITS CHROMODACRYORRHEA - BILATERAL	P P P
1508	WITHIN NORMAL LIMITS	рррр
1509	WITHIN NORMAL LIMITS	рррр
1510	WITHIN NORMAL LIMITS	рррр
1511	WITHIN NORMAL LIMITS	рррр
1512	WITHIN NORMAL LIMITS	PPPP

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

TEMALES	GROUP 2 30 MG/M3	TUDIVIDOND MERK	Y CLINICAL OBSERVATIONS	
ANIMAL#	OBSERVATIONS	STUDY	- 12233455 70852916302	
2501	WITHIN NORMAL LIMITS		рррр	
2502	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P P 1 1	
2503	WITHIN NORMAL LIMITS		рррр	
2504	WITHIN NORMAL LIMITS		рррр	
2505	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		p p p 1	
2506	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P P P 1	
2507	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P P P 1	
2508	WITHIN NORMAL LIMITS		<b>РР</b> Р	
2509	WITHIN NORMAL LIMITS		рррр	
2510	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P P 1 1	
	CHROMODACRYORRHEA - BILATERA	ն	P	

#### APPENDIX B

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

FEMALES (	GROUP 2 30 MG/M3	INDIVIDUAL WEEKLY	CLINICAL OBSERVATIONS	
ANIMAL#	OBSERVATIONS	DAY OF STUDY	- 1 2 2 3 3 4 5 5 7 0 8 5 2 9 1 6 3 0 2	
2511	WITHIN NORMAL LIMITS		рррр	
2512	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P P P 1	
CODE: 1-SI	LIGHT 2-MODERATE 3-MARKED P-PRESE			

### APPENDIX B

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

<b></b>			
ANIMAL#	OBSERVATIONS	DAY OF STUDY	- 12233455 70852916302
3501	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK DORSAL CERVICAL	)	P P 3 1
3502	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK DORSAL CERVICAL	)	P P 1 1
3503	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK DORSAL CERVICAL	,	P P 2 2
3504	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK FACIAL		P P 1
3505	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK FACIAL TEST MATERIAL ON FUR (BLACK DORSAL CERVICAL		P P P P P P P 1 1 1 1 1 1 1 1 1 1 1 1 1
3506	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK FACIAL		P P 1 1
3507	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK FACIAL		P P 1 1

#### APPENDIX B

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

ANIMAL#	OBSERVATIONS	DAY OF STUDY	- 12233455 70852916302	
3508	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P P 1 1	
3509	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) DORSAL CERVICAL		P P 1	
3510	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P P 1 1	
3511	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) DORSAL CERVICAL		P P 2 2	
3512	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P P 1 1	

#### APPENDIX B

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

ANIMAL#	OBSERVATIONS	DAY OF STUDY	- 1 2 2 3 3 4 5 5 7 0 8 5 2 9 1 6 3 0 2	
4501	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR		P P 1 2	
	FACIAL		•	
4502	WITHIN NORMAL LIMITS		P P	
	TEST MATERIAL ON FUR FACIAL	(BLACK)	2 2	
				ç
4503	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR	(Br.ACK)	P P 2	
	FACIAL	(BBROK)	2	
4504	WITHIN NORMAL LIMITS		РР	
	TEST MATERIAL ON FUR FACIAL	(BLACK)	3 3	
4505	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR		PP	
	FACIAL	(BLACK)	1 3	
4506	WITHIN NORMAL LIMITS		рр	
	TEST MATERIAL ON FUR	(BLACK)	2 2	
	FACIAL			
4507	WITHIN NORMAL LIMITS		P P	
	TEST MATERIAL ON FUR	(BLACK)	1	
	FACIAL			
4508	WITHIN NORMAL LIMITS		P P	
	TEST MATERIAL ON FUR FACIAL	(BLACK)	1 2	
	CHROMODACRYORRHEA - E	BILATERAL	P P	

#### APPENDIX B

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

			DAY OF	- 12233455	
NIMAL#	OBSERVATIONS		STUDY	7 0 8 5 2 9 1 6 3 0 2	
4509	WITHIN NORMAL LIMITS			P P	
	TERMINAL SACRIFICE			p	
	TEST MATERIAL ON FUR	(BLACK)		2 2 2 3 3 3 3	
	FACIAL				
	TEST MATERIAL ON FUR	(BLACK)		1	
	ON BOTH EARS				
4510	WITHIN NORMAL LIMITS			РР	
	TEST MATERIAL ON FUR	(BLACK)		2 2	
	FACIAL				
4511	WITHIN NORMAL LIMITS			РР	
	TEST MATERIAL ON FUR	(BLACK)		2 3	
	FACIAL				
4512	WITHIN NORMAL LIMITS	•		рр	
	TEST MATERIAL ON FUR			1 1	
	FACIAL			~ ~	

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For summarization purposes, descriptive comments [i.e., location of stains(s), etc.] are not presented in this appendix. These data are contained in the study raw data if needed.

### APPENDIX C

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL CLINICAL OBSERVATIONS DURING GESTATION

FEMALE#	OBSERVATIONS	DAY OF GESTATION	0 1 2 3	1 4 5 6 7 8 9 0	1 1 1 1 1 1 1 2 3 4 5 6	1 1 1 2 7 8 9 0	
3501			1	Р	p	1	
3502	TEST MATERIAL ON FUR (BLACK) WITHIN NORMAL LIMITS		P	₽	P	ı	
3503	TEST MATERIAL ON FUR (BLACK) WITHIN NORMAL LIMITS		1	P	P	1	
3504	WITHIN NORMAL LIMITS		P	Р	P	P	
3506	TEST MATERIAL ON FUR (BLACK) WITHIN NORMAL LIMITS		1	P	P	1	
3507	TEST MATERIAL ON FUR (BLACK) WITHIN NORMAL LIMITS		₽	P	P	1	
3508	WITHIN NORMAL LIMITS		P	P	P	P	
3509	ALOPECIA - EXTREMITIES/SNOUT WITHIN NORMAL LIMITS		Р	P	2	2	
3510	TEST MATERIAL ON FUR (BLACK) WITHIN NORMAL LIMITS		P	P	Р	1	
3511	TEST MATERIAL ON FUR (BLACK) WITHIN NORMAL LIMITS		1	P	p	1	
3512	TEST MATERIAL ON FUR (BLACK) WITHIN NORMAL LIMITS		P	P	P	1	

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#### APPENDIX C

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL CLINICAL OBSERVATIONS DURING GESTATION

					<b></b>			
remale#	OBSERVATIONS	I (	DAY OF GESTATION	0 1 2 3 4	5 6 7 8	1 1 1 1 9 0 1 2 3	1 1 1 1 1 1 1 4 5 6 7 8	1 2 9 0
4501	TEST MATERIAL ON FUR WITHIN NORMAL LIMITS			p	1		1	1
4502	TEST MATERIAL ON FUR	(BLACK)	:	1	1		1	1
4503	TEST MATERIAL ON FUR	(BLACK)	:	ı	1		1	1
4504	TEST MATERIAL ON FUR	(BLACK)	:	1	1		1	1
4505	TEST MATERIAL ON FUR	(BLACK)	:	1	1		1	1
4506	TEST MATERIAL ON FUR WITHIN NORMAL LIMITS	• • • • • • • • • • • • • • • • • • • •	1	₽	1		1	1
4507	TEST MATERIAL ON FUR	(BLACK)	:	ı	1		1.	1
4508	TEST MATERIAL ON FUR	(BLACK)	:	1	1		.1	1
4510	TEST MATERIAL ON FUR WITHIN NORMAL LIMITS	(BLACK)	1	•	1		1	1
4511	TEST MATERIAL ON FUR	(BLACK)	<u>:</u>	L	1		1	1
4512	TEST MATERIAL ON FUR WITHIN NORMAL LIMITS	(BLACK)	•	?	P		P	1

 <u>-</u>	
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For summarization purposes, descriptive comments [i.e., location of stains(s), etc.] are not presented in this appendix. These data are contained in the study raw data if needed.

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### APPENDIX D

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL MATERNAL CLINICAL OBSERVATIONS DURING LACTATION

GROUP 1 0 MG/M3

						_
FEMALE#	OBSERVATIONS	DAY OF LACTATION	0	123	4	
						_
1501	WITHIN NORMAL LIMITS		P	₽	P	
	TERMINAL SACRIFICE				P	
1502	WITHIN NORMAL LIMITS			PР	P	
	TERMINAL SACRIFICE				P	
1503	WITHIN NORMAL LIMITS		P	P	P	
	TERMINAL SACRIFICE				P	
1505	WITHIN NORMAL LIMITS		P	P	P	
	TERMINAL SACRIFICE				P	
1506	WITHIN NORMAL LIMITS		p i	P	P	
	TERMINAL SACRIFICE				P	
1507	TERMINAL SACRIFICE				p	
	ALOPECIA - EXTREMITIES/SNOUT		3 3	3	3	
1508	WITHIN NORMAL LIMITS		PI	P	P	
	TERMINAL SACRIFICE				P	
1509	WITHIN NORMAL LIMITS		P	•		
	TERMINAL SACRIFICE				P	
	ALOPECIA - EXTREMITIES/SNOUT				2	
1510	WITHIN NORMAL LIMITS		P	P	P	
	TERMINAL SACRIFICE				P	
1511	WITHIN NORMAL LIMITS		P 1		P	
	TERMINAL SACRIFICE				P	

#### APPENDIX D

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL MATERNAL CLINICAL OBSERVATIONS DURING LACTATION

GROUP 1	0 MG/M3			 
FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3 4	
1512	WITHIN NORMAL LIMITS TERMINAL SACRIFICE ALOPECIA - EXTREMITIES/SNOUT		P P	
2000 1 07	ALOFECIA - EXIREMITIES/SNOUT			 

### APPENDIX D

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL MATERNAL CLINICAL OBSERVATIONS DURING LACTATION

		DAY OF			
FEMALE#	OBSERVATIONS	LACTATION	0	1 2 3	4
2501	WITHIN NORMAL LIMITS		P	P	P
	TERMINAL SACRIFICE				P
2502	WITHIN NORMAL LIMITS		₽	P	p
	TERMINAL SACRIFICE				p
2503	WITHIN NORMAL LIMITS			P	P
	TERMINAL SACRIFICE RED/BROWN STAINS - AG AREA		1		P
2504	WT. W. W. W. W. W. W. W. W. W. W. W. W. W.				•
2504	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		₽	P	P P
2505	MITHURA MODALY A YAYATO		_		
2505	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	₽	p p
2506	WITHIN NORMAL LIMITS		_		
2500	TERMINAL SACRIFICE		P	P	P P
2507	WITHIN NORMAL LIMITS		ъ	P	p
2207	TERMINAL SACRIFICE		F	r	P
2508	WITHIN NORMAL LIMITS		P	P	p
	TERMINAL SACRIFICE		-	-	p p
2509	WITHIN NORMAL LIMITS		P	P	Р .
	TERMINAL SACRIFICE				p
2510	WITHIN NORMAL LIMITS			P	P
	TERMINAL SACRIFICE RED/BROWN STAINS - AG AREA		1		P
	, Olillio 110 Fillin		+		

#### APPENDIX D

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL MATERNAL CLINICAL OBSERVATIONS DURING LACTATION

GROUP	2	30	MG/M3
-------	---	----	-------

FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2	3 4	
2511	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P	P P	
2512	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		рр	P P	

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL MATERNAL CLINICAL OBSERVATIONS DURING LACTATION

EMALE#	OBSERVATIONS	DAY OF LACTATION	0 1	2 3 4	
3501	WITHIN NORMAL LIMITS		P P	 P	
	TERMINAL SACRIFICE			P	
3502	WITHIN NORMAL LIMITS		РР	P	
	TERMINAL SACRIFICE			P	
3503	WITHIN NORMAL LIMITS		P	P	
	TERMINAL SACRIFICE			P	
	TEST MATERIAL ON FUR (BLACK)		1	-	
3504	WITHIN NORMAL LIMITS		PP	P	
	TERMINAL SACRIFICE			P	
3505	WITHIN NORMAL LIMITS		РР	P	
	TERMINAL SACRIFICE			P	
3506	WITHIN NORMAL LIMITS		рр	р	
	TERMINAL SACRIFICE			P	
3507	WITHIN NORMAL LIMITS		р	P	
	TERMINAL SACRIFICE			P	
	TEST MATERIAL ON FUR (BLACK)		1	_	
3508	WITHIN NORMAL LIMITS		P	P	
	TERMINAL SACRIFICE			P	
3509	TERMINAL SACRIFICE			P	
	ALOPECIA - EXTREMITIES/SNOUT		3 3	3	
	RED/BROWN STAINS - AG AREA		2	Ŭ	
	ALOPECIA - GENERAL		_ 2	2	

CODE: 1-SLIGHT 2-MODERATE 3-MARKED P-PRESENT

#### APPENDIX D

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL MATERNAL CLINICAL OBSERVATIONS DURING LACTATION

GROUP 3 100 MG/
-----------------

FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2	3 4	
3510	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P P	P P	
3511	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		РР	P P	
3512	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		РР	P P	

CODE: 1-SLIGHT 2-MODERATE 3-MARKED P-PRESENT

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL MATERNAL CLINICAL OBSERVATIONS DURING LACTATION

GROUP 4	300 MG/	M2

		DAY OF			
FEMALE#	OBSERVATIONS	LACTATION	0 1 2 3	3 4	
4501	WITHIN NORMAL LIMITS		p	P	
	TERMINAL SACRIFICE		F	P	
	RED/BROWN STAINS - AG AREA		1	-	
4502	WITHIN NORMAL LIMITS		P P	P	
	TERMINAL SACRIFICE			P	
4505	WITHIN NORMAL LIMITS		P P	P	
	TERMINAL SACRIFICE			P	
4506	WITHIN NORMAL LIMITS		PP	P	
	TERMINAL SACRIFICE			P	
4507	WITHIN NORMAL LIMITS		P	P	
	TERMINAL SACRIFICE			P	
4508	WITHIN NORMAL LIMITS		PΡ	P	
	TERMINAL SACRIFICE			P	
4511	WITHIN NORMAL LIMITS		PР	P	
	TERMINAL SACRIFICE			P	
4512	WITHIN NORMAL LIMITS		РР	P	
	TERMINAL SACRIFICE			P	

CODE: 1-SLIGHT 2-MODERATE 3-MARKED P-PRESENT

APPENDIX E

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY	OF ST	YOUT				
ANIMAL#	-7	0	7	14	21	28	31
1001	195	255	289	319	341	369	382
1002	196	265	302	324	351	367	383
1003	194	263	299	324	343	366	379
1004	205	277	315	353	376	395	408
1005	201	274	316	348	371	405	406
1006	199	264	301	338	371	397	396
1007	183	241	264	295	312	340	348
1008	187	239	268	291	313	346	356
1009	200	268	303	332	360	387	398
1010	193	265	293	327	356	385	399
1011	196	262	291	320	347	375	382
. 1012	189	246	274	291	309	335	335
MEAN	195	260	293	322	346	372	381
S.D.	6.4	12.2	16.9	20.6	23.5	22.9	23.3
N	12	12	12	12	12	12	12

### APPENDIX E

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

MALES	GROUP 2	30	MG/M3						
		DAY	OF ST	JDY					
ANIMAL#		-7	0	7	14	21	28	31	
2001		198	263	294	317	345	374	378	
2002	*	196	253	285	309	330	357	364	
2003		197	257	289	322	348	373	378	
2004		204	280	319	361	398	430	442	
2005		187	238	249	268	288	316	326	
2006		200	265	294	322	349	369	377	
2007		196	259	292	324	349	388	389	
2008		186	246	277	300	328	357	368	
2009		203	264	296	325	361	398	415	
2010		194	259	292	321	349	363	373	
2011		194	263	300	336	363	392	398	
2012		189	248	284	306	331	359	366	
MEAN		195	258	289	317	345	373	381	
S.D.		5.7	10.8	16.3	22.1	26.1	27.8	28.8	
N		12	12	12	12	12	12	12	

APPENDIX E

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

MALES	GROUP 3	100	MG/M3					
		DAY	OF ST	UDY				
ANIMAL#		-7	0	7	14	21	28	31
3001		185	245	273	299	323	339	351
3002		203	272	307	354	387	422	429
3003		196	255	282	300	315	341	344
3004		205	268	317	361	394	433	446
3005		197	261	292	324	352	383	388
3006		188	251	268	298	326	345	356
3007		195	256	295	326	348	368	377
3008		190	253	282	303	329	361	374
3009		194	251	284	309	339	363	370
3010		200	260	301	334	358	391	398
3011		192	259	286	308	333	356	368
3012		196	256	292	309	332	356	361
MEAN		195	257	290	319	345	371	380
s.D.		5.9	7.4	14.0	21.5	24.8	30.5	31.0
N		12	12	12	12	12	12	12

APPENDIX E

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

MALES	GROUP 4	300	MG/M3				TNDIVID	OAL BOD	i waldhia (GRANA)
		DAY	OF ST						
ANIMAL#		-7	0	7	14	21	28	31	
4001		204	270	312	350	373	400	424	
4002		200	272	297	343	380	408	425	
4003		197	262	297	328	352	376	399	
4004		183	235	260	272	289	312	323	
4005		195	261	285	313	345	375	390	
4006		201	269	307	335	360	383	396	
4007		196	257	284	302	324	337	342	
4008		191	252	285	312	340	371	383	
4009		192	251	262	279	281	305	306	
4010		195	257	300	333	367	394	404	
4011		188	240	257	281	302	323	320	
4012		197	263	286	313	341	369	376	
MEAN		195	257	286	313	338	363	374	
S.D.		5.8	11.5	18.2	25.9	32.5	35.0	41.0	
N		12	12	12	12	12	12	12	

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PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL BODY WEIGHTS (GRAMS) FEMALES GROUP 1 0 MG/M3 DAY OF STUDY ANIMAL# -7 0 14 21 28 35 42 49 52 271 278 MEAN S.D. 5.5 6.8 9.5 9.3 0.0 0.0 0.0 0.0 0.0 N

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# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY	OF ST	UDY									
ANIMAL#	-7	0	7	14	21	28	35	42	49	52		
2501	178	223	231	248						• • • • • • • • • • • • • • • • • • • •	 	 ·
2502	171	213	223	231								
2503	177	207	217	236								
2504	175	212	229	235								
2505	178	216	232	234								
2506	185	232	250	270								
2507	183	230	245	249								
2508	180	215	223	241								
2509	171	208	217	231								
2510	189	220	243	252								
2511	174	204	221	238								
2512	183	229	244	270								
EAN	179	217	231	245				٠,				
.D.	5.6	9.5	11.5	13.6								
N	12	12	12	12								

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PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

FEMALES GRO	OUP 3 100	MG/M3			3	MDIVIDU	AL BODY W	EIGHTS	(GRAMS)			
	DAY	OF ST	עסטי								 	
ANIMAL#	-7	0	7	14	21	28	35	42	49	52		
3501	173	208	217	220							 ·	
3502	184	221	247	263								
3503	176	205	232	238								
3504	180	213	219	243								
3505	189	232	260	271	289	327	380					
3506	178	219	245	260			500					
3507	166	208	216	226								
3508	178	215	238	255								
3509	182	211	225	240								
3510	174	207	219	236								
3511	177	217	223	236								
3512	185	216	221	242								
MEAN	179	214	230	244	289	327	380					
S.D.	6.1	7.5	14.3	15.3	0.0	0.0	0.0					
N	12	12	12	12	1	1	1					

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PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL BODY WEIGHTS (GRAMS) FEMALES GROUP 4 300 MG/M3 DAY OF STUDY ANIMAL# -7 0 7 14 21 28 35 42 49 52 ------239 264 MEAN Ş.D. 5.4 9.1 9.5 8.4 0.0 0.0 0.0 0.0 0.0 0.0 N

APPENDIX F

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY	0.5	F STUD	v				
ANIMAL#			0-7		14-21	21-28	20 21	0-31
	,			, - <u>1</u> - 4	14-21	21-20	20-31	0-31
1001	60		34	31	21	29	13	127
1002	69		37	22	28	15	17	118
1003	69		36	26	19	23	14	116
1004	72		38	38	23	20	13	132
1005	73		42	32	23	35	1	132
1006	65		37	37	34	26	-1	131
1007	59		23	31	17	28	8	107
1008	52		29	23	22	33	10	117
1009	68		35	29	27	27	11	130
1010	72		28	34	29	29	14	134
1011	67		28	30	27	28	8	120
1012	57		28	18	18	26	0	89
MEAN	65		33	29	24	27	9	121
S.D.	6.6		5.5	6.1	4.9	5.4	6.1	13.0
N	12		12	12	12	12	12	12

#### APPENDIX F

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY	OF STU	J	IDΥ	YCT	ΣΩΥ	YCT
IMAL#	-7-0	0-7	7	7-14	7-14 14-21	7-14 14-21 21-28	7-14 14-21 21-28 28-31
2001	64	31	2	3	3 28	3 28 29	3 28 29 5
2002	57	33	24		21	21 27	21 27 7
2003	60	32	33		26	26 25	26 25 6
2004	77	39	42		37	37 31	37 31 13
2005	51	10	19		20	20 28	20 28 10
2006	66	28	28		28	28 20	28 20 8
2007	63	33	32	25	5	5 39	5 39 1
2008	60	31	23	28	3	3 29	3 29 11
2009	61	33	28	37		37	
2010	65	33	29	28		14	14 10
2011	69	37	36	27		28	
2012	60	35	22	25			
N	63	31	28	28		28	28 8
	6.3	7.1	6.7	5.1		6.6	
-	12	12	12	12		12	

APPENDIX F

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

MALES	GROUP 3	10	0 MG/M3						
		DAY	OF STU	Σ					
ANIMAL#		-7-0	0-7	7-14	14-21	21-28	28-31	0-31	
3001		60	28	27	24	16	12	106	
3002		69	36	47	33	35	7	158	
3003		59	28	17	16	25	3	89	
3004		63	49	44	33	39	12	178	
3005		64	31	31	29	31	5	127	
3006		63	17	30	28	19	11	105	
3007		61	39	31	22	20	9	121	•
3008		63	29	21	26	33	13	121	
3009		57	33	25	30	24	7	119	
3010		60	41	33	24	32	7	138	
3011		67	27	22	26	23	12	109	
3012		60	36	17	24	24	5	105	
MEAN		62	33	29	26	27	9	123	
S.D.		3.5	8.2	9.4	4.8	7.2	3.3	24.8	
N		12	12	12	12	12	12	12	

APPENDIX F

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY	OF STU	DY				
HLAMII	-7-0	0-7	7-14	14-21	21	-28	-28 28-31
4001	66	42	38	23		27	27 23
4002	72	25	46	37	- 2	8	
4003	65	35	32	24	24		22
4004	52	25	12	18	22	2	
4005	66	24	28	33	30		
4006	69	37	28	25	24		13
4007	61	27	17	22	13	ţ	3 5
4008	60	34	27	28	32		
4009	59	11	17	2	24		
4010	62	43	33	34	27		10
4011	52	17	24	21	21		
4012	67	22	28	28	28		
N	63	29	27	24	25		11
٠.	6.1	9.8	9.5	9.1	5.0		7.9
Ī	12	12	12	12	12		12

#### APPENDIX F

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY	OF STU	DY							
ANIMAL#	-7-0	0-7	7-14	14-21	21-28	28-35	35-42	42-49	49-52	0-14
1501	34	11	15			· <b></b>				26
1502	32	-7	24							17
1503	27	9	1							10
1504	32	10	2	32	12	-4	7	16	-4	12
1505	44	4	14							18
1506	35	9	8							18
1507	34	20	19							38
1508	38	11	11							22
1509	29	13	9							22
1510	32	14	24							39
1511	36	14	10							24
1512	52	10	13							23
MEAN	36	10	12	32	12	-4	7	16	-4	22
S.D.	6.7	6.5	7.4	0.0	0.0	0.0	0.0	0.0	0.0	8.9
N	12	12	12	1	1	1	1	1	1	12

APPENDIX F

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

FEMALES	GROUP 2 30	MG/M3		 	 	<b></b> -			
	DAY	OF STU	IDY						
ANIMAL#	~7-0						49-52		
	46	8	17	 	 			25	
2502	42	11	8					19	
2503	30	10	19					29	
2504	37	18	6					24	
2505	38	15	3					18	
2506	47	18	20					38	
2507	46	15	4					19	
2508	35	9	17					26	
2509	38	9	13					23	
2510	32	23	9					32	
2511	30	17	17					34	
2512	46	14	26					40	
MEAN	39	14	13					27	
S.D.	6.4	4.7	7.1					7.5	
. N	12	12	12					12	

APPENDIX F

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

		OF STU								
ANIMAL#	-7-0 							49-52	0-14	
3501	36	9	3				 		12	
3502	37	26	16						42	
3503	29	28	5						33	
3504	33	6	24						30	
3505	43	28	11	17	38	53			39	
3506	41	26	15						42	
3507	42	8	10						18	
3508	36	23	18						41	
3509	29	. 14	15						30	
3510	33	11	17						28	
3511	40	6	13						18	
3512	31	5	20						26	
MEAN	36	16	14	17	38	53			30	
S.D.	4.9	9.6	5.9	0.0	0.0	0.0			10.0	
N	12	12	12	1	1	1			12	

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

APPENDIX F

	DAY	OF STU	DY								
ANIMAL#	-7-0	0-7	7-14	14-21	21-28	28-35	35-42	42-49	49-52	0-14	
4501	31	16	9							24	
4502	44	15	9							24	
4503	38	27	4							32	
4504	37	20	7							27	
4505	37	11	9							19	
4506	48	10	10							20	
4507	32	17	14							31	
4508	40	8	14							21	
4509	43	7	5	25	28	-7	1	7	4	12	
4510	27	16	11							27	
4511	41	14	12							26	
4512	45	11	17							28	
MEAN .	39	14	10	25	28	-7	1	7	4	24	
3.D.	6.1	5.6	3.7	0.0	0.0	0.0	0.0	0.0	0.0	5.4	
N	12	12	12	1	1	7	7	1	7	12	

### APPENDIX G

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

		DAY OF G	ESTATION	
ANIMAL#	0	7	14	20
1501	251	274	310	372
1502	226	257	289	355
1503	226	257	290	354
1504x NP				
1505	237	262	299	380
1506	236	273	302	364
1507	238	274	309	392
1508	237	276	306	381
1509	237	264	300	351
1510	236	253	297	351
1511	239	277	314	395
1512	252	273	300	361
MEAN	238	267	301	369
S.D.	8.2	8.8	7.9	16.2
N	11	11	11	11

NP=NOT PREGNANT x=EXCLUDED FROM MEAN

#### APPENDIX G

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

GROUP 2	30 MG/M3				,
		DAY OF	GESTATION		
#LAMINA	0	7	14	20	
2501	246	281	302	361	
2502	235	268	295	351	
2503	233	263	305	380	
2504	241	282	311	381	
2505	247	281	312	382	
2506	267	306	336	416	
2507	249	280	311	364	
2508	234	274	310	367	
2509	236	258	291	355	
2510	256	285	318	381	
2511	237	284	326	397	
2512	262	292	340	414	
MEAN	245	279	313	379	
S.D.	11.3	12.9	15.0	21.4	
N	12	12	12	12	

APPENDIX G

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

		DAY OF	GESTATION		
ANIMAL#	0	7	14	20	
3501	224	248	271	293	
3502	266	310	355	426	
3503	246	291	327	395	
3504	238	271	303	381	
3506	264	296	337	401	
3507	224	253	287	342	
3508	253	287	312	388	
3509	233	271	310	388	
3510	236	273	303	356	
3511	252	289	330	389	
3512	233	265	306	329	
MEAN	243	277	313	371	
S.D.	14.8	18.8	23.4	37.9	
N	11	11	11	11	

APPENDIX G

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

			DAY OF	GESTATION		
ANIMAL#		0	7	14	20	
4501		242	275	307	371	
4502		249	277	310	403	
4503x	NP	251	292	303	304	
4504		230	267	280	262	
4505		237	272	302	365	
4506		245	279	322	389	
4507		240	274	301	332	
4508		234	273	308	373	
4509x	NP					
4510x	NP	235	271	283	274	
4511		245	274	316	395	
4512		252	290	322	395	
EAN		241	275	308	365	
.D.		7.1	6.4	12.8	44.2	
N		9	9	9	9	

NP=NOT PREGNANT x=EXCLUDED FROM MEAN

### APPENDIX H

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL GESTATION BODY WEIGHT GAIN (GRAMS)

GROUP 1	0 MG/M	3			INDIV	DOAL GESTATION BODI WEIGHT GAIN (GRAMS)
ANIMAL#			OF GESTATI 7 - 14			·
ANIMALH			/ - 14			
1501		23	36	61	121	
1502		32	32	66	129	
1503		31	33	64	128	
1504x	NP					
1505		26	37	81	143	
1506		37	29	63	128	
1507		36	36	82	154	
1508		39	30	75	144	
1509		28	36	51	114	
1510		18	43	54	116	
1511		38	36	82	156	
1512		21	27	61	108	
MEAN		30	34	67	131	
S.D.		7.3	4.6	11.1	16.2	*
N		11	11	11	11	

NP=NOT PREGNANT x=EXCLUDED FROM MEAN

### APPENDIX H

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL GESTATION BODY WEIGHT GAIN (GRAMS)

GROUP 2	30 MG/M3					
ANIMAL#		DAY OF GESTATION 0 - 7 7 - 14 14 - 20 0 - 20				
ANIMAL#		7 - 14		0 - 20		
2501	35	21	59	115		
2502	33	27	57	117		
2503	30	42	76	147		
2504	40	29	70	140		
2505	34	31	70	135		
2506	40	30	81	150		
2507	31	31	53	115		
2508	40	36	57	133		
2509	22	33	64	119		
2510	29	34	63	126		
2511	47	42	72	160		
2512	30	48	74	152		
MEAN	34	34	66	134		
S.D.	6.5	7.4	8.7	15.9		
N	12	12	12	12		

#### APPENDIX H

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL GESTATION BODY WEIGHT GAIN (GRAMS)

GROUP 3	100 MG/M3				·
ANIMAL#		F GESTAT	ION 14 - 20	0 - 20	
3501	24	23	22	69	
3502	43	45	71	160	
3503	46	35	68	150	
3504	33	32	78	1.43	
3506	32	41	64	136	
3507	30	34	55	118	
3508	33	26	75	134	
3509	38	39	78	155	
3510	37	30	53	120	
3511	36	41	59	136	
3512	31	42	23	95	
MEAN	35	35	59	129	
S.D.	6.3	7.1	19.9	27.0	
N	11	11	11	11	

### APPENDIX H

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL GESTATION BODY WEIGHT GAIN (GRAMS)

					OF GESTATION
MAL#		0 - 7	7 -	14	14 14 - 20
4501		33	33		63
4502		28	33		93
4503x	NP	41	10		1
4504		37	13	-18	
4505		35	31	63	
4506		33	43	67	
4507		34	27	32	
4508		39	36	65	
4509x	NP				
4510x	NP	36	12	-8	3
4511		29	42	80	150
4512		38	32	73	143
MAAN		34	32	58	124
S.D.		3.8	8.7	32.8	38.8
N		9	9	9	9

NP=NOT PREGNANT

x=EXCLUDED FROM MEAN

### APPENDIX I

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY OF LACTATION	
Animal No.	1	4
1501	278	307
1502	262	278
1503	268	302
1505	280	304
1506	265	287
1507	294	320
1508	293	313
1509	273	284
1510	275	304
1511	288	300
1512	290	309
MEAN	279	301
S.D.	11.4	12.6
N	11	11

### APPENDIX I

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

DAY OF LACTATION			
Animal No.	1	4	
2501	286	320	·
2502	278	305	
2503	286	309	
2504	308	329	
2505	301	330	
2506	317	345	
2507	286	308	
2508	283	315	
2509	273	288	
2510	278	316	
2511	314	327	
2512	311	336	
MEAN	293	319	
S.D.	15.6	15.6	
N	12	12	

#### APPENDIX I

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY OF LACTATION		
Animal No.	1	4	
3501	250	261	
3502	304	329	
3503	315	329	
3504	289	307	
3505	301	312	
3506	310	331	
3507	260	287	
3508	283	301	
3509	278	309	
3510	282	305	
3511	314	346	
3512	280	295	
MEAN	289	309	
S.D.	20.6	23.0	
N	12	12	

### APPENDIX I

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	DAY OF LACTATION			
Animal No.	1	4		
4501	282	302		
4502	298	323		
4505	290	306		
4506	292	328		
4507	295	307		
4508	285	312		
4511	267	305		
4512	303	326		
MEAN	289	314		
S.D.	11.4	10.5		
N	8	8		

11

#### APPENDIX J

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 1	0 мg/мз	INDIVIDUAL MATERIAL MACIATION BODY WEIGHT GAIN (GRAMS)
	DAY OF LACTATION	
FEMALE#	1 - 4	
1501	29	
1502	16	
1503	34	
1505	24	
1506	22	
1507	25	
1508	20	
1509	11	
1510	29	
1511	12	
1512	19	
MEAN	22	
S.D.	7.3	

### APPENDIX J

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 2	30 MG/M3	INDIVIDUAL MATERNAL LACTATION BODY WEIGHT GAIN (GRAMS)
FEMALE#	DAY OF LACTATION 1 - 4	······································
2501	34	
2502	27	
2503	23	
2504	21	
2505	29	
2506	29	
2507	22	
2508	31	
2509	15	
2510	38	
2511	13	
2512	25	
MEAN	25	
s.D.	7.3	
N	12	

### APPENDIX J

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

CROTTE	2	100	MC/M3

	DAY OF LACTATION	N
FEMALE#	1 - 4	
3501	11	
3502	25	
3503	15	
3504	17	
3505	11	
3506	22	
3507	26	
3508	18	
3509	31	
3510	22	
3511	33	
3512	15	
MEAN	20	
S.D.	7.2	
N	12	

### APPENDIX J

### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 4	300 MG/M3				
FEMALE#	DAY OF LACTAT	ION	 	·	 
4501	20		 	· <del></del>	 
4502	25				
4505	16				
4506	36				
4507	12				
4508	27				
4511	38				
4512	22				
MEAN	25				
S.D.	9.1				
N	8				

APPENDIX K

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

MALES	GROUP 1	ROUP 1 0 MG/M3			INDIVIDUAL FEED CONSUMPTION (GRAMS/RG/DAY)
		DAY	OF STU	DΥ	
ANIMAL#		0	7	14	
1001		106	90	82	
1002		105	83	70	
1003		121	100	86	
1004		113	88	82	
1005		111	93	83	
1006		109	89	82	
1007		105	85	81	
1008		102	95	86	
1009		111	90	82	
1010		116	95	87	
1011		111	90	83	
1012		109	90	81	
MEAN		110	91	82	
S.D.		5.2	4.6	4.3	
N		12	12	12	

APPENDIX K

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

	DAY	OF STU	YOY	
ANIMAL#	0	7	14	•
2001	110	94	82	
2002	105	88	79	
2003	104	85	79	
2004	113	93	87	
2005	111	86	82	
2006	105	86	78	
2007	113	92	85	
2008	113	97	83	
2009	108	90	81	
2010	110	98	83	
2011	108	90	81	
2012	106	90	79	
EAN	109	91	81	
.D.	3.3	4.2	2.6	
N	12	12	12	

APPENDIX K

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

	DAY	OF ST	UDY	
ANIMAL#	0	7	14	
3001	114	93	82	
3002	112	92	85	
3003	105	89	73	
3004	104	89	77	
3005	108	91	82	
3006	108	85	77	
3007	110	92	81	
300B	108	88	73	
3009	111	91	79	
3010	100	89	79	
3011	110	92	75	
3012	114	98	82	
AN	109	91	79	
D.	4.1	3.3	3.8	
N	12	12	12	

APPENDIX K

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

MALES	GROUP 4		MG/M3		INDIVIDUAL FEED CONSOMPTION	(GRAMS/RG/DAY)
			OF ST	JDY		
ANIMAL#		0	7	14		
4001		111	93	85		
4002	:	107	84	80		
4003		111	88	79		
4004		103	92	77		
4005		114	89	79		
4006		115	92	84		
4007		110	88	80		
4008		109	89	82		
4009		104	83	74		
4010		123	104	97		
4011		106	84	82		
4012		119	97	85		
MEAN		111	90	82		
S.D.		5.9	6.0	5.6		
N		12	12	12		

APPENDIX K

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

FEMALES		MG/M3 	<b></b>				
	DAY	OF ST	UDY				
ANIMAL#	0	7	14	35	42	49	52
1501	CF	CF	CF				
1502	100	84	93				
1503	93	80	74				
1504	91	79	81	65	72	67	72
1505	CF	CF	CF				
1506	96	85	83				
1507	98	90	93				
1508	96	84	82				
1509	94	84	82				
1510	97	85	88				
1511	94	83	83				
1512	107	82	80				
MEAN	97	84	84	65	72.	67	72
S.D.	4.6	3.0	5.7	0.0	0.0	0.0	0.0
N	10	10	10	1	1	1	1

APPENDIX K

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

	DAY	OF STU	ΣΥ						
ANIMAL#		7	14	35	42	49	52		
2501	105	82	83					 	 
2502	97	82	77						
2503	CF	CF	CF						
2504	101	89	82						
2505	99	88	83						
2506	104	92	84						
2507	CF	CF	CF						
2508	CF	CF	CF						
2509	98	87	85						
2510	CF	CF	CF						
2511	93	87	81						
2512	106	90	87						
MEAN	100	87	83						
S.D.	4.4	3.7	2.9						
N	8	8	8						

APPENDIX K

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

	עאמ	OF ST	mv					 		 	 	
ANIMAL#		7	14	35	42	49	52					
3501	95	83	73					 	<b></b>	 	 	
3502	98	84	77									
3503	104	90	74									
3504	94	82	86									
3505	101	93	83	80								
3506	103	89	85									
3507	CF	CF	CF									
3508	CF	CF	CF									
3509	CF	CF	CF									
3510	94	82	80									
3511	100	80	79									
3512	95	76	66									
/EAN	98	84	78	80								
5.D.	4.0	5.3	6.3	0.0								
N	9	9	9	1.								

APPENDIX K

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

FEMALES	GROUP 4	300	мс/мз			11101112	ONE TEE	D CONSON	FITON (GRAND) NG) DAT)
		DAY	OF STU	DY					
#LAMINA		0	7	14	35	42	49	52	
4501		95	81	75					
4502		101	83	77					
4503		103	94	85					
4504		103	89	78					
4505		105	89	75					
4506		105	83	77					
4507		93	82	75					
4508		108	87	84					
4509		98	84	76	68	60	66	78	
4510		CF	CF	CF					
4511		107	88	78					
4512		107	88	82					
MEAN		102	86	78	68	60	66	78	
S.D.		4.9	4.0	3.7	0.0	0.0	0.0	0.0	
N		11	11	11	1	1	1	1	

### APPENDIX L

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL GESTATION FEED CONSUMPTION -- (GRAMS/KG/DAY)

GROUP 1 0 MG/M3

	DAY OF G	ESTATION		
ANIMAL#	0 - 7		14 - 20	0 - 20
1501	CF	79	71	75
1502	99	87	81	89
1503	85	83	76	81
1504x NP				
1505	78	82	74	78
1506	87	82	73	81
1507	96	88	82	89
1508	94	86	73	84
1509	84	82	75	80
1510	82	91	80	84
1511	92	85	78	85
1512	78	80	72	77
MEAN	88	84	76	82
S.D.	7.3	3.6	3.9	4.6
N	10	11	11	. 11

NP=NOT PREGNANT x=EXCLUDED FROM MEAN CF=Contaminated Feeder

APPENDIX L

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL GESTATION FEED CONSUMPTION -- (GRAMS/KG/DAY)

GROUP 2	30 MG/M3		INDI	TIDORU GES.	ATION FEED CONSUMPTION (GRAMS/RG/DAY)
ANIMAL#		GESTATION 7 - 14	14 20	0 20	
WATERWAY.		/ - 14	14 - 20	0 - 20	
2501	88	79	74	80	
2502	86	79	72	79	
2503	91	87	76	85	
2504	93	81	71	82	
2505	88	80	72	80	
2506	88	81	75	81	
2507	82	84	71	79	
2508	79	75	72	75	
2509	83	76	72	7 <b>7</b>	
2510	CF	CF	61	61	
2511	92	88	78	86	
2512	89	89	74	84	
MEAN	87	82	72	. 79	
S.D.	4.3	4.7	4.2	6.4	
N	11	11	12	. 12	
CF=Con	taminated Feeder	r			

APPENDIX L

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL GESTATION FEED CONSUMPTION -- (GRAMS/KG/DAY)

GROUP 3	100 MG/M3				
ANIMAL#		GESTATION 7 - 14		0 - 20	·
2501					
3501	81	78	68	76	
3502	83	80	71	78	
3503	92	84	74	84	
3504	89	82	77	82	
3506	80	84	67	77	
3507	CF	CF	66	66	
3508	CF	73	73	73	
3509	89	84	83	85	
3510	88	83	78	83	
3511	86	81	73	80	
3512	. 77	79	67	80 74	•
MEAN	85	81	72	78	
S.D.	4.9	3.5	5.2	5.6	·
N	9	10	11	11	
CF=Con	taminated Feed	er			

### APPENDIX L

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL GESTATION FEED CONSUMPTION -- (GRAMS/KG/DAY)

GROUP	4	300	MG/	M3

		DAY OF G	ESTATION	r	
ANIMAL#				14 - 20	0 - 20
4501		88	84	74	82
4502		86	80	78	81
4503x	NP	95	87	74	85
4504		87	78	66	77
4505		87	85	80	84
4506		83	81	72	79
4507		82	76	73	77
4508		97	87	78	87
4509x	NP				
4510x	NP	96	88	66	83
4511		87	84	77	83
4512		85	78	75	79
MEAN		87	81	75	81
S.D.		4.1	3.6	4.0	3.3
N		9	9	9	9

NP=NOT PREGNANT

x=EXCLUDED FROM MEAN

### APPENDIX M

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 1	0 MG/M3	
ANIMAL#	DAY OF LACTATION 1 - 4	
1501	144	
1502	105	
1503	122	
1505	116	·
1506	115	
1507	147	
1508	125	
1509	114	
1510	126	
1511	109	
1512	127	
MEAN	123	
S.D.	13.3	
N	11	

### APPENDIX M

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 2	30 MG/M3	· · · · · · · · · · · · · · · · · · ·
ANIMAL#	DAY OF LACTATION 1 ~ 4	
2501	128	
2502	144	
2503	135	
2504	137	
2505	125	
2506	120	·
2507	147	
2508	126	
2509	124	
2510	122	
2511	124	
2512	117	
MEAN	129	
s.D.	9.5	·
N	12	

### APPENDIX M

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

	100 MG/M3	INDIVIDUAL MATERNAL LACTATION FEED CONSUMPTION (GRAMS/KG/DAY)
ANIMAL#	DAY OF 1 - 4	
3501	82	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3502	102	
3503	122	
3504	122	
3505	122	
3506	118	
3507	119	
3508	101	
3509	122	
3510	108	
3511	123	
3512	83	
MEAN	110	
S.D.	15.3	
N	12	

### APPENDIX M

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 4	300 MG/M3		
ANIMAL#	DAY OF LACTATION	N	
4501	113		
4502	123		
4505	120		
4506	117		
4507	80		
4508	169		
4511	148		
4512	123		
MEAN	124		
S.D.	26.0		
N	8		

#### APPENDIX N - MATING PERIOD

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### ESTROUS STAGES

GROUP 1 0 MG/M3 DAY OF ESTROUS EVALUATION FEMALE# 1 2 3 4 5 6 7 8 9 10 11 12 13 14 1501 DDDC 1502 D S 1503 D S 1504 1505 D D S 1506 D D D C 1507 1508 D D P C D D S 1509 1510 D S 1511 D D D C 1512 D D S

## APPENDIX N - MATING PERIOD

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### ESTROUS STAGES

GROUP 2 30 MG/M3

					 		 					 	 	 	 	<b>-</b>	 	<b>-</b>	 	 	
FEMALE#	1	2						TION	12	13 :	1.4						•			 	
					 	_															
2501	D	С			 		 					 	 	 	 		 		 	 	
2502	D	D	C																		
2503	E	С																			
2504	D	D	D	C																	
2505	M	D	D	С																	
2506	D	D	Ç																		
2507	D	D	C																		
2508	С																				
2509	D	s																			
2510		D																			
2511		P	C																		
2512	D	C																			

### APPENDIX N - MATING PERIOD

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### ESTROUS STAGES

GROUP 3	100 N	1G/N	13												BELLOOD STAGES
			DA	Y C	FE	STR	ous	ΕV	ALU	ATIO	N				
FEMALE#	1	2	3	4	5	6	7	8	9	10 1	1	12 :	.3 1	4	
3501	D	D	D	c											
3502	D	D	Ç												
3503	D	D	D	P	s										
3504	C														
3505	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
3506	D	D	D	S											
3507	D	Ð	D	s											
3508	D	С													
3509	C														
3510	D	P	C												
3511	M	D	D	С											
3512	D	C													

### APPENDIX N - MATING PERIOD

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### ESTROUS STAGES

GROUP 4	300 N	IG/N	13													
FEMALE#	1	2			F E			8 EV					13	14	······································	
4501	Е	Е	М	D	D	P	C									
4502	D	D	C													
4503	C															
4504	E	ş														
4505	D	s														
4506	D	s														
4507	C															
4508	D	D	С													
4509	D	D	D	D	D	D	D	D	D	D	D	D	D	D		
4510	D	C														
4511	D	P	С													
4512	P	s														

### APPENDIX O

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL MATING ASSIGNMENTS

GROUP 1	0 MG/M3
---------	---------

Pemale No.	Male No.	Sperm/Plug	Outcome	Date of Cohabitation	Date of Insemination	Date of Parturition
1501	1001	 +	P	8-JUN-04	12-JUN-04	4-JUL-04
1502	1002	+	P	8-JUN-04	10-JUN-04	1-JUL-04
1503	1003	+	Þ	8-JUN-04	10-JUN-04	2-JUL-04
1504	1004	-	NP	8-JUN-04		
1505	1005	+	P	8-JUN-04	11-JUN-04	3-JUL-04
1506	1006	+	P	8-JUN-04	12-JUN-04	3-JUL-04
1507	1007	+	₽	8-JUN-04	9-JUN-04	1-JUL-04
1508	1008	+	P	8-JUN-04	12-JUN-04	4-JUL-04
1509	1009	+	P	8-JUN-04	11-JUN-04	4-JUL-04
1510	1010	+	P	8-JUN-04	10-JUN-04	2-JUL-04
1511	1011	+	P	8-JUN-04	12-JUN-04	4-JUL-04
1512	1012	+	P	8-JUN-04	11-JUN-04	4-JUL-04

<sup>+ =</sup> Sperm/Plug Positive - = Sperm/Plug Negative N = Not Mated

NP=NOT PREGNANT

P=PREGNANT

### APPENDIX O

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL MATING ASSIGNMENTS

emale No.	Male No.		Sperm/Plug	Outcome	Date of Cohabitation	Date of Insemination	Date of Parturition
2501	2001		+	P	8-JUN-04	10-JUN-04	2-JUL-04
2502	2002		+	p	8-JUN-04	11-JUN-04	3-JUL-04
2503	2003		+	P	8-JUN-04	10-JUN-04	2-JUL-04
2504	2004	•	+	P	8-JUN-04	12-JUN-04	4~JUL-04
2505	2005		+	P	8-JUN-04	12~JUN-04	4-JUL-04
2506	2006		+	P	8-JUN-04	11-JUN-04	3-JUL-04
2507	2007		+	P	8-JUN-04	11-JUN-04	4-JUL-04
2508	2008		+	P	8-JUN-04	9-JUN-04	1-JUL-04
2509	2009		+	P	8-JUN-04	10-JUN-04	2-JUL-04
2510	2010		+	P	8-JUN-04	11-JUN-04	2-JUL-04
2511	2011		+	₽	8-JUN-04	11-JUN-04	4-JUL-04
2512	2012		+	P	8-JUN-04	10-JUN-04	2-JUL-04

<sup>+ =</sup> Sperm/Plug Positive - = Sperm/Plug Negative N = Not Mated

P≃PREGNANT

### APPENDIX O

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## GROUP 3 100 MG/M3 INDIVIDUAL MATING ASSIGNMENTS

emale No.	Male No.	 Sperm/Plug	Outcome	Date of Cohabitation	Date of Insemination	Date of Parturition
3501	3001	+	P	8-JUN-04	12-JUN-04	4-JUL-04
3502	3002	+	p	8-JUN-04	11-JUN-04	3-JUL-04
3503	3003	+	P	8-JUN-04	13-JUN-04	5-JUL-04
3504	3004	+	P	8-JUN-04	9-JUN-04	1-JUL-04
3505	3005	_	P	8-JUN-04	J 0011 04	2-JUL-04
3506	3006	+	P	8-JUN-04	12-JUN-04	4-JUL-04
3507	3007	+	P	8-JUN-04	12-JUN-04	4-JUL-04
3508	3008	+	P	8-JUN-04	10-JUN-04	1-JUL-04
3509	3009	+	P	8-JUN-04	9-JUN-04	1-JUL-04
3510	3010	+	P	8-JUN-04	11-JUN-04	4-JUL-04
3511	3011	+	P	8-JUN-04	12-JUN-04	4-JUL-04
3512	3012	+	P	8-JUN-04	10-JUN-04	2-JUL-04

<sup>+ =</sup> Sperm/Plug Positive - = Sperm/Plug Negative N = Not Mated

P=PREGNANT

### APPENDIX O

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## INDIVIDUAL MATING ASSIGNMENTS

GROUP 4	00 MG/M3	TNDIVIDOAL MATIN	• Paris			
Female No.	Male No.	Sperm/Plug	Outcome	Date of Cohabitation	Date of Insemination	Date of Parturition
4501	4001	+	P	8-JUN-04	15-JUN-04	7-JUL-04
4502	4002	+	P	8-JUN-04	11-JUN-04	2-JUL-04
4503	4003	+	NP	8-JUN-04	9-JUN-04	Z-30H-04
4504	4004	+	P	8-JUN-04	10-JUN-04	
4505	4005	+	P	8-JUN-04	10-JUN-04	2-JUL-04
4506	4006	+	P	8-JUN-04	10-JUN-04	2-50H-04 2-JUL-04
4507	4007	+	P	8-JUN-04	9-JUN-04	1-JUL-04
4508	4008	+ .	₽	8-JUN-04	11-JUN-04	3-JUL-04
4509	4009	<u>.</u>	NP	8-JUN-04		2-00B 04
4510	4010	+	NP	8-JUN-04	10-JUN-04	
4511	4011	+	P	8-JUN-04	11-JUN-04	3-JUL-04
4512	4012	+	P	8-JUN-04	10-JUN-04	2-JUL-04

<sup>+ =</sup> Sperm/Plug Positive - = Sperm/Plug Negative N = Not Mated

NP≖NOT PREGNANT

P=PREGNANT

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## APRENDIX P

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL DELIVERY AND LITTER DATA

CROTTE	٦.	^	MG/M3
GROUP	1	U	Mt 4 / M. 4

		LITTE	R DEL	(VERED		0		NUMI		LIVE PUPS	DURATION OF GESTATION (DAYS)	TOTAL CORPORA LUTEA	TOTAL IMPLAN-	PRE- IMPLAN-	POST- IMPLAN-
EDVA I DA						-		1		4					TATION LOSS
FEMALE#		N	N	N	М	F	M	F	M	F	И	N	N	N	N
											22	14	14	0	1
1501	,	13	0	13	9	4	9	4	9	4	21	14	14	o.	1
1502		13	0	13	6	7	6	7	6	7	22	12	12	0	1
1503		11	0	11	5	б	5	6	5	6				U	7
1504 NP					-	-	_	-	_	•	-	0	0	-	-
1505		13	1	14	11	2	11	2	11	2	22	14	14	0	0
1506		13	0	13	4	9		9		-	22 21	17	13	4	n
			•		-	9	4	9	4	9	22	17	16	1	2
1507		14	0	14	13	1	13	1	13	1	22			±.	4
1508		15	0	15	10	5	10	5	10	5		19	15	4	U
1509		11	1	12	7	4	7	4	7	4	23	18	14	4	2
1510		12	0	12	6	6	6	6	6	6	22	12	12	0	0
1511		13	0	13	10	3	10	3	10	3	22	15	15	0	2
1512		13	o o	13	7	6	7	6	7	6	23	14	14	0	1
			·	-5	,	J	,	0	,	0					
MEAN		12.8	0.2	13.0	8.0	4.8	8.0	4.8	8.0 4	.8	22.0	15.1	13.9	1.2	0.9
S.D.		1.2	0.4	1.1	2.8	2.3	2.8	2.3	2.8 2	.3	0.6	2.3	1.2	1.8	0.8
N		11	11	11	11	11	11	11		11	11	11	11	11	11

NP=Not Pregnant

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#### APPENDIX P ·

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL DELIVERY AND LITTER DATA

GROUP 2 30 MG/M3

	LITT	ER DEL	IVERED				NUM:		LIVE PUPS	DURATION OF GESTATION	TOTAL CORPORA	TOTAL IMPLAN-	PRE- IMPLAN-	POST-
	LIVE	DEAD	TOTAL		0		1		4	(DAYS)	LUTEA			IMPLAN- S TATION LOSS
FEMALE#	N	N	N	M	F	М	F	М	F	N	N	N	N	N N
2501	13	1	14	5	8	5	8	5	8	22	14	14		
2502	12	0	12	4	8	4	8	4	8	22	18		0 '	0
2503	14	0	14	5	9	5	9	5	9	22		13	5	1
2504	14	0	14	- 6	8	6	7	6	7		16	15	1	1
2505	14	ō	14	-	7		<i>'</i>	-	,	22	18	15	3	1
		-			'	′	/	6	7	22	15	15	0	1
2506	14	0	14	9	5	9	5	9	5	22	14	14	0	0
2507	11	0	11	5	6	5	6	5	6	23	13	11		Ô
2508	12	0	12	6	6	6	6	6	6	22	14	14	0	. 0
2509	14	0	14	6	8	6	8	6	8	22			0	2
2510	14	2	16	6	8	6	8	6	8		14	14	0	0
2511	13	0	13	-	_	_	-	-	=	21	17	16	1	0
		-		5	8	5	8	5	8	23	15	15	0	2
2512	13	2	15	4	9	4	9	4	9	22	17	17	0	2
MEAN	13.2	0.4	13.6	5.7 7	7.5	5.7	7.4	5.6	7.4	22.1	15.4	14.4	1.0	
S.D.	1.0	0.8	1.4	1.4 1	1.2	1.4	1.2	1.3		0.5	1.7			0.8
N	12	12	12		12	12	12	12	12	12		1.5	1.6	0.8
		12		12	14	12	12	12	14	14	12	12	12	12

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### APPENDIX P

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL DELIVERY AND LITTER DATA

GROUP 3 100 MG/M3

	LITT	ER DEL	IVERED				NUMI		LIVE PUPS	DURATION OF	TOTAL CORPORA	TOTAL	PRE- IMPLAN-	POST- IMPLAN-
	LIVE	DEAD	TOTAL		0		1		4	(DAYS)	LUTEA			TATION LOSS
FEMALE#	N	N	N	М	F	M	F	M	F	N	N	N	N	N
3501	3	0	3	2	1	2	1	2	1	22	9	3	6	0
3502	15	0	15	9	6	9	6	9	6	22	18	17	1	2
3503	14	0	14	6	8	6	8	6	7	22	15	15	Ō	1
3504	11	3	14	6	5	6	5	6	5	22	15	14	1	0
3505	1.2	0	12	9	3	9	3	9	3		14	14	ō	2
3506	12	0	12	5	7	5	7	5	7	22	14	14	Ô	2
3507	14	0	14	8	6	8	6	8	6	22	15	14	1	Õ
3508	14	0	14	9	5	9	5	9	5	21	15	15	0	1
3509	14	1	15	9	5	9	5	9	5	22	15	15	0	0
3510	8	0	8	5	3	5	3	5	3	23	14	8	6	o o
3511	10	1	11	6	4	6	4	6	4	22	13	13	Ō	2
3512	6	0	6	2	4	2	4	2	4	22	16	8	8	2
MEAN	11.1	0.4	11.5	6.3 4	1.8	6.3	4.8	6.3	1.7	22.0	14.4	12.5	1.9	1.0
S.D.	3.7	0.9	3.9	2.6	1.9	2.6	1.9	2.6	1.8	0.4	2.1	4	2.9	1.0
N	12	12	12	12	12	12	12	12	12	11	12	12	12	12

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APPENDIX P

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## INDIVIDUAL DELIVERY AND LITTER DATA

GROUP 4 300 MG/M3

			LITTE	ER DEL	IVERED				NUM		LIVE PUP			TOTAL	PRE-	POST-
			LIVE	DEAD	TOTAL		_			D.	AYS	GESTATION	CORPORA	IMPLAN-	IMPLAN-	IMPLAN-
DEMOT D#	_						0		7		4	(DAYS)	LUTEA	TATIONS	TATION LOSS	TATION LOSS
FEMALE#	-		N	N	N	М	F	M	F	М	F	N	Ň.	N	N	N
4501			11	1	12	6	5	6	5	6	4	22	15			_
4502			17	0	17	_	_	-	_		4		15	14	Т	2
4503 NP			Δ,	U	Ψ,	9	8	9	8	9	8	21	17	17	0	0
												-	0	0	-	-
4504 NVF												-	2	2	0	. 2
4505			10	1	11	5	5	5	5	5	5	22	.14	11	3	O <sup>i</sup>
4506			12	0	12	7	5	7	5	7	5	22	14	12	2	0
4507	:		4	0	4	2	2	2	2	2	2	22	8	7.	1	3
4508			13	1	1.4	7.	_	7	-	7	2	22	16	15	1	1
4509 NP				-	7.2	٠,	0	,	6	/	6	24	10		_	d
4510 NP					•							-	0	0	-	-
												_	0	0	_	-
4511			16	2	18	9	7	9	7	9	7	22	19	18	1	0
4512			15	0	15	8	7	8	7	8	7	22	18	18	. 0	3
MEAN			12.3	0.6	12.9	6.6	E 6									
S.D.			4.1	0.7				6.6		6.6	-	21.9	15.1	14.0	1.1	1.1
		•			4.4	2.3	1.8	2.3	1.8	2.3	1.9	. 0.4	3.4	3.9	1.0	1.4
N .			8	8	8	8	8	8	8	8	8	8	8	8	8	8

NP=Not Pregnant NVF = No Viable Fetuses, early pregnancy loss

### APPENDIX Q

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP SEX AND STATUS DURING LACTATION

GROUP 1	0 MG/M3												
	PUP #				<b></b>								
FEMALE#	1 2	3	4	5 6	7 8	9 10	11 1	2 13	14 15	16	17 18	19 20	21 22 23
1501	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4 FK	4 FK 4 FK	4 FK 4					
1502	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4	FK 4 FK	4 FK 4 FK	4 FK 4 FK	4 FK 4					
1503	MK 4 MK	4 MK 4	MK 4 FK	4 FK 4	FK 4 FK	4 FK 4 MK	4 FK 4						
1505	FS MK	4 MK 4	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4 MK 4	4 MK 4 MK	4 FK 4	FK 4				
1506	MK 4 MK	4 MK 4	MK 4 FK	4 FK 4	FK 4 FK	4 FK 4 FK 4	4 FK 4 FK	4 FK 4					
1507	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4 MK 4	4 MK 4 MK	4 MK 4	FK 4				
1508	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4 MK 4	4 FK 4 FK	4 FK 4	FK 4 FK	4			
1509	MS MK	4 MK 4	MK 4 MK	4 MK 4	MK 4 MK	4 FK 4 FK	4 FK 4 FK	4					
1510	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4	FK 4 FK	4 FK 4 FK 4	4 FK 4 FK	4					
1511	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4 MK 4	4 FK 4 FK	4 FK 4					
1512	MK 4 MK	4 MK 4	MK 4 MK	4 MK 4	MK 4 FK	4 FK 4 FK 4	4 FK 4 FK	4 FK 4					

SEX CODE PRECEDES PUP STATUS CODE. NUMERICAL VALUE INDICATES DAY OF LACTATION. SEX CODES: M-MALE F-FEMALE U-UNCERTAIN

PUP STATUS CODES: A-ALIVE S-STILLBORN K-SCHEDULED SACRIFICE

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### APPENDIX Q

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP SEX AND STATUS DURING LACTATION

GROUP 2 30 MG/M3

- <b></b> -	<b></b>		<b>-</b>										- <b>-</b> ·															 					
	PU	P #																															
FEMALE#	1	2	2	3		4		5	6		7	8		9		10	11	-	12		13	:	14	1	5	16	17	18	19	20	21	22	23
2501	MS	MK	4 M	K 4	1 MI	< 4	MK	4 1	1K	 4 FK	4	FK	4	FK 4	F	K 4	FK	4	FK ·	 4 E	K 4	4 FI	 K 4					 				~	
2502	MK 4	MK	4 M	K 4	1 MI	Κ 4	FΚ	4 1	·K	4 FK	4	FK	4 ]	FK 4	F	K 4	FK	4	FK ·	4													
2503	MK 4	MK	4 M	K 4	1 M	ζ 4	MK	4 1	·K	4 FK	4	FK	4	FK 4	F	K 4	FK	4	FK 4	4 E	K 4	4 FI	Κ 4										
2504	FD 0	MK	4 M	K 4	1 MI	₹ 4	MK	4 N	1K	4 MK	4	FK	4 ]	FK 4	F	K 4	FK	4	FK ·	4 E	K 4	4 F	K 4										
2505	MK 4	MK	4 M	M 3	M E	ζ 4	MK	4 1	1K	4 MK	4	FK	4 1	FK 4	F	K 4	FK	4	FK 4	4 E	K 4	4 FI	Κ 4										
2506	MK 4	MK	4 M	K 4	M	<b>4</b>	MK	4 N	ıĸ	4 MK	4	ΜK	4 1	MK 4	F	K 4	FK	4	FK 4	4 E	K 4	4 F	Κ 4										
2507	MK 4	MK	4 M	K 4	MI	ζ4	MK	4 1	ĸ.	4 FK	4	FK	4 )	FK 4	F	K 4	FK	4															
2508	MK 4	MK	4 M	K 4	MI	ζ 4	MK	4 1	ıĸ .	4 FK	4	FK	4 1	FK 4	F	K 4	FK	4	FK 4	4													
2509	MK 4	MK	4 M	K 4	MI	ζ4	MK	4 N	IK ·	4 FK	4	FK	4 1	FK 4	F	K 4	FK	4	FK ·	4 E	K 4	4 FE	ζ4										
2510	MS	MS	: M	K 4	1 MI	( 4	MK	4 1	K ·	4 MK	4	MK	4 1	FK 4	F	K 4	FK	4	FK .	4 E	K 4	4 FI	Κ 4	FK	4	FK 4							
2511	MK 4	MK	4 M	K 4	M	₹ 4	MK	4 I	·K	4 FK	4	FK	4 !	FK 4	F	K 4	FK	4	FK -	4 F	K 4	1											
2512	MS	FS	M	K 4	MI	<b>4</b>	MK	4 N	ıĸ .	4 FK	4	FK	4 1	FK 4	F	K 4	FK	4	FK 4	4 E	K 4	1 F	< 4	FK	4								

SEX CODE PRECEDES PUP STATUS CODE. NUMERICAL VALUE INDICATES DAY OF LACTATION.

SEX CODES: M-MALE F-FEMALE U-UNCERTAIN

PUP STATUS CODES: A-ALIVE S-STILLBORN D-DIED M-MISSING K-SCHEDULED SACRIFICE

### APPENDIX Q

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## INDIVIDUAL PUP SEX AND STATUS DURING LACTATION

GROUP 3	100 MG/M3			IN	DIVIDUA	.ь рор .	SEX A	ND STAT	US DUR	RING LA	ACTAT :	ION								
	PUP #												•	<b></b>						
FEMALE#	1 2	2 3	4	5 6	7	8	9	10 11	12	13	14	15	16	17	18	19	20	21	22	23
3501	MK 4 MK	4 FK	 4																	
3502	MK 4 MK	4 MK	4 MK 4 N	NK 4 MK	4 MK 4	MK 4 M	K 4 F	K 4 FK	4 FK 4	FK 4	EK 4	EK 4								
3503	MK 4 MK	4 MK	4 MK 4 N	IK 4 MK	4 FK 4	FK 4 F	K 4 F	K 4 FK	4 FK 4	FK 4	ED 3	FK 4								
3504	MS FS			IK 4 MK																
3505	MK 4 MK																			
3506	MK 4 MK																			
3507	MK 4 MK	4 MK	4 MK 4 M	IK 4 MK	4 MK 4	MK 4 F	K 4 F	K 4 FK	4 FK 4	FK 4	FK 4									
3508	MK 4 MK																			
3509				IK 4 MK								FK 4								
3510	MK 4 MK																			
3511	FS MK	4 MK	4 MK 4 M	IK 4 MK	4 MK 4	FK 4 F	K 4 F	K 4 FK	4											
3512	MK 4 MK																			

SEX CODE PRECEDES PUP STATUS CODE. NUMERICAL VALUE INDICATES DAY OF LACTATION.

SEX CODES: M-MALE F-FEMALE U-UNCERTAIN

PUP STATUS CODES: A-ALIVE S-STILLBORN D-DIED K-SCHEDULED SACRIFICE

### APPENDIX Q

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP SEX AND STATUS DURING LACTATION

GROUP 4	300 MG/M3																																					
	PÜ	P#																																				
FEMALE#	1	2	2	3	3	4		5		6		7	8	8	:	€	10	)	11		12		13	1	.4	15	5	16	1	7	18		19	20	21	2	2	23
4501	FS	MK	4	MK	4 1	MK	4 M	IK 4	ME		MK	4	FK	<b>-</b> 4	FD	2	FK	4	FK	 4	FK 4	 4																
4502	MK 4	MK	4	MK	4 1	MK	4 M	IK 4	MK	4	MK	4	MK	4	MK	4	FK	4	FK	4	FK 4	- 4 F	K 4	FK	4	FK	4	FK 4	FK	4								
4505	FS	MK	4	MK	4 [	MK	4 M	IK 4	MK	4	FK	4	FK	4	FK	4	FΚ	4	FK ·	4																		
4506	MK 4	MK	4	MK	4	MK	4 M	IK 4	ME	4	MK	4	FΚ	4	FK	4	FΚ	4	FK ·	4	FK 4	4																
4507	MK 4	MK	4	FΚ	4	FK ·	4																															
4508	FS	MK	4	MK	4 1	MK	4 M	IK 4	MK	4	MK	4	MK	4	FΚ	4	FΚ	4	FK ·	4	FK 4	4 F	K 4	FK	4													
4511	FS	FS	3	MK	4 1	МK	4 M	IK 4	MK	4	MK	4	MK	4	MK	4	MK	4	MK	4	FK 4	4 F	K 4	FK	4	FK	4	FK 4	FK	4	FK	4						
4512	MK 4	MK	4	MK	4 1	MK	4 M	IK 4	ME	4	MK	4	MK	4	FΚ	4	FΚ	4	FK	4	FK 4	4 F	K 4	FK	4	FK	4											

SEX CODE PRECEDES PUP STATUS CODE. NUMERICAL VALUE INDICATES DAY OF LACTATION.

SEX CODES: M-MALE F-FEMALE U-UNCERTAIN

PUP STATUS CODES: A-ALIVE S-STILLBORN D-DIED K-SCHEDULED SACRIFICE

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## Note:

The day on which parturition initiated was defined as lactation day 0. When parturition began on day 0 and ended on day 1 (e.g., litters 1502, 3508 and 4507), the lactation days 0 and 1 observations were actually reported on lactation day 0.

#### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP 1 0 MG/M3

FEMALE#			OBSERVA	TIONS		DAY OF LACTATION	0 1 2 3	4
1501	PUP#	1	WITHIN	NORMAL	LIMITS		P	P
	PUP#	2	WITHIN	NORMAL	LIMITS		P	P
	PUP#	3	WITHIN				P	P
	PUP#	4	WITHIN				P	p
	PUP#	5	WITHIN				P	P
	PUP#	6	WITHIN				₽	P
	PUP#		WITHIN				P	p
	PUP#		WITHIN				P	P
	PUP#		WITHIN				P	P
	PUP#		WITHIN				P	P
	PUP#		WITHIN				₽	P
	PUP#		WITHIN				P	p
	PUP#	13	WITHIN	NORMAL	LIMITS		P	P
1502	PUP#	٦	WITHIN	MODMAT.	TIMIMO		P	n
1502	PUP#		WITHIN				P	P P
	PUP#	3	WITHIN				P	P P
	PUP#	4	WITHIN				P	p
	PUP#	5	WITHIN				P	p
	PUP#	6	WITHIN				Þ	p
	PUP#	7					P	P P
•	PUP#	8	WITHIN				P	p
	PUP#		WITHIN				P	P
	PUP#	10	WITHIN				P	P
	PUP#	11	WITHIN	NORMAL	LIMITS		P	P
	PUP#	12	WITHIN	NORMAL	LIMITS		P	P
	PUP#	13	WITHIN	NORMAL	LIMITS		P	P
1503	PUP#	1	WITHIN	NORMAL.	LIMITS		P	P
	PUP#	2	WITHIN	NORMAL	LIMITS		P	P
	PUP#	3	WITHIN	NORMAL	LIMITS		P	P
	PUP#	4	WITHIN	NORMAL	LIMITS		P	p ·
	PUP#	5	WITHIN	NORMAL	LIMITS		P	P

### APPENDIX R

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

MALE#		OBSERVATIONS	DAY OF LACTATION	0 1 2	2 3 4	
1503 PUP#	6	WITHIN NORMAL LIMITS		P	P	
		WITHIN NORMAL LIMITS		P	P	
		WITHIN NORMAL LIMITS		P	P	
PUP#	9	WITHIN NORMAL LIMITS		P	P	
		WITHIN NORMAL LIMITS		P	P	
PUP#	11	WITHIN NORMAL LIMITS		Þ	P	
1505 PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#	6	WITHIN NORMAL LIMITS		p	P	
PUP#	7	WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#	14	WITHIN NORMAL LIMITS		P	P	
1506 PUP#	1	WITHIN NORMAL LIMITS		P	p	
PUP#	2	WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#	4	WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#	-	WITHIN NORMAL LIMITS		P	P	
PUP#	-	WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#		WITHIN NORMAL LIMITS		P	P	
PUP#	12	WITHIN NORMAL LIMITS		P	P	

### APPENDIX R

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

EMALE#		OBSERVATIONS		DAY OF LACTATION		
		OBSERVATIONS			0 1 2 3	4
1506 PUP	# 13	WITHIN NORMAL	LIMITS		P	P
1507 PUP	# 1	WITHIN NORMAL	LIMITS		P	P
PUP	# 2	WITHIN NORMAL	LIMITS		P	P
PUP	# 3	WITHIN NORMAL	LIMITS		P	P
PUP	# 4	WITHIN NORMAL			P	P
PUP		WITHIN NORMAL	LIMITS		P	P
PUP		WITHIN NORMAL	LIMITS		P	P
PUP		WITHIN NORMAL	LIMITS		P	P
	# 8	WITHIN NORMAL			P	P
	# 9	WITHIN NORMAL			P	P
	# 10	WITHIN NORMAL			P	P
	# 11	WITHIN NORMAL			P	P
	12	WITHIN NORMAL			P	P
	# 13	WITHIN NORMAL			P	P
PUP	# 14	WITHIN NORMAL	LIMITS		P	P
		WITHIN NORMAL			P	P
P <b>U</b> P	# 2	WITHIN NORMAL	LIMITS		P	p
PUP:					P	P
PUP:		WITHIN NORMAL	LIMITS		P	P
PUP:		WITHIN NORMAL			P	P
PUP		WITHIN NORMAL	LIMITS		P	P
PUP:	¥ 7	WITHIN NORMAL	LIMITS		P	P
PUP	<b>#</b> 8	WITHIN NORMAL	LIMITS		P	P
PUP:	<b>‡</b> 9	WITHIN NORMAL	LIMITS		P	P
PUP	‡ 10	WITHIN NORMAL	LIMITS		P	P
PUP	<b>‡</b> 11	WITHIN NORMAL	LIMITS		P	P
PUP	12	WITHIN NORMAL	LIMITS		P	P
PUP	13	WITHIN NORMAL	LIMITS		P	P
PUP	14	WITHIN NORMAL	LIMITS		P	P
PUP:	15	WITHIN NORMAL	LIMITS		p	P

#### APPENDIX R

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

## INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP 1	0 мg/мз			
		DAY OF		 
FEMALE#	OBSERVATIONS	LACTATION	0 1 2 3 4	

FEMALE#	OBS	ERVATIONS		DAY OF LACTATION	0 1 2 3	3 <b>4</b>
1509 PUP#	2 WIT	IIN NORMAI	LIMITS		P	P
PUP#	3 WIT	HIN NORMAI	LIMITS		P	P
PUP#	4 WIT	HIN NORMAI	LIMITS		P	P
PUP#	5 WIT	HIN NORMAI	LIMITS		P	P
PUP#	6 WIT	HIN NORMAI	LIMITS		P	P
PUP#	7 WIT	HIN NORMAI	LIMITS		P	p
PUP#	TIW 8	IIN NORMAI	LIMITS		P	P
PUP#	9 WIT	IIN NORMAI	LIMITS		P	P
PUP# 1	TIW 0	IIN NORMAI	. LIMITS		P	p
PUP# 1		IIN NORMAI	LIMITS		P	p
PUP# 1	2 WIT	IIN NORMAL	LIMITS		P	P
1510 PUP#		HIN NORMAL			P	P
		HIN NORMAL			P	p
"		IIN NORMAL			P	P
		IIN NORMAI			P	P
	5 WIT	IIN NORMAL	LIMITS		P	P
- **		IIN NORMAL			P	P
,		IIN NORMAL			P	P
PUP#		IIN NORMAL	_		P	P
PUP#		IIN NORMAL	_		P	P
PUP# 1		IIN NORMAL	_		P	P
PUP# 1:		IIN NORMAL	_		P	P
PUP# 1:	2 WIT	IIN NORMAL	LIMITS		P	P
		IIN NORMAL	-		P	P
PUP# :	2 WIT	IIN NORMAL	LIMITS		₽	P
PUP# :	WIT	IIN NORMAL	LIMITS		P	P
PUP# 4	WIT:	IIN NORMAL	LIMITS		P	P
PUP#	5 WIT	IIN NORMAL	LIMITS		P	P
PUP# (	WIT	IN NORMAL	LIMITS		P	P
	7 WIT	IN NORMAL	LIMITS		P	P
PUP# 4	3 WIT	IN NORMAL	LIMITS		P	P

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP	1	0	MG.	/M3

FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3	4
1511 PUP# 9	WITHIN NORMAL LIMITS		 Р	p
PUP# 10	WITHIN NORMAL LIMITS		P	т Р
PUP# 11	WITHIN NORMAL LIMITS		P	p
PUP# 12	WITHIN NORMAL LIMITS		P	P
PUP# 13	WITHIN NORMAL LIMITS		P	P
1512 PUP# 1	WITHIN NORMAL LIMITS		P	P
PUP# 2	WITHIN NORMAL LIMITS		P	P
PUP# 3	WITHIN NORMAL LIMITS		P	P
PUP# 4	WITHIN NORMAL LIMITS		P	p
PUP# 5	WITHIN NORMAL LIMITS		P	P
PUP# 6	WITHIN NORMAL LIMITS		P	P
PUP# 7	WITHIN NORMAL LIMITS		P	P
PUP# 8	WITHIN NORMAL LIMITS		P	P
PUP# 9	WITHIN NORMAL LIMITS		P	P
PUP# 10	WITHIN NORMAL LIMITS		P	P
PUP# 11	WITHIN NORMAL LIMITS		P	P
PUP# 12	WITHIN NORMAL LIMITS		P	P
PUP# 13	WITHIN NORMAL LIMITS		P	P

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP :	3 (	) MG/	М3
---------	-----	-------	----

FEMALE#			OBSERVA	ATIONS		DAY OF LACTATION	0 1 2 3	4
2501 PUF	#	2	WITHIN	NORMAL	LIMITS		P	р
PUP	#	3	WITHIN	NORMAL	LIMITS		P	P
PUP	#	4	WITHIN	NORMAL	LIMITS		P	P
PUP	#	5	WITHIN	NORMAL	LIMITS		P	P
PUP	#	6	WITHIN	NORMAL	LIMITS		P	P
PUP		7	WITHIN	NORMAL	LIMITS		P	P
PUP		8			LIMITS		P	P
PUP		9			LIMITS		P	P
PUP			WITHIN				P	P
PUP			WITHIN				P	P
PUP			WITHIN				P	P
PUP			WITHIN				P	P
PUP	# 1	.4	WITHIN	NORMAL	LIMITS		P	P
2502 PUP	II.	1	MITMITTAL	11001111	× ****			
PUP			WITHIN				P	P
PUP			WITHIN				P	P
PUP			WITHIN				P	P
PUP			WITHIN				P	P
PUP			WITHIN WITHIN				P	P
PUP			WITHIN				P	P .
PUP			WITHIN				P	P
PUP			WITHIN				P	P
PUP			WITHIN				P	P
PUP			WITHIN				P	p
PUP			WITHIN				P	P
FOF	* _	2	MIIIII	NORMAL	DIMITS		P	P
2503 PUP	ŧ	1	WITHIN	NORMAL	LIMITS		n	n.
PUP			WITHIN				P P	P
PUP			WITHIN					P
PUP			WITHIN					P P
PUP			WITHIN				-	
PUP			WITHIN					P P
							E	r

#### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP 2 30 1	MG/	M:
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FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3	4
2503 PUP# 7	WITHIN NORMAL LIMITS		P	p
PUP# 8	WITHIN NORMAL LIMITS		P	P
PUP# 9	WITHIN NORMAL LIMITS		P	P
PUP# 10	WITHIN NORMAL LIMITS		P	P
PUP# 11	WITHIN NORMAL LIMITS		P	P
PUP# 12	WITHIN NORMAL LIMITS		P	P
PUP# 13	WITHIN NORMAL LIMITS		P	P
PUP# 14	WITHIN NORMAL LIMITS		P	P
	WITHIN NORMAL LIMITS		P	P
PUP# 3	WITHIN NORMAL LIMITS		₽	P
PUP# 4	WITHIN NORMAL LIMITS		P	P
PUP# 5	WITHIN NORMAL LIMITS		₽	P
PUP# 6	WITHIN NORMAL LIMITS		P	P
PUP# 7	WITHIN NORMAL LIMITS		P	P
PUP# 8	WITHIN NORMAL LIMITS		P	P
PUP# 9	WITHIN NORMAL LIMITS		P	P
PUP# 10	WITHIN NORMAL LIMITS		P	P
PUP# 11	WITHIN NORMAL LIMITS		P	P
PUP# 12	WITHIN NORMAL LIMITS		₽	P
PUP# 13	WITHIN NORMAL LIMITS		P	P
PUP# 14	WITHIN NORMAL LIMITS		P	P
2505 PUP# 1			P	P
PUP# 2			P	P
PUP# 3	WITHIN NORMAL LIMITS		P	
PUP# 4	WITHIN NORMAL LIMITS		P	P
PUP# 5	WITHIN NORMAL LIMITS		P	P
PUP# 6	WITHIN NORMAL LIMITS		P	P
PUP# 7	WITHIN NORMAL LIMITS		P	P
PUP# 8	WITHIN NORMAL LIMITS		P	P
PUP# 9	WITHIN NORMAL LIMITS		P	P
PUP# 10	WITHIN NORMAL LIMITS		P	P

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP	2	30	MG/	M3

FEMALE#			OBSERVA	ATIONS		DAY OF LACTATION	0123	4
2505 PU	IP#	11	WITHIN	NORMAL	LIMITS		P	P
PU	P#	12	WITHIN	NORMAL	LIMITS		P	P
PU	P#	13	WITHIN	NORMAL	LIMITS		P	P
PU	P#	14	WITHIN	NORMAL	LIMITS		P	P
2506 PU	r D #	1	WITHIN	NYO DM'N Y	LIMITE		_	n
	P#		WITHIN				P	P
	IP#	3	WITHIN				P	P
	P#		WITHIN				P P	P
	P#		WITHIN				_	P
	P#		WITHIN				P P	P
	ιP#	7	WITHIN				P	P
	ΓP#		WITHIN				P	P
	·Σ#		WITHIN				P	P
	ΓP#		WITHIN				P	P P
	P#			NORMAL			p	P
	IP#		WITHIN				P P	P
	P#		WITHIN				P	p p
			WITHIN				P	p p
	- "						F	r .
2507 PL	P#	1	WITHIN	NORMAL	LIMITS		P	p
PL	P#	2	WITHIN	NORMAL	LIMITS		P	P
PU	P#	3	WITHIN	NORMAL	LIMITS		P	P
PÜ	P#	4	WITHIN	NORMAL	LIMITS		P	P
PU	P#	5	WITHIN	NORMAL	LIMITS		P	P
PU	P#	6	WITHIN	NORMAL	LIMITS		P	p
PU	P#	7	WITHIN	NORMAL	LIMITS		P	p
PU	Р#	8	WITHIN	NORMAL	LIMITS		P	P
PU	Ρ#	9	WITHIN	NORMAL	LIMITS		P	P
PU	P#	10	WITHIN	NORMAL	LIMITS		P	P
PU	P#	11	WITHIN	NORMAL	LIMITS		P	p

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

					DAY OF		
EMALE#		OBSERVA	RIONS		LACTATION	0 1 2 3	
2508 PUP	‡ 1	WITHIN	NORMAL	LIMITS		P	 
PUP:	‡ 2	WITHIN	NORMAL	LIMITS		P	
PUP:	‡ 3	WITHIN	NORMAL	LIMITS		P	
PUP	<b>‡ 4</b>	WITHIN	NORMAL	LIMITS		P	
PUP:	‡ 5	WITHIN	NORMAL	LIMITS		P	
PUP:	† 6	WITHIN	NORMAL	LIMITS		P	
		WITHIN				P	
PUP	ŧ 8	WITHIN	NORMAL	LIMITS		P	
		WITHIN				P	
		WITHIN				P	
		WITHIN				P	
PUP	12	WITHIN	NORMAL	LIMITS		P	
2509 PUP	<b>‡</b> 1	WITHIN	NORMAL	LIMITS		P	
PUP	‡ 2	WITHIN	NORMAL	LIMITS		P	
		WITHIN				P	
		WITHIN				P	
		WITHIN				P	
		WITHIN				P	
	•	WITHIN				P	
		WITHIN				₽	
		WITHIN	-			P	
		WITHIN				P	
	-	WITHIN				P	
		WITHIN				P	
	•	WITHIN				P	
PUP	14	WITHIN	NORMAL	LIMITS		P	
2510 PUP						P	
		WITHIN				P	
		WITHIN				P	
		WITHIN				P	
PUP	† 7	WITHIN	NORMAL	LIMITS		P	

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP	2	3.0	MG/	мα

FEMALE#	OBSERVATIONS	DAY OF		
· · · · · · · · · · · · · · · · · · ·	OBSERVATIONS	LACTATION	0 1 2 3	4
2510 PUP# 8	WITHIN NORMAL LIMITS		P	P
PUP# 9	WITHIN NORMAL LIMITS		P	P
PUP# 10	WITHIN NORMAL LIMITS		Þ	P
PUP# 11	WITHIN NORMAL LIMITS		P	P
PUP# 12	WITHIN NORMAL LIMITS		P	P
PUP# 13	WITHIN NORMAL LIMITS		P	P
PUP# 14	WITHIN NORMAL LIMITS		P	P
PUP# 15	WITHIN NORMAL LIMITS		P	P
PUP# 16	WITHIN NORMAL LIMITS		P	p
2511 PUP# 1	WITHIN NORMAL LIMITS		P	P
PUP# 2	WITHIN NORMAL LIMITS		P	P
PUP# 3	WITHIN NORMAL LIMITS		P	P
PUP# 4	WITHIN NORMAL LIMITS		P	P
PUP# 5	WITHIN NORMAL LIMITS		P	P
PUP# 6	WITHIN NORMAL LIMITS		P	P
PUP# 7	WITHIN NORMAL LIMITS		P	P
PUP# 8	WITHIN NORMAL LIMITS		P	P
PUP# 9	WITHIN NORMAL LIMITS		P	P
PUP# 10	WITHIN NORMAL LIMITS		P	P
PUP# 11	WITHIN NORMAL LIMITS		P	P
PUP# 12	WITHIN NORMAL LIMITS		P	P
PUP# 13	WITHIN NORMAL LIMITS		P	P
2512 PUP# 3	WITHIN NORMAL LIMITS		P	P
PUP# 4	WITHIN NORMAL LIMITS		P	P
PUP# 5	WITHIN NORMAL LIMITS		P	P
PUP# 6	WITHIN NORMAL LIMITS		P	P
PUP# 7	WITHIN NORMAL LIMITS		P	P
PUP# 8	WITHIN NORMAL LIMITS		P	P
PUP# 9	WITHIN NORMAL LIMITS		P	P
PUP# 10	WITHIN NORMAL LIMITS		P	p
PUP# 11	WITHIN NORMAL LIMITS		P	P

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP	2	3.0	MG/	M7

FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3	4
PUP# 13 PUP# 14	WITHIN NORMAL LIMITS WITHIN NORMAL LIMITS WITHIN NORMAL LIMITS WITHIN NORMAL LIMITS		P P P	P P P P

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP	3	100	MG/M3

										***************************************
						DAY OF				
FEMALE#			OBSERV	ATIONS		LACTATION	0	1 2	2 3	4
3501	PUP#		WITHIN	MODMAT	TIMIDO					
3301	PUP#	2					P			P
	PUP#	3					P			P
	FOF#	3	MITHIN	MORMAL	LIMITS		P			P
3502	PUP#	1	WITHIN	NORMAL	LIMITS		P			P
	PUP#	2	WITHIN	NORMAL	LIMITS		P			p
	PUP#	3	WITHIN	NORMAL	LIMITS		P			p
	PUP#	4		NORMAL			P			p
	PUP#	5	WITHIN	NORMAL	LIMITS		P			P
	PUP#	6	WITHIN	NORMAL	LIMITS		P			P
	PUP#	7	WITHIN	NORMAL	LIMITS		P			P
	PUP#	8	WITHIN	NORMAL	LIMITS		P			P
	PUP#	9	WITHIN	NORMAL	LIMITS		P			P
	PUP#	10	WITHIN	NORMAL	LIMITS		P			P
	PUP#	11	WITHIN	NORMAL	LIMITS		P			p
	PUP#	12	WITHIN	NORMAL	LIMITS		P			p
	PUP#	13	WITHIN	NORMAL	LIMITS		P			P
	PUP#	14	WITHIN	NORMAL	LIMITS		P			P
	PUP#	15	WITHIN	NORMAL	LIMITS		P			p
3503	PUP#	1	WITHIN	NORMAL	LIMITS		P			P
	PUP#	2	WITHIN	NORMAL	LIMITS		P			p
	PUP#	3	WITHIN	NORMAL	LIMITS		P			P
	PUP#	4	WITHIN	NORMAL	LIMITS		P			P
	PUP#	5	WITHIN	NORMAL	LIMITS		P			P
	PUP#	6	WITHIN	NORMAL	LIMITS		P			P
	PUP#	7	WITHIN	NORMAL	LIMITS		Ρ			P
	PUP#	8	WITHIN	NORMAL	LIMITS		P			P
	PUP#	9	WITHIN	NORMAL	LIMITS		P			P
	PUP#			NORMAL			P			P
	PUP#			NORMAL			P			p
	PUP#			NORMAL			P			p
	PUP#	13	WITHIN	NORMAL	LIMITS		P			P

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP 3	100 MG/M3		

FEMALE# OBSERV		0 1 2 3	4
3503 PUP# 14 WITHIN		P	1
	N NORMAL LIMITS	P	p
	N NORMAL LIMITS	P	`Þ
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P ·	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
PUP# 14 WITHIN	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
PUP# 4 WITHIN	N NORMAL LIMITS	P	P
PUP# 5 WITHIN	N NORMAL LIMITS	P	p
PUP# 6 WITHIN	N NORMAL LIMITS	P	P
PUP# 7 WITHIN	N NORMAL LIMITS	P	p
PUP# 8 WITHIN	N NORMAL LIMITS	P	P
PUP# 9 WITHIN	N NORMAL LIMITS	P	P
PUP# 10 WITHIN	N NORMAL LIMITS	P	P
PUP# 11 WITHIN	N NORMAL LIMITS	P	P
PUP# 12 WITHIN	N NORMAL LIMITS	P	p
	N NORMAL LIMITS	P	p
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
	N NORMAL LIMITS	P	P
PUP# 6 WITHIN	N NORMAL LIMITS	P	P

<sup>&</sup>lt;sup>1</sup>Died on Lactation Day 3.

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP	3	100	MG/	'мз
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FEMALE#		OBSERVATIONS		DAY OF LACTATION	0 1 0 0	
					0 1 2 3	4
		WITHIN NORMAL			P	P
PUP		WITHIN NORMAL			₽	P
PUP		WITHIN NORMAL			P	P
PUPŧ		WITHIN NORMAL	LIMITS		P	P
PUP		WITHIN NORMAL	LIMITS		P	P
PUP#	12	WITHIN NORMAL	LIMITS		P	P
3507 PUP#		WITHIN NORMAL	<del>-</del>		P	p
PUP		WITHIN NORMAL			P	P
PUP#		WITHIN NORMAL			P	P
PUP#		WITHIN NORMAL			P	P
PUP#		WITHIN NORMAL			P	p
PUP#		WITHIN NORMAL			P	P
PUP#		WITHIN NORMAL			P	p
PUP#		WITHIN NORMAL			P	P
PUP#		WITHIN NORMAL	LIMITS		P	P
PUP#		WITHIN NORMAL			P	P
PUP#	11	WITHIN NORMAL	LIMITS		P	P
PUP#		WITHIN NORMAL			P	P
PUP#	13	WITHIN NORMAL	LIMITS		P	p
PUP#	14	WITHIN NORMAL	LIMITS		P	P
3508 PUP#	1	WITHIN NORMAL	LIMITS		P	P
PUP#	2	WITHIN NORMAL	LIMITS		P	P
PUP#	3	WITHIN NORMAL	LIMITS		P	P
PUP#	4	WITHIN NORMAL	LIMITS		P	P
PUP#	5	WITHIN NORMAL	LIMITS		P	P
PUP#	6	WITHIN NORMAL	LIMITS		P	P
PUP#	7	WITHIN NORMAL	LIMITS		P	P
PUP#	8	WITHIN NORMAL	LIMITS		P	P
PUP#	9	WITHIN NORMAL	LIMITS		P	P
PUP#	10	WITHIN NORMAL	LIMITS		P	P
PUP#	11	WITHIN NORMAL	LIMITS		P	P

#### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

FEMALE#		OBSERVATIONS		DAY OF			
<del>-</del>		OBSERVATIONS		LACTATION	0 1 2 3	1	
3508 PUP#	12	WITHIN NORMA	L LIMITS		P	•	
PUP#	13	WITHIN NORMA	L LIMITS		P	•	
PUP#	14	WITHIN NORMA	L LIMITS		P	•	
3509 PUP#	2	WITHIN NORMA	L LIMITS		P		
PUP#	3	WITHIN NORMA	L LIMITS		P		
PUP#	4	WITHIN NORMA	L LIMITS		P	•	
PUP#	5	WITHIN NORMA	L LIMITS		P		
PUP#	6	WITHIN NORMA	L LIMITS		P	•	
PUP#	7	WITHIN NORMA	L LIMITS		P		
PUP#	8	WITHIN NORMA	L LIMITS		P		
PUP#	9	WITHIN NORMA	L LIMITS		P		
# <b>9</b> U9	10	WITHIN NORMAN	L LIMITS		P		
PUP#	11	WITHIN NORMAN	L LIMITS		P		
PUP#	12	WITHIN NORMA	L LIMITS		P		
PUP#	13	WITHIN NORMAL	L LIMITS		P		
PUP#	14	WITHIN NORMA	L LIMITS		P		
PUP#	15	WITHIN NORMAN	L LIMITS		P	•	
3510 PUP#	1	WITHIN NORMAL	L LIMITS		P		
PUP#	2	WITHIN NORMAL	L LIMITS		P		
PUP#	3	WITHIN NORMAL	L LIMITS		₽		
PUP#	4	WITHIN NORMAL	L LIMITS		P		
PUP#	5	WITHIN NORMAI	LIMITS		P		
PUP#	6	WITHIN NORMA	L LIMITS		P		
PUP#	7	WITHIN NORMA	L LIMITS		P		
PUP#	8	WITHIN NORMAL	L LIMITS		P		
3511 PUP#	2	WITHIN NORMAI	LIMITS		P		
PUP#	3	WITHIN NORMAI	LIMITS		P	, ,	
PUP#	4	WITHIN NORMAL	LIMITS		P	•	
PUP#	5	WITHIN NORMAI	LIMITS		P	•	
PUP#	6	WITHIN NORMAI	LIMITS		P		

#### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP 3	100	0 MG	/мз			VIDUAL FOF (	LINICAL OBSERV	ATIONS DURIN	G LACTATION	I		
FEMALE#		<b>-</b>	OBSERV	ATIONS			DAY OF LACTATION	0 1 2 3	4		 	
3511	PUP#		WITHIN	NORMAL	LIMITS			P	P		 	
	PUP#	_	WITHIN	NORMAL	LIMITS			Ъ	P			
	PUP#	9	WITHIN	NORMAL	LIMITS			P	P			
	PUP#	10	WITHIN	NORMAL	LIMITS			P	P			
	PUP#	11	WITHIN	NORMAL	LIMITS			P	P			
3512	PUP#	1	WITHIN	NORMAL	LIMITS			P	P			
	PUP#	2	WITHIN	NORMAL	LIMITS			P	p			
	PUP#	3	WITHIN	NORMAL	LIMITS			P	P			
	PUP#	4	WITHIN	NORMAL	LIMITS			Þ	P			
	PUP#	5	WITHIN	NORMAL	LIMITS			- P	p D			
	PUP#	6	WITHIN	NORMAL	LIMITS			P P	P			
								-	-			

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP 4	300 MG/M3

FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3	4
4501 PUP# 2	WITHIN NORMAL LIMITS		P	P
PUP# 3	WITHIN NORMAL LIMITS		- P	P
PUP# 4	WITHIN NORMAL LIMITS		P	P
PUP# 5	WITHIN NORMAL LIMITS		P	P
PUP# 6	WITHIN NORMAL LIMITS		P	P
PUP# 7	WITHIN NORMAL LIMITS		P	P
PUP# 8	WITHIN NORMAL LIMITS		P	P
PUP# 9			P	1
PUP# 10			P	P
PUP# 11			P	P
PUP# 12	WITHIN NORMAL LIMITS		P	P
			•	
4502 PUP# 1			P	P
PUP# 2			P	P
PUP# 3			P	P
PUP# 4			P	P
PUP# 5			P	P
PUP# 6			P	P
PUP# 7			P	P
PUP# 8			P	P
PUP# 9			P	P
PUP# 10			P	P
PUP# 11			P	P
PUP# 12			P	P
PUP# 13			P	P
PUP# 14			P	P
PUP# 15			P	P
PUP# 16			P	P
PUP# 17	WITHIN NORMAL LIMITS		P	P

<sup>&</sup>lt;sup>1</sup>Died on Lactation Day 2.

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP 4 300 MG/M3

ASOS PUP# 2							DAY OF		
4505 PUD# 2 WITHIN NORMAL LIMITS	FEMALE#			OBCEDU	ATTONG		DAY OF		
PUP# 3			- <b></b> -				DACIATION	0 1 2 3	4
PUP# 3	4505	PUP#	2	WITHIN	NORMAL.	T.TMTTS		ъ	D
PUP# 4 WITHIN NORMAL LIMITS									
PUP# 5 WITHIN NORMAL LIMITS								-	
PUP# 6 WITHIN NORMAL LIMITS			_					-	
PUP# 7   WITHIN NORMAL LIMITS						_		_	
PUP# 8 WITHIN NORMAL LIMITS P P P P P P P P P P P P P P P P P P P								_	
PUP# 9								_	
PUP# 10		PUP#	9					_	
PUP# 11   WITHIN NORMAL LIMITS								_	
4506 PUP# 1 WITHIN NORMAL LIMITS									
PUP# 2   WITHIN NORMAL LIMITS								•	
PUP# 2 WITHIN NORMAL LIMITS	4506	PUP#	1	WITHIN	NORMAL	LIMITS		P	Þ
PUP# 3 WITHIN NORMAL LIMITS		PUP#	2	WITHIN	NORMAL	LIMITS			
PUP# 4   WITHIN NORMAL LIMITS		PUP#	3	WITHIN	NORMAL	LIMITS		P	
PUP# 5   WITHIN NORMAL LIMITS   P   P   P   P   P   P   P   P   P		PUP#	4	WITHIN	NORMAL	LIMITS		P	
PUP# 7       WITHIN NORMAL LIMITS       P       P         PUP# 8       WITHIN NORMAL LIMITS       P       P         PUP# 9       WITHIN NORMAL LIMITS       P       P         PUP# 10       WITHIN NORMAL LIMITS       P       P         PUP# 11       WITHIN NORMAL LIMITS       P       P         PUP# 12       WITHIN NORMAL LIMITS       P       P         PUP# 2       WITHIN NORMAL LIMITS       P       P         PUP# 3       WITHIN NORMAL LIMITS       P       P         PUP# 4       WITHIN NORMAL LIMITS       P       P         PUP# 3       WITHIN NORMAL LIMITS       P       P         PUP# 3       WITHIN NORMAL LIMITS       P       P         PUP# 4       WITHIN NORMAL LIMITS       P       P         PUP# 4       WITHIN NORMAL LIMITS       P       P		PUP#	5	WITHIN	NORMAL	LIMITS		P	P
PUP# 8   WITHIN NORMAL LIMITS   P   P   P   P   P   P   P   P   P		PUP#	6	WITHIN	NORMAL	LIMITS		P	P
PUP# 9 WITHIN NORMAL LIMITS P P P P P P P P P P P P P P P P P P P		PUP#	7	WITHIN	NORMAL	LIMITS		P	P
PUP# 10 WITHIN NORMAL LIMITS P P P PUP# 11 WITHIN NORMAL LIMITS P P PUP# 12 WITHIN NORMAL LIMITS P P PUP# 2 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 5 P PUP# 5 P PUP# 5 P PUP# 6 P PUP# 6 P PUP# 6 P PUP# 6 P PUP# 7 P PUP# 7 P PUP# 7 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P PUP# 9 P		PUP#	8	WITHIN	NORMAL	LIMITS		P	P
PUP# 11 WITHIN NORMAL LIMITS P P P PUP# 12 WITHIN NORMAL LIMITS P P PUP# 2 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P		PUP#	9	WITHIN	NORMAL	LIMITS		P	P
PUP# 12 WITHIN NORMAL LIMITS  P P P  4507 PUP# 1 WITHIN NORMAL LIMITS  P P P  PUP# 2 WITHIN NORMAL LIMITS  P P P  PUP# 3 WITHIN NORMAL LIMITS  P P P  PUP# 4 WITHIN NORMAL LIMITS  P P P  4508 PUP# 2 WITHIN NORMAL LIMITS  P P P  PUP# 3 WITHIN NORMAL LIMITS  P P P  PUP# 3 WITHIN NORMAL LIMITS  P P P  PUP# 4 WITHIN NORMAL LIMITS  P P P  PUP# 4 WITHIN NORMAL LIMITS  P P P  PUP# 5 WITHIN NORMAL LIMITS  P P P		PUP#	10	WITHIN	NORMAL	LIMITS		P	P
4507 PUP# 1 WITHIN NORMAL LIMITS P P P PUP# 2 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P		PUP#	11	WITHIN	NORMAL	LIMITS		P	P
PUP# 2 WITHIN NORMAL LIMITS P P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P		PUP#	12	WITHIN	NORMAL	LIMITS		P	P
PUP# 2 WITHIN NORMAL LIMITS P P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P									
PUP# 3 WITHIN NORMAL LIMITS P P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P	4507			WITHIN	NORMAL	LIMITS		P	P
PUP# 4 WITHIN NORMAL LIMITS P P P 4508 PUP# 2 WITHIN NORMAL LIMITS P PUP# 3 WITHIN NORMAL LIMITS P PUP# 4 WITHIN NORMAL LIMITS P P P P P P P P P P P P P P P P P P P		PUP#	2					P	P
4508 PUP# 2 WITHIN NORMAL LIMITS P P P PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P		PUP#	3	WITHIN	NORMAL	LIMITS		P	P
PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P		PUP#	4	WITHIN	NORMAL	LIMITS		P	P
PUP# 3 WITHIN NORMAL LIMITS P P PUP# 4 WITHIN NORMAL LIMITS P P									
PUP# 4 WITHIN NORMAL LIMITS P P	4508							P	P
								P	P
PUP# 5 WITHIN NORMAL LIMITS P P									
		PUP#	5	WITHIN	NORMAL	LIMITS		P	P ·

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP	4	300	MG/M3
-------	---	-----	-------

						DAY OF				***************************************
FEMALE#			OBSERVATION	IS		LACTATION	(	1 2	3 4	4
4508 PU	#	6	WITHIN NOR	/AL	LIMITS		1	 P	1	P
PUI	#	7	WITHIN NOR	(AL	LIMITS			P		P
PUI	#	8	WITHIN NOR	1AL	LIMITS			- -		- P
PUI	#	9	WITHIN NORM	LAL	LIMITS		1	?		P
PUI	# :	10	WITHIN NOR	ΊAL	LIMITS		1	?		P
PUI	# :	11	WITHIN NOR	(AL	LIMITS		1	?		p
PU	# :	12	WITHIN NOR	IAL	LIMITS		3	2	1	P
PUI	# :	13	WITHIN NORM	IAL	LIMITS		3		1	P
PUI	# 1	14	WITHIN NOR	IAL	LIMITS		1	?	1	P
4511 PU	#	3	WITHIN NORM	1AL	LIMITS		1	e e	1	P
PUI	#	4	WITHIN NORM	íAL	LIMITS		I	?		P
PUI	#	5	WITHIN NORM	íAL	LIMITS		J	?	I	- P
PUI	#	6	WITHIN NORM	lAL	LIMITS		1	>	I	P
PUI	#	7	WITHIN NORM	IAL	LIMITS		1	>		P
PUI	#	8	WITHIN NORM	IAL	LIMITS		I	?	1	P
PUI	#	9	WITHIN NORM	IAL	LIMITS		I	•	I	P
PUI	# ]	L O	WITHIN NORM	IAL	LIMITS		Ţ	,	I	P
PUI	# 1	L1	WITHIN NORM	IAL	LIMITS		I	,	E	2
PU	,		WITHIN NORM				1	,	F	P
PUI			WITHIN NORM	$\mathbf{L}$	LIMITS		E	•	I	p
PUE	# 1	L4	WITHIN NORM	ΙΑL	LIMITS		E	•	F	P
PUE	# 1	L5	WITHIN NORM	ΙAL	LIMITS		E	•	E	p
PUI	# 1	L6	WITHIN NORM	ΙAL	LIMITS		E	•	E	?
PUF			WITHIN NORM	ΆL	LIMITS		E	>	E	·
PUE	# 1	18	WITHIN NORM	IAL	LIMITS		E	•	F	
4512 PUF	#	1	WITHIN NORM	lAL	LIMITS		F	<b>,</b>	F	
PUF	#	2	WITHIN NORM	AL	LIMITS		F		Ē	
PUP	#	3	WITHIN NORM	ΆL	LIMITS		P		F	
PUF	#	4	WITHIN NORM	$\mathbf{AL}$	LIMITS		Ę		F	
PUF	#	5	WITHIN NORM	ΑL	LIMITS		F		F	
PUF	#	6	WITHIN NORM	AL	LIMITS		F		Ē	

### APPENDIX R

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP CLINICAL OBSERVATIONS DURING LACTATION

GROUP 4	300	MG	/M3			0211110112 02021111110	no bonzii	
						DAY OF		
FEMALE#			OBSERVA	ATIONS		LACTATION	0 1 2 3	4
4512	PUP#	7	WITHIN	NORMAL	LIMITS		P	P
	PUP#	8	WITHIN	NORMAL	LIMITS		P	P
	PUP#	9	WITHIN	NORMAL	LIMITS		P	P
	PUP#	10	WITHIN	NORMAL	LIMITS		P	P
	PUP#	11	WITHIN	NORMAL	LIMITS		P	P
	PUP#	12	WITHIN	NORMAL	LIMITS		P	P
	PUP#	13	WITHIN	NORMAL	LIMITS		P	P
	PUP#	14	WITHIN	NORMAL	LIMITS		P	P

CODE: 1-SLIGHT 2-MODERATE 3-MARKED P-PRESENT

PUP# 15 WITHIN NORMAL LIMITS

APPENDIX S

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 1	0 MG/M	3							UP BOD		(0.						LACT	ATION	DAY 1	
FEMALE#	MEAN		PUP#																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1501	7.4	7.6	7.3	7.2	7.7	7.8	7.8	7.1	7.3	7.5	6.9	7.4	7.0	7.1						
1502	6.2	6.8	6.2	6.5	6.8	6.4	6.1	5.8	6.1	6.2	5.7	6.0	6.3	6.1						
1503	7.6	7.6	7.9	8.1	7.4	7.4	7.5	7.5	7.5	7.4	7.6	7.8								
1504	NP																			
1505	7.2	s	7.6	7.1	6.1	6.7	7.4	7.6	7.5	7.3	7.8	7.3	7.3	6.9	7.5					
1506	6.6	6.8	6.8	6.8	6.4	6.9	6.5	6.4	6.7	6.3	6.1	6.3	6.5	6.7						
1507	7.8	7.7	7.8	8.0	8.2	7.8	8.4	8.2	8.2	7.2	8.0	7.4	8.1	7.4	7.4					
1508	6.7	7.6	7.2	4.8	6.9	6.9	7.3	5.3	7.4	7.2	7.3	7.3	6.8	6.0	6.1	6.5				
1509	8.2	S	8.6	8.5	8.4	8.1	8.1	8.5	8.5	8.0	7.7	8.3	7.8							
1510	7.3	7.8	8.1	7.6	7.6	7.3	7.5	5.7	7.4	7.1	6.6	7.4	7.2							
1511	8.4	8.5	8.3	8.9	8.3	8.7	8.5	8.6	7.8	8.3	9.1	8.3	7.4	8.2						
1512	7.8	8.8	7.7	8.0	7.6	7.7	7.3	7.9	7.7	8.4	7.8	7.6	7.3	7.8						
MEAN	7.4																			
S.D.	0.68																			
N	11																			

PUP STATUS CODES: S-STILLBORN NP=Not Pregnant

APPENDIX S

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 2	30 MG/	мз				:	INDIVI	DUAL PI	JP BOD	WEIG	HTS (G	RAMS)					LACT.	ATION	DAY 1	-
FEMALE#	MEAN		PUP#											· · · · · · ·	~ ~ ~ ~ ~ ~ ~					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2501	6.9	s	6.7	7.3	7.5	7.1	6.6	6.5	6.7	7.2	6.4	7.0	6.7	6.6	7.3					
2502	7.4	7.7	7.5	7.9	7.6	7.2	7.6	7.1	7.0	7.1	7.0	7.7	7.3							
2503	7.9	8.5	8.8	8.3	8.3	7.9	7.5	7.6	7.5	8.3	8.1	7.2	8.2	7.3	7.7					
2504	7.4	D	7.7	7.9	8.3	5.7	8.0	7.5	7.0	8.0	7.4	6.9	6.9	7.3	7.6					
2505	6.6	6.3	7.1	6.5	6.7	7.2	6.3	7.0	6.2	6.1	6.9	6.7	5.8	7.1	6.7					
2506	8.0	8.5	8.6	7.6	8.3	8.3	7.9	8.7	6.2	8.1	8.1	7.7	8.2	7.8	7.9					
2507	8.1	8.3	8.7	7.2	8.6	8.4	7.8	8.1	7.4	8.1	8.1	8.0								
2508	7.7	8.2	7.8	7.7	7.8	7.9	8.7	6.3	7.7	7.5	7.5	8.0	7.2							
2509	7.0	6.4	7.5	7.6	7.0	7.0	6.7	7.2	6.5	6.6	6.9	7.3	7.1	7.4	7.0					
2510	6.0	S	s	5.7	6.6	6.0	6.4	6.3	6.4	6.1	5.6	6.4	6.5	5.9	5.3	5.4	5.6			
2511	8.6	9.7	8.7	9.3	8.4	8.8	8.6	7.3	8.9	8.2	8.3	8.5	8.3	8.6						
2512	7.2	S	S	7.9	6.9	7.5	7.8	6.7	6.7	7.3	6.8	7.4	7.1	7.6	7.0	7.1				
MEAN	7.4																			
S.D.	0.71																			
N	12																			

PUP STATUS CODES: S-STILLBORN D-DIED

APPENDIX S

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP BODY WEIGHTS (GRAMS) GROUP 3 100 MG/M3 LACTATION DAY 1 FEMALE# MEAN PUP# 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 3501 7.7 6.1 8.7 8.4 3502 8.3 8.4 8.9 8.6 8.6 9.0 7.7 8.5 9.1 7.0 8.3 7.8 8.0 8.1 8.0 7.9 3503 7.8 8.3 7.6 8.2 8.5 7.7 7.3 7.9 7.6 7.4 7.9 7.9 8.0 7.7 3504 7.4 S S S 7.5 8.2 7.7 8.2 8.0 7.4 6.7 6.9 6.5 3505 8.2 8.2 8.1 8.2 8.4 8.9 8.4 8.0 8.7 8.4 7.9 7.5 7.8 3506 8.0 8.9 8.9 8.2 7.9 8.5 7.6 7.7 7.6 7.7 7.8 7.6 7.9 3507 7.1 7.5 6.6 5.9 7.8 8.0 7.5 7.6 6.6 6.9 7.8 6.5 7.1 3508 6.5 6.0 6.7 7.1 7.0 6.6 7.3 6.4 6.6 6.7 6.1 6.2 6.1 6.2 5.9 3509 7.5 S 7.4 7.6 7.6 8.1 7.5 7.2 7.8 7.1 7.4 7.3 7.5 7.1 7.5 7.3 3510 9.9 9.6 9.2 10.0 10.3 10.2 10.1 10.1 9.6 S 8.0 8.0 8.4 8.3 7.9 8.2 8.0 8.2 7.2 7.1 3511 7.9 3512 7.6 7.4 7.5 7.9 7.9 7.3 7.4 MEAN 7.8 s.D. 0.82 N 12

PUP STATUS CODES: S-STILLBORN

APPENDIX S

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY

SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

GROUP 4	300 MC	3/M3					INDIVI	DUAL P	UP BOD	Y WEIG	HTS (G	RAMS)					LACT	ATION	DAY 1	
FEMALE#	MEAN	1	PUP#	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
4501	7.4	s	7.6	7.4	7.6	7.5	7.8	7.3	7.7	6.6	7.1	7.1	7.2							
4502 4503	5.9 NP	5.9	6.1	6.4	6.5	6.3	6.6	5.8	5.6	6.0	5.8	6.1	5.9	5.6	6.3	4.1	5.7	6.2		
4504	NVF																			
4505	7.3	s	7.6	7.3	8.0	7.7	7.8	7.3	7.2	7.0	6.6	6.4								
4506	7.7	7.8	8.1	7.4	8.2	8.1	7.5	7.7	7.4.	7.3	7.5	7.6	7.4							
4507	7.4	.7.0	7.6	7.8	7.3															
4508 4509 4510	7.1 NP NP	s	7.7	7.0	6.2	7.5	7.7	7.3	7 - 1	7.3	7.1	7.4	6.3	7.2	6.5					
4511	6.6	s	s	6.8	6.0	7.4	7.2	7.4												
4512	6.6	6.7	6.6	7.2	7.2	5.6	7.0	7.4	6.3 6.5	6.6 6.4	6.5 7.1	7.3 5.9	6.8 6.6	6.6 6.8	5.6 6.4	6.6 5.7	6.7	6.3	5.6	
MEAN	7.0																			
S.D.	0.57						•													
N	8																			

PUP STATUS CODES: S-STILLBORN NP=Not Pregnant NVF=No Viable Fetuses

APPENDIX S

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP BODY WEIGHTS (GRAMS)

GROUP 1	0 MG/1	M3															LACT	ATION	DAY 4	
FEMALE#	MEAN	1	PUP#	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1501	9.9	10.0	10.5	9.8	10.0	10.5	10.2	10.1	9.6	10.1	9.3	9.7	9.7	9.8						
1502	9.1	9.7	9.3	10.3	10.0	9.4	8.8	8.3	9.1	8.7	8.6	8.3	9.0	8.7						
1503	11.2	11.3	11.2	11.5	11.1	11.6	10.6	11.4	11.1	11.2	11.1	11.6								
1504	NP																			
1505	11.2	S	11.9	11.0	9.8	10.0	11.2	11.8	11.3	11.3	11.4	11.3	11.3	11.0	11.8					
1506	9.9	10.0	10.2	10.5	9.5	10.4	9.9	10.0	10.0	9.3	9.4	9.5	9.9	10.2						
1507	12.1	11.6	11.6	12.5	12.1	12.1	12.5	13.3	12.9	11.5	11.8	10.7	12.1	12.5	11.8					
1508	9.9	11.1	10.6	7.9	10.4	9.8	10.3	7.8	10.6	10.2	10.3	10.9	10.8	8.9	8.9	10.0				
1509	12.0	S	12.4	12.4	12.6	12.0	11.6	12.4	12.1	11.7	11.4	11.8	11.9							
1510	10.3	10.5	11.0	10.7	10.4	10.6	11.0	8.4	10.5	10.4	9.4	10.5	10.1							
1511	11.6	11.9	11.6	11.8	11.4	11.7	11.9	11.7	11.1	11.2	12.3	11.3	10.6	11.7						
1512	11.3	12.5	11.4	11.5	11.4	11.8	10.2	11.6	11.3	11.8	10.5	11.6	11.1	10.1						
MEAN	10.8						,													
S.D.	0.99																			
N	11																			

PUP STATUS CODES: S-STILLBORN NP=Not Pregnant

APPENDIX S

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP BODY WEIGHTS (GRAMS)

GROUP 2	30 MG,	/мз					INDIAI	DUAL E	PUP BOI	NA MEIG	SHTS (C	RAMS)					LACT	ATION	DAY 4	
FEMALE#	MEAN	1	PUP#	3														<b>-</b>		
	<b></b>				4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2501	10.2	s	10.3	10.5	11.0	10.5	9.9	10.0	9.9	10.4	9.6	10.3	10.0	9 7	10.6					
2502	11.1	10.5	11.4	11.8	11.4	10.9		10.7		11.1		11.5	10.6	3.7	10.6					
2503	11.5	11.9	12.2	11.8	11.8	11.7	11.0	11.3		11.6	12.8	10.5	11.7	11.2	11 2					
2504	11.1	D	11.3	11.6	12.3	8.4	11.8	11.7	10.9	12.1	10.3	10.8	10.4		11.7					
2505	10.1	9.5	10.7	M	9.8	11.3	9.4	10.7	9.6	9.1	10.7	10.4	8.7	11.2						
2506	12.1	12.4		12.4	12.8	12.4	12.3	12.9	8.6	11.8	12.4	11.4	12.3							
2507	12.0		13.0				11.4	11.7	11.6	12.3	12.2	11.9								
2508	11.6	12.3			11.3	12.2	12.5	9.6	11.7	11.2	11.7	12.3	11.2							
2509	10.1	9.1	10.9	10.9	9.8	10.1	10.3	9.8	9.2	9.4	10.0	10.4	10.4	10.8	9.7					
2510	9.1	S	S	9.1	9.7	9.3	9.7	9.2	9.5	9.1	8.7	9.7	9.7	8.6	7.7	8.6	8.8			
2511	12.2	13.1			11.9			10.8	12.6	11.6	11.9	11.7	11.7	12.3						
2512	10.9	S	S	11.2	10.1	11.8	11.6	10.4	10.9	10.9	10.8	11.1	10.7	11.3	10.7	10.8				
MEAN	11.0																			
S.D.	0.96																			
N	12																			

PUP STATUS CODES: S-STILLBORN D-DIED M-MISSING

APPENDIX S

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP BODY WEIGHTS (GRAMS)

GROUP 3	100 M	<b>З/МЗ</b>															LACT	ATION	DAY 4	
FEMALE#	MEAN		PUP#																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
3501	10.6	8.5	11.4	11.8																
3502	10.7	11.0	10.7	10.8	11.3	11.3	10.1	11.0	12.1	8.8	10.8	10.4	10.4	11.1	10.4	10.8				
3503	11.4	12.2	11.2	12.2	11.8	11.6	11.1	10.9	11.4	10.8	11.0	11.6	11.5	11.4	D					
3504	11.5	S	S	S	12.1	12.1	11.9	12.4	12.7	11.3	10.6	11.1	9.9	11.9	10.1					
3505	11.4	11.7	11.5	11.6	11.4	12.1	11.7	11.0	11.9	11.5	11.0	10.6	11.2							
3506	12.1	13.3	13.3	12.1	12.0	12.6	11.2	11.9	11.7	11.8	12.2	11.4	12.1							
3507	9.7	10.1	9.3	8.2	10.7	10.7	10.1	10.5	9.5	10.0	10.2	9.2	9.3	9.6	9.0					
3508	8.9	7.8	8.9	9.9	9.7	9.1	9.6	8.9	9.1	9.6	8.3	8.7	8.7	8.4	8.3					
3509	10.8	Ş	10.8	11.3	11.5	10.8	10.8	10.8	11.6	10.9	10.7	10.5	11.4	9.7	10.3	10.4				•
3510	14.4	14.4	13.8	14.7	14.7	14.9	14.6	14.4	13.9											
3511	11.9	s	12.2	12.6	12.4	12.3	11.6	12.4	11.7	12.2	10.8	10.6								
3512	12.2	11.5	12.0	13.3	12.5	11.5	12.4													
MEAN	11.3																			
S.D.	1.38																			
N	12																			

PUP STATUS CODES: S-STILLBORN D-DIED

APPENDIX S

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

### INDIVIDUAL PUP BODY WEIGHTS (GRAMS)

GROUP 4	300 M	G/M3															LACT.	ATION 1	DAY 4	
FEMALE#	MEAN	1	PUP#	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
4501	11.5	 S	11.5	11 7															<b>-</b>	
				11.7	11.6	11.8	11.7			D	11.1									
4502	8.5	8.8	8.8	8.8	9.0	9.2	9.2	7.8	7.9	8.4	7.8	8.5	8.8	8.9	8.8	6.2	8.8	8.6		
4503	NP	•																		
4504	NVF																			
4505	10.8	Ś	11.6	10.4	11.8	11.1	11.8	10.7	10.5	10.9	9.7	9.4								
4506	10.8	11.0	11.4	10.4	11.5	11.2	10.5	10.8	10.9	10.3	10.6	10.7	10.5							
4507	11.6	11.1	11.5	12.3	11.5															
4508	10.8	S	11.5	10.9	9.9	11.6	11.0	10.9	10.6	11.2	11.2	11.1	9.6	10.8	9.6					
4509	NP					•							5.0	10.0	٥.0					
4510	NP																			
4511	9.6	s	s	9.5	8.9	10.2	10 3	10.1	9.5	9.7	9.8	10.4		0.7						
4512	9.8	10.0	9.8				10.1		9.1				9.3	9.7	8.6	10.3	9.8	9.0	8.5	
.5.2	2.0	10.0	٥.٥	10.0	10.5	0.9	10.1	10.1	9.1	10.1	10.1	9.1	9.5	10.0	9.8	8.3				
MEAN	10.4																			
S.D.	1.06																			
N	8																			
14	0																			

PUP STATUS CODES: S-STILLBORN D-DIED NP=Not Pregnant NVF=No Viable Fetuses

Individual Organ Weights	
Preface	Appendix T

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Absolute Organ Weights	242
% Organ to Body Weight Ratios	
% Organ to Brain Weight Ratios	

### **Key to Abbreviations:**

g = Grams observ. = Observed

semis w/ coag GI = Seminal vesicles with Coagulating gland

wt. = Weight

### Corresponding exposure levels for each group were as follows:

Group 1 - 0 mg/m³ Group 2 - 30 mg/m³ Group 3 - 100 mg/m³ Group 4 - 300 mg/m³

### Notes:

- 1. Ovaries and Oviducts were weighed together.
- 2. These appendices consist of all collective females (even those that are non-pregnant or had no viable fetuses). Non-pregnant females and females with no viable fetuses are presented separately from the pregnant females.

## Individual Absolute Organ Weights (g) Study number: 034246

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Appendix T		-						
Animal G		Terminal		Brain	Epididy	ymis Right	Pitui	tary gland
No/sex Sul	bgroup	Body wt. (g)	Adrenal Glands	Ep	ididymis Left		Lungs	
				Male	Animals			
1001/M	1/1	382.3	0.0701	1.9328	0.5438	0.5143	1.8699	0.0113
1002/M	1/1	383.2	0.0698	2.1296	0.5611	0.5961	1.8185	0.0095
1003/M	1/1	379.3	0.0738	2.0776	0.6095	0.5826	1.5971	0.0033
1004/M	1/1	408.1	0.0563	2.0146	0.5942	0.5213	1.9075	0.0108
1005/M	1/1	406.0	0.0668	1.9962	0.5428	0.5679	2.1965	0.0119
1006/M	1/1	395.5	0.0706	2.0250	0.5576	0.5713	2.1107	0.0125
1007/M	1/1	348.2	0.0615	2.0135	0.5693	0.5308	1.7544	0.0123
1008/M	1/1	356.4	0.0574	1.8283	0.5737	0.6452	1.6465	0.0072
1009/M	1/1	398.2	0.0602	2.0856	0.5501	0.5501	1.9692	0.0114
1010/M	1/1	398.8	0.0518	2.0849	0.5606	0.5883	2.3906	0.0114
1011/M	1/1	382.3	0.0569	1.9728	0.3368	0.6057	1,7704	0.0124
1012/M	1/1	335.1	0.0739	1.8978	0.5344	0.5274		
Number of ob			(12)	(12)			1.7038	0.0123
Manuel Of OD.	BCIV	(12)	(12)	(12)	(12)	(12)	(12)	(12)
2001/M	2/1	378.4	0.0618	1.9711	0.5808	0.6239	1.9829	0.0117
2002/M	2/1	364.1	0.0583	1.9964	0.5869	0.6188	2.0649	0.0148
2003/M	2/1	378.4	0.0678	2.0818	0.5580	0.5729	1.8530	0.0090
2004/M	2/1	442.4	0.0788	2.0227	0.6156	0.6284	2.2273	0.0131
2005/M	2/1	325.5	0.0732	1.9715	0,5551	0.5450	1.9030	0.0109
2006/M	2/1	376.9	0.0528	1.9960	0.5910	0.6136	2.0802	0.0133
2007/M	2/1	388.7	0.0575	2.0279	0.5079	0.5421	1.8984	0.0133
2008/M	2/1	367.8	0.0664	1.9400	0.5901	0.6072	1.9499	0.0086
2009/M	2/1	415.1	0.0607	1.9579	0.5772	0.5781	2.3608	0.0127
2010/M	2/1	373.1	0.0558	1.9255	0.5534	0.6302	2.2593	0.0094
2011/M	2/1	398.3	0.0584	2.0242	0.5850	0.5833	1.9803	0.0132
2012/M	2/1	366.0	0.0588	1.9618	0.5636	0.5682	1.8600	0.0093
Number of obs		(12)	(12)	(12)	(12)	(12)	(12)	(12)
3001/M	3/1	350 5	0.0406	1 0005	0 5100			
3001/M 3002/M	3/1	350.5	0.0426	1.9825	0.5492	0.5045	2.4645	0.0085
3002/M 3003/M	3/1	429.1	0.0876	2.1395	0.5818	0.5689	2.4892	0.0144
3003/M 3004/M	3/1	343.8	0.0427	2.1122	0.5370	0.5813	2.1257	0.0120
3004/M 3005/M	•	445.8	0.0665	1.9954	0.5878	0.6327	2.5409	0.0145
3005/M 3006/M	3/1 3/1	387.7	0.0595	1.9876	0.5449	0.5473	2.4374	0.0123
3006/M 3007/M	3/1	356.0	0.0484	2.0993	0.5831	0.5752	2.0342	0.0116
	-	377.2	0.0586	1.9751	0.6285	0.6420	1.7369	0.0101
3008/M	3/1	374.4	0.0614	1.9682	0.5435	0.5846	2.1050	0.0110
3009/M	3/1 3/1	369.6	0.0513	1.9197	0.5043	0.4976	2.2929	0.0095
3010/M		397.9	0.0583	2.1475	0.5953	0.5973	2.4515	0.0123
3011/M	3/1	367.5	0.0613	1.9483	0.6257	0.6132	1.9580	0.0130
3012/M	3/1	361.1	0.0800	1.9453	0.6192	0.6742	2.3011	0.0124
Number of obs	serv. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4001/M	4/1	423.6	0.0623	1.9963	0.5140	0.5403	2.9856	0.0122
4002/M	4/1	424.8	0.0632	2.1793	0.5826	0.5761	2.5610	0.0122
4003/M	4/1	398.6	0.0619	1.9776	0.5379	0.5777	2.5082	0.0114
	• -			-,,	0.55.5	0.37.7	2.3002	0.0114

## Individual Absolute Organ Weights (g) Study number: 034246

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•	•		Brain	Epidio	lymis Right	Pitui	tary gland
No/sex Subgrou	ip Body wt. (g)	Adrenal Glands	Epidi	dymis Left		Lungs	
4004/M 4/1	323.4	0.0612	1.8820	0.5374	0.5804	2.3145	0.0092
4005/M 4/1	389.6	0.0583	1.9519	0.6333	0.6453	2,2236	0.0097
4006/M 4/1	396.4	0,0688	2.0109	0.5550	0.5776	2.9429	0.0137
4007/M 4/1	341.9	0.0608	2.1681	0.5468	0.5256	2.8764	0.0127
4008/M 4/1	383.2	0.0762	1.9844	0.6107	0.6143	2.6246	0.0107
4009/M 4/1	305.9	0.0792	1.9584	0.5175	0.5070	2.4874	0.0111
4010/M 4/1	404.3	0.0619	2.0196	0.5410	0.5467	2,7706	0.0126
4011/M 4/1	320.2	0.0601	1.9006	0.6034	0.6335	2.4827	0.0101
4012/M 4/1	375.9	0.0709	1.8911	0.4949	0.5789	2.4305	0.0140
Number of observ.	: (12)	(12)	(12)	(12)	(12)	(12)	(12)

### Individual Absolute Organ Weights (g) Study number: 034246

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Animal G	roup/	Terminal	Semi	a w/Coag Gl	<del></del>	Testis Pight	
No/sex Su	baroup	Body wt. (a)	Prostate	.b	Testis Left	resers kryne	Thymus
			Semi Prostate				
			0.8926 0.7041 0.9753 0.5873 1.0368 0.8897 0.9466 0.5956 0.7993 0.6625 1.2291 0.6467 (12)	Male	Animals		
1001/M	1/1	382.3	0.8926	1.6061	1.4849	1.5091	0.4074
1002/M	1/1	383.2	0.7041	1.3519	1.5680	1.6198	0.5022
1003/M	1/1	379.3	0.9753	1.2374	1.6161	1.5997	0.4323
1004/M	1/1	408.1	0.5873	1.4909	1.5768	1.5858	0.6701
1005/M	1/1	406.0	1.0368	1.6097	1.7300	1.7028	0.6701 0.5289
1006/M	1/1	395.5	0.8897	1.8777	1.5575	1.5981	0.6390
1007/M	1/1	348.2	0.9466	1.5679	1.3994	1,4502	0.5162
1008/M	1/1	356.4	0.5956	1.4901	1.6121	1.6087	0.5099
1009/M	1/1	398.2	0.7993	1.5345	1.6606	1.6826	0.5300
1010/M	1/1	398.8	0.6625	1.7388	1.7240	1.6819	0.5410
1011/M	1/1	382.3	1.2291	1.2224	0.7701	1.5957	0.4726
1012/M	1/1	335.1	0.6467	1.1665	1.6791	1.6638	0.5656
Number of ob	serv. :	(12)	(12)	(12)	(12)	(12)	(12)
			0.9219 0.6592 1.0653 1.1366 1.1209 0.6892 1.1443 0.6113 0.8520 0.6861 1.0589 0.7908 (12)				0.5656 (12)
2001/M	2/1	378.4	0.9219	1.4632	1.7110	1.7360	0.4108
2002/M	2/1	364.1	0.6592	1.8607	1.7041	1.7427	0.3155
2003/M	2/1	378.4	1.0653	1.2226	1.5325	1.6121	0.3469
2004/M	2/1	442.4	1.1366	1.5060	1.7191	1.7116	0.7004
2005/M	2/1	325.5	1.1209	1.7239	1.5446	1.5667	0.5481
2006/M	2/1	376.9	0.6892	1.7958	1.7006	1.6926	0.3289
2007/M	2/1	388.7	1.1443	1.0822	1,5536	1.5653	0.3853
2008/M	2/1	367.8	0.6113	1.6453	1.7919	1.8219	0.5857
2009/M	2/1	415.1	0.8520	1.4160	1.6974	1.6652	0.4152
2010/M	2/1	373.1	0.6861	1.8794	1.7001	1.7321	0.3917
2011/M	2/1	398.3	1.0589	1.3811	1.5848	1.5376	0.3816
2012/M	2/1	366.0	0.7908	1.4595	1.7928	1.6815	0.5721
Number of ob	serv. :	(12)	(12)	(12)	(12)	(12)	(12)
					,,	,,	(22)
3001/M	3/1	350.5	0.7691	1.0059	1.4531	1.4931	0.8271
3002/M	3/1	429.1	0,9724	1.7528	1.7049	1.7444	0.6924
3003/M	3/1	343.8	0.5036	1.4440	1.5030	1.5892	0.5386
3004/M	3/1	445.8	0.7988	1.5715	1.7349	1.7232	0.6708
3005/M	3/1	387.7	0.8208	1.3714	1.5236	1.5354	0.7446
3006/M	3/1	356.0	0.7300	1.2432	1.6472	1.6290	0.4954
3007/M	3/1	377.2	0.8854	1,1465	1.6336	1.6477	0.3871
3008/M	3/1	374.4	0.8856	1.9762	1.6437	1.6524	0.5005
3009/M	3/1	369.6	0.9116	1.2413	1.4794	1.4614	0.6139
3010/M	3/1	397.9	0.6468	1.6024	1.6658	1.7243	0.6992
3011/M	3/1	367.5	0.9899	1.2304	1.7146	1.7301	0.4923
3012/M	3/1	361.1	0.9262	1.3403	1.6404	1.6617	0.6024
Number of ob	serv. :	(12)	0.7691 0.9724 0.5036 0.7988 0.8208 0.7300 0.8854 0.8856 0.9116 0.6468 0.9899 0.9262 (12)	(12)	(12)	(12)	(12)
4001/M	4/1	423.6	0.8667 0.8421 0.9707	1.8012	1.5477	1.5236	
4002/M	4/1	424.8	0.8421	1.6492	1.7426	1.7535	
4002/34	4/1	398.6	0 9707	1 2304	1 7399	1.7535 1.7482	0,4329

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Animal Group/	Terminal	Semis	w/Coag Gl		Testis Right		
No/sex Subgroup Bo	ody wt. (g)	Prostate	-	Testis Left	J	Thymus	
4004/M 4/1	323.4	0.6585	1.3885	1.4416	1.4532	0.5307	
4005/M 4/1	389.6	0.8578	1.3212	1.7520	1.7696	0.5786	
4006/M 4/1	396.4	0.9741	1.8351	1.7514	1,6404	0.4309	
4007/M 4/1	341.9	0.8248	1.4531	1.6412	1.5881	0.4141	
4008/M 4/1	383.2	0.8788	1.7702	1.5979	1.6046	0.5415	
4009/M 4/1	305.9	0.6758	1.3185	1.5079	1.4982	0.2372	
4010/M 4/1	404.3	0.6453	1.8259	1.5085	1.5219	0.6355	
4011/M 4/1	320.2	0.9686	0.8373	1.7129	1.7532	0.3943	
4012/M 4/1	375.9	0.8664	1.7895	1,6178	1.6099	0.6047	
umber of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	

# Summary statistics for absolute organ weights (g) Study number: 034246

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Appendix T (pregnant							rsion 4.2.2
Animal Group/ No/sex Subgroup Bo	Terminal	Adrenal Glands	Brain	_	Ovary Left		tary gland
		Autenar Grands		Lungs	·	Ovary Right	
1501/F 1/1			Female	Anima	l s		
	306.7	0.1124	2.1738	1.7623	0.0801	0.0837	0.0134
1502/F 1/1	277.8	0.1089	1.9274	1.2813	0.0858	0.0699	0.0180
1503/F 1/1	302.4	0.0798	1.9809	1.3265	0.0523	0.0661	0.0147
1505/F 1/1	304.4	0.0726	1.7944	1.4296	0.0746	0.0555	0.009
1506/F 1/1	287.4	0.0813	1.8357	1.4700	0.0667	0.0701	0.015
1507/F 1/1	319.5	0.1020	1.9177	1.4117	0.1002	0.0642	0.016
1508/F 1/1	312.6	0.0906	2.0339	1.8038	0.0770	0.0704	0.021
1509/F 1/1	284.0	0.0868	1.9919	1.5542	0.0669	0.0695	0.0169
1510/F 1/1	303.5	0.0909	2.0102	1.2590	0.0672	0.0674	0.019
1511/F 1/1	299.8	0.0897	2.0144	1.6354	0.0723	0.0707	0.016
1512/F 1/1	308.6	0.0923	1.9461	1.6421	0.0732	0.0623	0.017
Mean:	300.6	0.0916	1.9660	1.5069	0.0742	0.0682	0.016
Standard deviation:	12.6	0.0121	0.1018	0.1875	0.0122	0.0069	0.003
Number of observ. :	(11)	(11)	(11)	(11)	(11)	(11)	(11
2501/F 2/1	319.5	0.0801	1.9260	1.6201	0.0581	0.0705	0.015
2502/F 2/1	305.3	0.0870	1.9358	1.4617	0.0790	0.0789	0.014
2503/F 2/1	309.1	0.0899	1.9090	1.5889	0.0941	0.0823	0.020
2504/F 2/1	328.9	0.0885	1.9948	1.7263	0.0798	0.0738	0.016
2505/F 2/1	329.8	0.0747	1.8631	1.6790	0.0810	0.0724	0.018
2506/F 2/1	345.4	0.0843	1.9667	1.6469	0.0759	0.1015	0.010
2507/F 2/1	307.8	0.0816	1.8118	1.7385	0.0886	0.0632	0.021
2508/F 2/1	314.6	0.0951	2.0031	1.5835	0.0595	0.0641	0.015
2509/F 2/1	287.9	0.0772	1.9411	1.5952	0.0617	0.0699	0.016
2510/F 2/1	316.0	0.0893	1.9005	1.7155	0.0818	0.0718	0.018
2511/F 2/1	327.1	0.0860	1.9893	1.8429	0.0672	0.0766	0.014
2512/F 2/1	335.8	0.0843	1.9819	1.7788	0.0738	0.0825	0.021
Mean:	318.9	0.0848	1.9353	1.6648	0.0750	0.0756	0.016
tandard deviation:	15.6	0.0058	0.0578	0.1033	0.0114	0.0102	0.003
number of observ. :	(12).	(12)	(12)	(12)	(12)	(12)	(12)
3501/F 3/1	260.6	0.0704	2.0224	1.8901	0.0735	0.0617	0.0143
3502/F 3/1	328.6	0.0940	1.9582	1.9530	0.0663	0.0872	0.018
3503/F 3/1	329.3	0.0926	2.0074	2.2934	0.0917	0.0872	0.015
3504/F 3/1	306.7	0.0918	1.8347	1.8118	0.0791	0.0558	0.018
3505/F 3/1	314.7	0.0931	1.9503	1.8958	0.0649	0.0865	0.0149
3506/F 3/1	331.2	0.0924	1,9972	1.9165	0.0049	0.0730	0.017
3507/F 3/1	286.5	0.0801	1.9048	2.1311	0.0637	0.0715	0.017
3508/F 3/1	301.2	0.0720	1.8573	1.5744	0.0728	0.0653	0.021
3509/F 3/1	308.5	0.0974	1.9540	1.9898	0.0860	0.0738	
3510/F 3/1	304.7	0.0792	2.0432	2.3182	0.0645		0.0214
3511/F 3/1	346.2	0.0806	2.0432	2.3162	0.0840	0.0766	0.0201
3512/F 3/1	295.3	0.0654	1.9377	1.9683		0.0691	0.0089
Mean:	309.5	0.0841	1.9587	1.9869	0.0547	0.0768	0.0160
tandard deviation:	23.0	0.0108			0.0732	0.0737	0.0175
acviation:	23.0	0.0108	0.0676	0.2050	0.0109	0.0100	0.004

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* *	Terminal		Brain		Ovary Left	Pitui	tary gland
No/sex Subgroup Bo	dy wt. (g)	Adrenal Glands		Lungs		Ovary Right	
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4501/F 4/1	301.8	0.0942	1.9442	3.0010	0.0877	0.0662	0.0210
4502/F 4/1	323.4	0.0999	1.9136	2.0036	0.0646	0.0789	0.0177
4505/F 4/1	305.7	0.0879	1.8606	2.1542	0.0644	0.0793	0.0176
4506/F 4/1	328.3	0.1239	1.8526	2.1175	0.0683	0.0778	0.0162
4507/F 4/1	307.4	0.0765	2.0073	2.1033	0.0842	0.0792	0.0174
4508/F 4/1	312.2	0.1164	1.7969	2,6315	0.0728	0.0824	0.0098
4511/F 4/1	304.8	0.1109	1.9341	2.4818	0.0768	0.0908	0.0161
4512/F 4/1	325.6	0.0869	1.9985	2.6454	0.0783	0.0747	0.0166
Mean:	313.7	0.0996	1.9135	2.3923	0.0746	0.0787	0.0166
Standard deviation:	10.5	0.0163	0.0732	0.3519	0.0087	0.0069	0.0031
Number of observ. :	(8)	. (8)	(8)	(8)	(8)	(8)	(8)

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Animal G		Terminal	Uter	us w/vagina		
No/sex Su	bgroup B	ody wt. (g)	Thymus	, ,		
				Female	Animals	
1501/F	1/1	306.7	0.3009	1.0678	Allidis	
1502/F	1/1	277.8	0.2892	0.8602		
1503/F	1/1	302.4	0.2502	1.1072		
1505/F	1/1	304.4	0.4215	1.1360		
1506/F	1/1	287.4	0.2245	0.9684		
1507/F	1/1	319.5	0.3280	0.8639		
1508/F	1/1	312.6	0.2326	0.9410		
1509/F	1/1	284.0	0.3678	0.8963		
1510/F	1/1	303.5	0.3878	0.9918		
1511/F	1/1	299.8	0.2322	1.2256		
-	1/1	308.6	0.3482	0.9358		
•	iean:	300.6				
Standard dev			0.2921	0.9995		
Number of ob		12.6 (11)	0.0677	0.1196		
number of op	serv. :	(11)	(11)	(11)		
2501/F	2/1	319.5	0.2285	0.9291		
2502/F	2/1	305.3	0.2121	0.8392		
2503/F	2/1	309.1	0.2256	0.9809		
2504/F	2/1	328.9	0.4117	1.1112		
2505/F	2/1	329.8	0.3540	0.9202		
2506/F	2/1	345.4	0.5141	1.1295		
2507/F	2/1	307.8	0.3848	0.8150		
2508/F	2/1	314.6	0.3777	0.8948		
2509/F	2/1	287.9	0.2848	0.8331		
2510/F	2/1	316.0	0.2232	1.0154		
2511/F	2/1	327.1	0.3123	0.9954		
2512/F	2/1	335.8	0.2370	1.0216		
M	lean:	318.9	0.3138	0.9571		
Standard dev		15.6	0.0957	0.1038		
Number of ob	serv. :	(12)	(12)	(12)		
3501/F	3/1	260.6	0.3154	0.8133		
3501/F 3502/F	3/1	328.6	0.2683	1.0133		
3502/F	3/1	329.3	0.2683	1.0133		
3504/F	3/1	306.7	0.4179			
3504/F	3/1	314.7		0.8565		
3505/F 3506/F			0.2788	0.9861		
3506/F 3507/F	3/1 3/1	331.2 286.5	0.4796	0.9729		
3507/F 3508/F	3/1	301.2	0.2291	1.1104		
•	* .		0.2844	1.1064		
3509/F	3/1	308.5	0.3355	0.9994		
3510/F	3/1	304.7	0.2665	0.7764		
3511/F	3/1	346.2	0.4424	1.3011		
3512/F	3/1	295.3	0.3578	0.7303		
	lean:	309.5	0.3241	0.9757		
standard dev	lation:	23.0	0.0851	0.1618		

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-	Terminal	Uteru	s w/vagina	
No/sex Subgroup Bo	dy wt. (g)	Thymus		
Number of observ. :	(12)	(12)	(12)	
4501/F 4/1	301.8	0.2792	1.0836	
4502/F 4/1	323.4	0.2310	1.2313	
4505/F 4/1	305.7	0.3604	0.9856	
4506/F 4/1	328.3	0.3344	1.0223	
4507/F 4/1	307.4	0.3067	0.8076	
4508/F 4/1	312.2	0.2926	1.0399	
4511/F 4/1	304.8	0.1677	1.0390	
4512/F 4/1	325.6	0.2708	0.8516	
Mean:	313.7	0.2804	1.0076	
Standard deviation:	10.5	0.0602	0.1325	
Number of observ. :	(8)	(8)	(8)	

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Appendix T	(non-pr	egnant	animals)	
Animal		TI A wm		

Animal Group/	Terminal		Brain Ovary Left		Pitu:	itary gland	
No/sex Subgroup	Body wt. (g)	Adrenal Glands		Lungs		Ovary Right	
			Female	Animal	s		
1504/F 1/1	289.6	0.0720	1.9004	1.7627	0.0653	0.0613	0.0136
Mean:	289.6	0.0720	1.9004	1.7627	0.0653	0.0613	0.0136
Standard deviation:	0.0	0.000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observ. :	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4503/F 4/1	306.1	0.0985	1.8276	2.2323	0.0649	0.0792	0.0144
4504/F 4/1	269.4	0.0794	2.0250	2.3831	0.0597	0.0685	0.0120
4509/F 4/1	296.8	0.0802	1.8190	2.4772	0.0829	0.0628	0.0097
4510/F 4/1	270.7	0.0851	1.9002	2.3222	0.0928	0.0708	0.0189
Mean:	285.8	0.0858	1.8930	2.3537	0.0751	0.0703	0.0138
Standard deviation:	18.5	0.0088	0.0953	0.1030	0.0154	0.0068	0.0039
Number of observ. :	(4)	(4)	(4)	(4)	(4)	(4)	(4)

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3) .			
Uter	us w/vagina		
Thymus	. 3		
·	Female	Animals	
0.3777	0.8195		
0.3777	0.8195		
0.0000	0.0000		
(1)	(1)		
0.5539	0.6822		
0.4796	1.0413	•	
0.3747	1.0459		
0.4840	1.4326		
0.4731	1.0505		
0.0739	0.3065		
(4)	(4)		
	0.3777 0.3777 0.3777 0.0000 (1) 0.5539 0.4796 0.3747 0.4840 0.4731 0.0739	Uterus w/vagina Thymus  Female 0.3777 0.8195 0.3777 0.8195 0.0000 0.0000 (1) (1)  0.5539 0.6822 0.4796 1.0413 0.3747 1.0459 0.4840 1.4326 0.4731 1.0505 0.0739 0.3065	Uterus w/vagina Thymus  Female Animals  0.3777 0.8195  0.3777 0.8195  0.0000 0.0000 (1) (1)  0.5539 0.6822  0.4796 1.0413  0.3747 1.0459  0.4840 1.4326  0.4731 1.0505  0.0739 0.3065

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	Group/	Terminal		Brain		mis Right	Pitui	tary gland
No/sex	Subgroup	Body wt. (g)	Adrenal Glands	Ep:	ididymis Left		Lungs	
				Male	Animals			
1001/M	1/1	382.3	0.0183	0.5056	0.1422	0.1345	0.4891	0.003
1002/M	1/1	383.2	0.0182	0.5557	0.1464	0.1556	0.4746	0.002
1003/M	1/1	379.3	0.0195	0.5477	0.1607	0.1536	0.4211	0.003
1004/M	1/1	408.1	0.0138	0.4937	0.1456	0.1277	0.4674	0.002
1005/M	1/1	406.0	0.0165	0.4917	0.1337	0.1399	0.5410	0.002
1006/M	1/1	395.5	0.0179	0.5120	0.1410	0.1445	0.5337	0.003
1007/M	1/1	348.2	0.0177	0.5783	0.1635	0.1524	0.5038	0.003
1008/M	1/1	356.4	0.0161	0.5130	0.1610	0.1810	0.4620	0.003
1009/M	1/1	398.2	0.0151	0.5238	0.1381	0.1381	0.4945	0.002
1010/M	1/1	398.8	0.0130	0.5228	0.1406	0.1475	0.5994	0.003
1011/M	1/1	382.3	0.0149	0.5160	0.0881	0.1584	0.4631	0.003
1012/M	1/1	335.1	0.0221	0.5663	0.1565	0.1574	0.5084	0.003
umber of	observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(1:
2001/M	2/1	378.4	0.0163	0.5209	0.1535	0.1649	0.5240	0.003
2002/M	2/1	364.1	0.0160	0.5483	0.1612	0.1700	0.5671	0.00
2003/M	2/1	378.4	0.0179	0.5502	0.1475	0.1514	0.4897	0.00
2004/M	2/1	442.4	0.0178	0.4572	0.1392	0.1420	0.5035	0.00
2005/M	2/1	325.5	0.0225	0.6057	0.1705	0.1674	0.5846	0.00
2006/M	2/1	376.9	0.0140	0.5296	0.1568	0.1628	0.5519	0.00
2007/M	2/1	388.7	0.0148	0.5217	0.1307	0.1395	0.4884	0.00
2008/M	2/1	367.8	0.0181	0.5275	0.1604	0.1651	0.5302	0.00
2009/M	2/1	415.1	0.0146	0.4717	0.1391	0.1393	0.5687	0.00
2010/M	2/1	373.1	0.0150	0.5161	0.1483	0.1689	0.6055	0.00
2011/M	2/1	398.3	0.0147	0.5082	0.1469	0.1464	0.4972	0.00
2012/M	2/1	366.0	0.0161	0.5360	0.1540	0.1552	0.5082	0.00
umber of o	observ. :		(12)	(12)	(12)	(12)	(12)	(1:
3001/M	3/1	350.5	0.0122	0.5656	0.1567	0.1439	0.7031	0.002
3002/M	3/1	429.1	0.0204	0.4986	0.1356	0.1326	0.5801	0.00
3003/M	3/1	343.8	0.0124	0.6144	0.1562	0.1691	0.6183	0.003
3004/M	3/1	445.8	0.0149	0.4476	0.1319	0.1419	0.5700	0.003
3005/M	3/1	387.7	0.0153	0.5127	0.1405	0.1412	0.6287	0.003
3006/M	3/1	356.0	0.0136	0.5897	0.1638	0.1616	0.5714	0.003
3007/M	3/1	377.2	0.0155	0.5236	0.1666	0.1702	0.4605	0.002
. 3008/M	3/1	374.4	0.0164	0.5257	0.1452	0.1561	0.5622	0.002
3009/M	3/1	369.6	0.0139	0.5194	0.1364	0.1346	0.6204	0.002
3010/M	3/1	397.9	0.0147	0.5397	0.1496	0.1501	0.6161	0.002
3011/M	3/1	367.5	0.0167	0.5301	0.1703	0.1669	0.5328	0.003
3012/M	3/1	361.1	0.0222	0.5387	0.1705	0.1867	0.6372	0.003
umber of d			(12)	(12)	(12)	(12)	(12)	(12
4001/M	4/1	423.6	0.0147	0.4713	0.1213	0.1275	0.7048	0.002
4002/M	4/1	424.8	0.0149	0.5130	0.1371	0.1356	0.6029	0.002
4003/M	4/1	398.6	0.0155	0.4961	0.1349	0.1449	0.6293	0.003

Appendix T

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Animal Group/	Terminal		Brain	Epidio	lymis Right	Pitui	tary gland
No/sex Subgroup	No/sex Subgroup Body wt. (g)		Epididymis Left		Lungs		
4004/M 4/1	323.4	0.0189	0.5819	0.1662	0.1795	0.7157	0.0028
4005/M 4/1	389.6	0.0150	0.5010	0.1626	0.1656	0.5707	0.0025
4006/M 4/1	396.4	0.0174	0.5073	0.1400	0.1457	0.7424	0.0035
4007/M 4/1	341.9	0.0178	0.6341	0.1599	0.1537	0.8413	0.0037
4008/M 4/1	383.2	0.0199	0.5178	0.1594	0.1603	0.6849	0,0028
4009/M 4/1	305.9	0.0259	0.6402	0.1692	0.1657	0.8131	0.0036
4010/M 4/1	404.3	0.0153	0.4995	0.1338	0.1352	0.6853	0.0031
4011/M 4/1	320.2	0.0188	0.5936	0.1884	0.1978	0.7754	0.0032
4012/M 4/1	375.9	0.0189	0.5031	0.1317	0.1540	0.6466	0.0037
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)

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Animal Group/ Terminal		Semi	s w/Coag Gl		Testis Right			
No/sex Subgroup	Body wt. (g)	Semi Prostate	. 2	Testis Left	g	Thymus		
			Male	Animals				
1001/M 1/1	382.3	0.2335	0.4201			0.1066		
1002/M 1/1	382.3 383.2	0.1837	0.3528			0.1311		
1003/M 1/1	379.3 408.1	0.2571	0.3262			0.1140		
1004/M 1/1	408.1	0.1439	0.3653		0.4210	0.1642		
1005/M 1/1	406.0	0.2554	0.3965			0.1303		
1006/M 1/1	395.5	0.2250	0.4748		0.4041	0.1616		
1007/M 1/1	348.2	0.2719	0.4503			0.1482		
1008/M 1/1	356.4	0.1671	0.4181	0.1523	0.4514	0.1431		
1009/M 1/1		0.2007	0.3854	0.1323	0.4514 0.4226	0.1331		
1010/M 1/1	398.2 398.8	0.1661	0.4360	0.4323	0.4220	0.1357		
1011/M 1/1	382.3 335.1	0.3215	0.3197			0.1337		
1012/M 1/1	335.1	0.1930	0.3481		0.4965	0.1688		
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)		
		,,	(20)	(12)	(12)	(12)		
2001/M 2/1	378.4	0.2436	0.3867	0 4522	0.4588	0.1086		
2002/M 2/1	364.1	0.1810	0.5110			0.0867		
2003/M 2/1	378.4	0.2815	0.3231			0.0867		
2004/M 2/1	378.4 442.4	0.2569	0.3404		0.4260	0.1583		
2005/M 2/1	325.5	0,3444	0.5296			0.1684		
2006/M 2/1	376.9	0.1829	0.4765		0.4013	0.0873		
2007/M 2/1	388.7	0.2944	0.2784		0.4491 0.4027			
2008/M 2/1	367.8	0.1662	0.4473	0.4872		0.0991		
2009/M 2/1	415.1	0.2053	0.3411			0.1592 0.1000		
2010/M 2/1	415.1 373.1	0.1839	0.5037	0.4067	0.4012	0.1000		
2011/M 2/1	398.3	0.2659	0.3467		0.4642 0.3860			
2012/M 2/1	398.3 366.0	0.2161	0.3988		0.4594	0.0958		
Number of observ. :		(12)	(12)		(12)	0.1563 (12)		
	, ,,	,	(12)	(12)	(12)	(12)		
3001/M 3/1	350.5	0.2194	0 2870	0 4146	0.4260	0.2360		
3002/M 3/1	350.5 429.1	0.2266	0.4085	0.3973				
3003/M 3/1	343.8	0.1465	0.4200	0.4372		0.1614		
3004/M 3/1	343.8 445.8	0.1792	0.3525		0.3865	0.1567		
3005/M 3/1	387.7	0.2117		0.3930		0.1505 0.1921		
3006/M 3/1	356.0	0.2051	0.3492		0.4576			
3007/M 3/1	377.2	0.2347	0.3040	0.4331	01.50.0	0.1392		
3008/M 3/1	374.4	0.2365	0.5278		0.4413	0.1026		
3009/M 3/1	369.6	0.2466	0.3358		· · · · · · ·	0.1337		
3010/M 3/1	397.9	0.1626	0.4027	0.4003 0.4186	0.3334	0.1661 0.1757		
3011/M 3/1	367.5	0.2694	0.3348	0.4186	0.4334	0.1340		
3012/M 3/1	361.1	0.2565	0.3712	0.4542	0.4700			
Number of observ. :		(12)	(12)	(12)	0.4334 0.4708 0.4602 (12)	0.1668		
	•	122/	122/	(12)	(12)	(12)		
4001/M 4/1	423.6	0.2046	0.4252	በ ንፍፍል	0 3507	0.1393		
4001/M 4/1 4002/M 4/1	424.8	0.2046 0.1982	0.3882	0.5054	0.3357	0.1393		
4003/M 4/1	398.6	0.2435	0.3087	0.4363	0.4128 0.4386	0.1384		
· · · · · · · · · · · · · · · · · · ·		2.2.23	0.5007	0.4363	V.4366	0.1086		

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Animal Group	/ Terminal	Semis	w/Coag Gl	···	Testis Right		
No/sex Subgro	up Body wt. (g)	Prostate	_	Testis Left	Ť	Thymus	
4004/M 4/1	323.4	0.2036	0.4293	0.4458	0.4494	0.1641	
4005/M 4/1	389.6	0.2202	0.3391	0.4497	0.4542	0.1485	
4006/M 4/1	396.4	0.2457	0.4629	0.4418	0.4138	0.1087	
4007/M 4/1	341.9	0.2412	0.4250	0.4800	0.4645	0.1211	
4008/M 4/1	383.2	0.2293	0.4620	0.4170	0.4187	0.1413	
4009/M 4/1	305.9	0.2209	0.4310	0.4929	0.4898	0.0775	
4010/M 4/1	404.3	0.1596	0.4516	0.3731	0.3764	0.1572	
4011/M 4/1	320.2	0.3025	0.2615	0.5349	0.5475	0.1231	
4012/M 4/1	375.9	0.2305	0.4761	0.4304	0.4283	0.1609	
Number of observ	. : (12)	(12)	(12)	(12)	(12)	(12)	

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Animal Group/ Terminal No/sex Subgroup Body wt. (g) Adrenal Glands		Brain		Ovary Left	ft Pituitary gland		
No/sex Subgroup Bo	oay wt. (g)	Adrenal Glands		Lungs	,	Ovary Right	
1501/5 - /-			Female	Animal	s		
1501/F 1/1	306.7	0.0366	0.7088	0.5746	0.0261	0.0273	0.0044
1502/F 1/1	277.8	0.0392	0.6938	0.4612	0.0309	0.0252	0.0065
1503/F 1/1	302.4	0.0264	0.6551	0.4387	0.0173	0.0219	0.0049
1505/F 1/1	304.4	0.0239	0.5895	0.4696	0.0245	0.0182	0.0032
1506/F 1/1	287.4	0.0283	0.6387	0.5115	0.0232	0.0244	0.0053
1507/F 1/1	319.5	0.0319	0.6002	0.4418	0.0314	0.0201	0.0052
1508/F 1/1	312.6	0.0290	0.6506	0.5770	0.0246	0.0225	0.0070
1509/F 1/1	284.0	0.0306	0.7014	0.5473	0.0236	0.0245	0.0060
1510/F 1/1	303.5	0.0300	0.6623	0.4148	0.0221	0.0222	0.0063
1511/F 1/1	299.8	0.0299	0.6719	0.5455	0.0241	0.0236	0.0055
1512/F 1/1	308.6	0.0299	0.6306	0.5321	0.0237	0.0202	0.0056
Mean:	300.6	0.0305	0.6548	0.5013	0.0247	0.0227	0.0054
Standard deviation:	12.6	0.0043	0.0388	0.0581	0.0039	0.0026	0.0011
Number of observ. :	(11)	(11)	(11)	(11)	(11)	(11)	(11)
2501/F 2/1	319.5	0.0251	0.6028	0.5071	0.0182	0.0221	0.0049
2502/F 2/1	305.3	0.0285	0.6341	0.4788	0.0259	0.0258	0.0048
2503/F 2/1	309.1	0.0291	0.6176	0.5140	0.0304	0.0266	0.0066
2504/F 2/1	328.9	0.0269	0.6065	0.5249	0.0243	0.0224	0.0050
2505/F 2/1	329.8	0.0227	0.5649	0.5091	0.0246	0.0220	0.0055
2506/F 2/1	345.4	0.0244	0.5694	0.4768	0.0220	0.0294	0.0029
2507/F 2/1	307.8	0.0265	0.5886	0.5648	0.0288	0.0205	0.0071
2508/F 2/1	314.6	0.0302	0.6367	0.5033	0.0189	0.0204	0.0049
2509/F 2/1	287.9	0.0268	0.6742	0.5541	0.0214	0.0243	0.0056
2510/F 2/1	316.0	0.0283	0.6014	0.5429	0.0259	0.0227	0.0057
2511/F 2/1	327.1	0.0263	0.6082	0.5634	0.0205	0.0234	0.0043
2512/F 2/1	335.8	0.0251	0.5902	0.5297	0.0220	0.0246	0.0064
Mean:	318.9	0,0267	0.6079	0.5224	0.0236	0.0237	0.0053
Standard deviation:	15.6	0.0022	0.0303	0.0298	0.0038	0.0026	0.0011
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3501/F 3/1	260.6	0.0270	0.7761	0.7253	0.0282	0.0237	0.0055
3502/F 3/1	328.6	0.0286	0.5959	0.5943	0.0202	0.0265	0.0057
3503/F 3/1	329.3	0.0281	0.6096	0.6964	0.0278	0.0265	0.0078
3504/F 3/1	306.7	0.0299	0.5982	0.5907	0.0258	0.0182	0.0061
3505/F 3/1	314.7	0.0296	0.6197	0.6024	0.0206	0.0275	0.0047
3506/F 3/1	331.2	0.0279	0.6030	0.5787	0.0234	0.0220	0.0053
3507/F 3/1	286.5	0.0280	0.6649	0.7438	0.0222	0.0250	0.0074
3508/F 3/1	301.2	0.0239	0.6166	0.5227	0.0242	0.0217	0.0074
3509/F 3/1	308.5	0.0316	0.6334	0.6450	0.0279	0.0239	0.0042
3510/F 3/1	304.7	0.0260	0.6706	0.7608	0.0212	0.0259	
3511/F 3/1	346.2	0.0233	0.5885	0.6068	0.0212	0.0251	0.0066
3512/F 3/1	295.3	0.0221	0.6562	0.6665	0.0185	0.0260	0.0026
Mean:	309.5	0.0272	0.6361	0.6445	0.0183		0.0054
Standard deviation:	23.0	0.0029	0.0520	0.0744		0.0238	0.0057
		0.0027	0.0520	0.0/44	0.0033	0.0029	0.0014

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	Terminal		Brain		Ovary Left	]	Pituitary gland	
No/sex Subgroup Bo	dy wt. (g)	Adrenal Glands		Lungs		Ovary Right		
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	
4501/F 4/1	301.8	0.0312	0.6442	0.9944	0.0291	0.0219	0.0070	
4502/F 4/1	323.4	0.0309	0.5917	0.6195	0.0200	0.0244	0.0055	
4505/F 4/1	305.7	0.0288	0.6086	0.7047	0.0211	0.0259	0.0058	
4506/F 4/1	328.3	0.0377	0.5643	0.6450	0.0208	0.0237	0.0049	
4507/F 4/1	307.4	0.0249	0.6530	0.6842	0.0274	0.0258	0,0057	
4508/F 4/1	312.2	0.0373	0.5756	0.8429	0.0233	0.0264	0.0031	
4511/F 4/1	304.8	0.0364	0.6345	0.8142	0.0252	0.0298	0.0053	
4512/F 4/1	325.6	0.0267	0.6138	0.8125	0.0240	0.0229	0.0051	
Mean:	313.7	0.0317	0.6107	0.7647	0.0239	0.0251	0.0053	
Standard deviation:	10.5	0.0049	0.0322	0.1248	0.0032	0.0024	0.0011	
Number of observ. :	(8)	(8)	(8)	(8)	(8)	(8)	(8)	

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	Terminal		s w/vagina	
No/sex Subgroup Boo	dy wt. (g)	Thymus		
1501/F 1/1	306.7	0.0981	Female 0.3482	Animals
1502/F 1/1	277.8	0.1041		
1503/F 1/1	302.4	0.1041	0.3096	
1505/F 1/1	304.4	0.0827	0.3661	
1506/F 1/1	287.4		0.3732	
1507/F 1/1	319.5	0.0781 0.1027	0.3370	
1508/F 1/1	312.6		0.2704	
1509/F 1/1	284.0	0.0744	0.3010	
1510/F 1/1	303.5	0.1295	0.3156	,
1511/F 1/1	299.8	0.0720	0.3268	
1511/F 1/1 1512/F 1/1		0.0775	0.4088	
1512/F 1/1 Mean:	308.6	0.1128	0.3032	
Standard deviation:	300.6	0.0973	0.3327	
Number of observ. :	12.6	0.0228	0.0393	
Number of observ. :	(11)	(11)	(11)	
2501/F 2/1	319.5	0.0715	0.2908	
2502/F 2/1	305.3	0.0695	0.2749	
2503/F 2/1	309.1	0.0730	0.3173	
2504/F 2/1	328.9	0.1252	0.3379	
2505/F 2/1	329.8	0.1073	0.2790	
2506/F 2/1	345.4	0.1488	0.3270	
2507/F 2/1	307.8	0.1250	0.2648	
2508/F 2/1	314.6	0.1201	0.2844	
2509/F 2/1	287.9	0.0989	0.2894	
2510/F 2/1	316.0	0.0706	0.3213	
2511/F 2/1	327.1	0.0955	0.3043	
2512/F 2/1	335.8	0.0706	0.3042	
Mean:	318.9	0.0980	0.2996	
Standard deviation:	15.6	0.0274	0.0228	
Number of observ. :	(12)	(12)	(12)	
3501/F 3/1	260.6	0 1010	0.2101	
3501/F 3/1 3502/F 3/1		0.1210	0.3121	
· ·	328.6	0.0816	0.3084	
· · · · · · · · · · · · · · · · · · ·	329.3	0.0648	0.3165	
3504/F 3/1	306.7	0.1363	0.2793	
3505/F 3/1	314.7	0.0886	0.3133	
3506/F 3/1	331.2	0.1448	0.2937	
3507/F 3/1	286.5	0.0800	0.3876	
3508/F 3/1	301.2	0.0944	0.3673	
3509/F 3/1	308.5	0.1088	0.3240	
3510/F 3/1	304.7	0.0875	0.2548	,
3511/F 3/1	346.2	0.1278	0.3758	
3512/F 3/1	295.3	0.1212	0.2473	
Mean:	309.5	0.1047	0.3150	
Standard deviation:	23.0	0.0254	0.0445	

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	Terminal			
No/sex Subgroup Bo	dy wt. (g)	Thymus		
Number of observ. :	(12)	(12)	(12)	
4501/F 4/1	301.8	0.0925	0.3590	
4502/F 4/1	323.4	0.0714	0.3807	
4505/F 4/1	305.7	0.1179	0.3224	
4506/F 4/1	328.3	0.1019	0.3114	
4507/F 4/1	307.4	0.0998	0.2627	
4508/F 4/1	312.2	0.0937	0.3331	
4511/F 4/1	304.8	0.0550	0.3409	
4512/F 4/1	325.6	0.0832	0.2615	
Mean:	313.7	0.0894	0.3215	
Standard deviation:	10.5	0.0194	0.0424	
Number of observ. :	(8)	(8)	(8)	

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	ant animals		· · · · · · · · · · · · · · · · · · ·		··		rsion 4.2.2
•	Terminal		Brain		Ovary Left		itary gland
No/sex Subgroup Boo	dy wt. (g)	Adrenal Glands		Lungs		Ovary Right	
			Female	Animal	s		
1504/F 1/1	289.6	0.0249	0.6562	0.6087	0.0225	0.0212	0.0047
Mean:	289.6	0.0249	0.6562	0.6087	0.0225	0.0212	0.0047
Standard deviation:	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observ. :	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4503/F 4/1	306.1	0.0322	0.5971	0.7293	0.0212	0.0259	0.0047
4504/F 4/1	269.4	0.0295	0.7517	0.8846	0.0222	0.0254	0.0045
4509/F 4/1	296.8	0.0270	0.6129	0.8346	0.0279	0.0212	0.0033
4510/F 4/1	270.7	0.0314	0.7020	0.8579	0.0343	0.0262	0.0070
Mean:	285.8	0.0300	0.6659	0.8266	0.0264	0.0247	0.0049
Standard deviation:	18.5	0.0023	0.0735	0.0680	0.0060	0.0023	0.0016
Number of observ. :	(4)	(4)	(4)	(4)	(4)	· (4)	(4)

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			us w/vagina		
No/sex Subgroup Bo	dy wt. (g)	Thymus			
			Female	Animals	
1504/F 1/1	289.6	0.1304	0.2830		
Mean:	289.6	0.1304	0.2830		
Standard deviation:	0.0	0.0000	0.0000		
Number of observ. :	(1)	(1)	(1)		
4503/F 4/1	306.1	0.1810	0.2229		
4504/F 4/1	269.4	0.1780	0.3865		
4509/F 4/1	296.8	0.1262	0.3524		
4510/F 4/1	270.7	0.1788	0.5292		
Mean:	285.8	0.1660	0.3728		
Standard deviation:	18.5	0.0265	0.1259		
Number of observ. :	(4)	(4)	(4)		

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	Group/	Terminal		idymis Left		Lungs		Prostate
No/sex Subgroup Body wt. (g)		Adrenal Glands Epididymis Right				tary gland		
				Male	Animals			
1001/M	1/1	382.3	3.6269	28.1353	26.6091	96.7457	0.5846	46.1817
1002/M	1/1	383.2	3.2776	26.3477	27.9912	85.3916	0.4461	33.0625
1003/M	1/1	379.3	3.5522	29.3367	28.0420	76.8724	0.6594	46.9436
1004/M	1/1	408.1	2.7946	29.4947	25.8761	94.6838	0.5361	29.1522
1005/M	1/1	406.0	3.3464	27.1917	28.4491	110.0341	0.5961	51.9387
1006/M	1/1	395.5	3.4864	27.5358	28.2123	104.2321	0.6173	43.9358
1007/M	1/1	348.2	3.0544	28.2742	26.3621	87.1319	0.5860	47.0127
1008/M		356.4	3.1395	31.3789	35.2896	90.0563	0.3938	32,5767
1009/M	1/1	398.2	2.8865	26.3761	26.3761	94.4189	0.5466	38.3247
1010/M	1/1	398.8	2.4845	26.8886	28.2172	114.6626	0.5948	31.7761
1011/M	1/1	382.3	2.8842	17.0722	30.7026	89.7405	0.6539	62.3023
1012/M	1/1	335.1	3.8940	27.6320	27.7901	89.7776	0.6481	34.0763
Number of	observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)
2001/M	2/1	378.4	3.1353	29.4658	31.6524	100.5987	0.5936	46.770B
2002/M	2/1	364.1	2.9203	29.3979	30.9958	103.4312	0.7413	33.0194
2003/M	2/1	378.4	3.2568	26.8037	27.5195	89.0095	0.4323	51.1721
2004/M	2/1	442.4	3.8958	30.4346	31.0674	110.1152	0.6476	56.1922
2005/M	2/1	325.5	3.7129	28.1562	27.6439	96.5255	0.5529	56.8552
2006/M	2/1	376.9	2.6453	29.6092	30.7415	104.2184	0.6663	34.5291
2007/M	2/1	388.7	2.8354	25.0456	26.7321	93.6141	0.6559	56.4278
2008/M	2/1	367.8	3.4227	30.4175	31.2990	100.5103	0.4433	31.5103
2009/M	2/1	415.1	3.1003	29.4806	29.5265	120.5782	0.6487	43.5160
2010/M	2/1	373.1	2.8979	28.7406	32.7292	117.3358	0.4882	35.6323
2011/M	2/1	398.3	2.8851	28.9003	28.8163	97.8312	0.6521	52.3120
2012/M	2/1	366.0	2.9972	28.7287	28.9632	94.8109	0.4741	40.3099
Number of o	observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3001/M	3/1	350.5	2.1488	27.7024	25.4477	124.3128	0.4288	38.7945
3002/M	3/1	429.1	4.0944	27.1933	26.5903	116.3450	0.6731	45.4499
3003/M	3/1	343.8	2.0216	25.4237	27.5211	100.6392	0.5681	23.8424
3004/M	3/1	445.8	3.3327	29.4578	31.7079	127.3379	0.7267	40.0321
3005/M	3/1	387.7	2.9936	27.4150	27.5357	122.6303	0.6188	41.2960
3006/M	3/1	356.0	2.3055	27.7759	27.3996	96.8990	0.5526	34.7735
3007/M	3/1	377.2	2.9669	31.8212	32.5047	87.9399	0.5114	44.8281
3008/M	3/1	374.4	3.1196	27.6141	29.7023	106.9505	0.5589	44.9954
3009/M	3/1	369.6	2.6723	26.2697	25,9207	119.4406	0.4949	47.4866
3010/M	3/1	397.9	2.7148	27.7206	27.8137	114.1560	0.5728	30.1187
3011/M	3/1	367.5	3.1463	32.1152	31.4736	100.4979	0.6672	50.8084
3012/M	3/1	361.1	4.1125	31.8306	34.6579	118.2903	0.6374	47.6122
Number of o	bserv. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4001/M	4/1	423.6	3.1208	25.7476	27.0651	149.5567	0.6111	43.4153
4002/M	4/1	424.8	2.9000	26.7334	26.4351	117.5148	0.6424	38.6409
4003/M	4/1	398.6	3,1301	27.1996	29,2122	126.8305	0.5765	49.0848

#### Summary Statistics for % Organ to Brain Weight Study number: 034246

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Animal Group/ Terminal		Epid	idymis Left		Lungs		Prostate	
No/sex S	No/sex Subgroup Body wt. (g)	Body wt. (g)	Adrenal Glands	Epidi	dymis Right	Pitui	tary gland	
4004/M	4/1	323.4	3.2519	28.5547	30.8395	122.9809	0.4888	34.9894
4005/M	4/1	389.6	2.9868	32.4453	33.0601	113.9198	0.4970	43.9469
4006/M	4/1	396.4	3.4214	27.5996	28.7235	146.3474	0.6813	48.4410
4007/M	4/1	341.9	2.8043	25.2202	24,2424	132.6692	0.5858	38.0425
4008/M	4/1	383.2	3.8400	30.7750	30.9565	132.2617	0.5392	44,2854
4009/M	4/1	305.9	4.0441	26.4246	25,8885	127.0119	0.5668	34.5078
4010/M	4/1	404.3	3.0650	26.7875	27.0697	137.1856	0.6239	31.9519
4011/M	4/1	320.2	3.1622	31.7479	33.3316	130.6272	0.5314	50.9629
4012/M	4/1	375.9	3.7491	26.1700	30.6118	128.5231	0.7403	45.8146
mber of c	bserv. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)

#### Summary Statistics for % Organ to Brain Weight Study number: 034246

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Animal	Group/	Terminal		Testis Left		Thymus	
No/sex	Subgroup	Body wt. (g)	Semis w/Coag Gl		Testis Right		
				Male	Animals		
1001/M	1/1	382.3	83.0971	76.8264	78.0784	21.0782	
1002/M	1/1	383.2	63.4814	73.6289	76.0612	23.5819	
1003/M	1/1	379.3	59.5591	77.7869	76.9975	20.8077	
1004/M	1/1	408.1	74.0048	78.2686	78.7154	33.2622	
1005/M	1/1	406.0	80.6382	86.6647	85.3021	26.4953	
1006/M	1/1	395.5	92.7259	76.9136	78.9185	31.5556	
1007/M	1/1	348.2	77.8694	69.5009	72.0238	25.6370	
1008/M	1/1	356.4	81.5020	88.1748	87.9889	27.8893	
1009/M	1/1	398.2	73.5760	79,6222	80.6770	25.4124	
1010/M	1/1	398.8	83.3997	82.6898	80.6705	25.9485	
1011/M	1/1	382.3	61.9627	39.0359	80.8850	23.9558	
1012/M	1/1	335.1	61.4659	88.4761	87.6699	29.8029	
Number of	observ.	: (12)	(12)	(12)	(12)	(12)	
2001/M	2/1	378.4	74.2327	86.8043	88.0727	20.8412	
2002/M	2/1	364.1	93.2028	85.3587	87.2921	15.8034	
2003/M	2/1	378.4	58.7280	73.6142	77.4378	16.6635	
2004/M	2/1	442.4	74.4549	84.9904	84.6196	34.6270	
2005/M	2/1	325.5	87.4410	78.3464	79.4674	27.8012	
2006/M	2/1	376.9	89.9699	85,2004	84.7996	16.4780	
2007/M	2/1	388.7	53.3656	76.6113	77.1882	19.0000	
2008/M	2/1	367.8	84.8093	92.3660	93.9124	30.1907	
2009/M	2/1	415.1	72.3224	86.6949	85.0503	21.2064	
2010/M	2/1	373.1	97.6058	88.2940	89.9559	20.3428	
2011/M	2/1	398.3	68.2294	78.2927	75.9609	18.8519	
2012/M	2/1	366.0	74.3960	91.3855	85.7121	29.1620	
Number of	observ,	: (12)	(12)	(12)	(12)	(12)	
3001/M	3/1	350.5	50.7390	73.2963	75.3140	41.7201	
3002/M	3/1	429.1	81.9257	79.6869	81.5331	32.3627	
3003/M	3/1	343.8	68.3647	71.1580	75.2391	25.4995	
3004/M	3/1	445.8	78.7561	86.9450	86.3586	33.6173	
3005/M	3/1	387.7	68.9978	76.6553	77.2490	37.4623	
3006/M	3/1	356.0	59.2197	78.4643	77.5973	23.5983	
3007/M	3/1	377.2	58.0477	82.7097	83.4236	19.5990	
3008/M	3/1	374.4	100,4065	83.5129	83.9549	25.4293	
3009/M	3/1	369.6	64.6612	77.0641	76.1265	31.9790	
3010/M	3/1	397.9	74.6170	77.5693	80.2934	32.5588	
3011/M	3/1	367.5	63.1525	88.0049	88.8005	25.2682	
3012/M	3/1	361.1	68.8994	84.3263	85.4213	30.9669	
Number of	observ.	: (12)	(12)	(12)	(12)	(12)	
4001/M	•	423.6	90.2269	77.5284	76.3212	29.5547	
4002/M	-	424.8	75.6757	79.9615	80.4616	26.9720	
4003/M	4/1	398.6	62.2168	87.9298	88.4001	21.8902	

# Summary Statistics for % Organ to Brain Weight Study number: 034246

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Animal	Group/	Terminal		Testis Left		Thymus	
No/sex S	ubgroup	Body wt. (g)	Semis w/Coag Gl		Testis Right	-	
4004/M	4/1	323.4	73.7779	76.5994	77.2157	28.1987	
4005/M	4/1	389.6	67.6879	89.7587	90.6604	29.6429	
4006/M	4/1	396.4	91.2577	87.0953	81.5754	21.4282	
4007/M	4/1	341.9	67.0218	75.6976	73.2485	19.0997	
4008/M	4/1	383.2	89.2058	80.5231	80.8607	27.2878	
4009/M	4/1	305.9	67.3254	76.9965	76.5012	12,1119	
4010/M	4/1	404.3	90.4090	74.6930	75.3565	31.4666	
4011/M	4/1	320.2	44.0545	90.1242	92.2446	20.7461	
4012/M	4/1	375.9	94.6275	85.5481	85.1304	31.9761	
Number of o	bserv.	: (12)	(12)	(12)	(12)	(12)	

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Animal Group/	Terminal		Brain		Ovary Left	Pit	uitary gland
No/sex Subgroup Bo	ody wt. (g)	Adrenal Glands		Lungs	*	Ovary Right	
			Female	Anima	1 s		
1501/F 1/1	306.7	5.1707	100.0000	81.0700	3.6848	3.8504	0.6164
1502/F 1/1	277.8	5.6501	100.0000	66.4782	4.4516	3.6266	0.9339
1503/F 1/1	302.4	4.0285	100.0000	66.9645	2.6402	3.3369	0.7423
1505/F 1/1	304.4	4.0459	100.0000	79.6701	4.1574	3.0930	0.5406
1506/F 1/1	287.4	4.4288	100.0000	80.0785	3.6335	3.8187	0.8280
1507/F 1/1	319.5	5.3189	100.0000	73.6142	5.2250	3.3478	0.8604
1508/F 1/1	312.6	4.4545	100.0000	88.6868	3.7858	3.4613	1.076
1509/F 1/1	284.0	4.3576	100.0000	78.0260	3.3586	3.4891	0.848
1510/F 1/1	303.5	4.5219	100.0000	62.6306	3.3430	3.3529	0.950
1511/F 1/1	299.8	4.4529	100.0000	81.1855	3.5892	3.5097	0.819
1512/F 1/1	308.6	4.7428	100.0000	84.3790	3.7614	3.2013	0.8890
Mean:	300.6	4.6521	100.0000	76.6167	3.7846	3.4625	0.827
Standard deviation:	12.6	0.5202	0.0000	8.1885	0.6646	0.2352	0.151
Number of observ. :	(11)	(11)	(11)	(11)	(11)	(11)	(11)
2501/F 2/1	319.5	4.1589	100.0000	84.1173	3.0166	3.6604	0.815
2502/F 2/1	305.3	4.4943	100.0000	75.5088	4.0810	4.0758	0.764
2503/F 2/1	309.1	4.7093	100.0000	83.2321	4.9293	4.3112	1.063
2504/F 2/1	328.9	4.4365	100.0000	86.5400	4.0004	3.6996	0.817
2505/F 2/1	329.8	4.0094	100.0000	90.1186	4.3476	3.8860	0.817
2506/F 2/1	345.4	. 4.2864	100.0000	83.7393	3.8593	5.1609	0.508
2507/F 2/1	307.8	4.5038	100.0000	95.9543	4.8902	3.4882	1.197
2508/F 2/1	314.6	4.7476	100.0000	79.0525	2.9704	3.2000	0.773
2509/F 2/1	287.9	3.9771	100.0000	82.1802	3.1786	3.6011	0.824
2510/F 2/1	316.0	4.6988	100.0000	90.2657	4.3041	3.7780	0.947
2511/F 2/1	327.1	4.3231	100.0000	92.6406	3.3781	3.8506	0.713
2512/F 2/1	335.8	4.2535	100.0000	89.7523	3.7237	4.1627	1.084
Mean:	318.9	4.3832	100.0000	86.0918	3.8899	3.9062	0.873
Standard deviation:	15.6	0.2617	0.0000	5.8919	0.6685	0.4975	0.188
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12
3501/F 3/1	260.6	3.4810	100.0000	93.4583	3.6343	3.0508	0.707
3502/F 3/1	328.6	4.8003	100.0000	99.7345	3.3858	4.4531	0.955
3503/F 3/1	329.3	4,6129	100.0000	114.2473	4.5681	4.3439	1.280
3504/F 3/1	306.7	5.0035	100.0000	98.7518	4.3113	3.0414	1.280
3505/F 3/1	314.7	4.7736	100.0000	97.2056	3.3277	4.4352	0.764
3506/F 3/1	331.2	4.6265	100.0000	95.9594	3.8754	3.6551	0.886
3507/F 3/1	286.5	4.2052	100.0000	111.8805	3.3442	3.7537	1.107
3508/F 3/1	301.2	3.8766	100.0000	84.7682	3.9197	3.5159	0.689
3509/F 3/1	308.5	4.9846	100.0000	101.8321	4.4012	3.5159	
3510/F 3/1	304.7	3.8763	100.0000	113.4593			1.095
3511/F 3/1	346.2	3.9562	100.0000		3.1568	3.7490	0.983
3512/F 3/1	295.3	3.3751		103.1071	4.1231	3.3917	0.436
Mean:	309.5		100.0000	101.5792	2.8229	3.9635	0.825
m e a n: Standard deviation:		4.2977	100.0000	101.3319	3.7392	3.7608	0.895
scandard deviation:	23.0	. 0.5764	0.0000	8.6343	0.5470	0.4810	0.227

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Animal Group/	Terminal		Brain		Ovary Left		Pituitary gland
No/sex Subgroup	Body wt. (g)	Adrenal Glands		Lungs	-	Ovary Right	1 3
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4501/F 4/1	301.8	4.8452	100.0000	154.3566	4.5109	3.4050	1.0801
4502/F 4/1	323.4	5.2205	100.0000	104.7032	3.3758	4.1231	0,9250
4505/F 4/1	305.7	4.7243	100.0000	115.7799	3.4612	4.2621	0.9459
4506/F 4/1	328.3	6.6879	100.0000	114.2988	3.6867	4.1995	0.8744
4507/F 4/1	307.4	3.8111	100.0000	104.7826	4.1947	3.9456	0.8668
4508/F 4/1	312.2	6.4778	100.0000	146.4467	4.0514	4.5857	0.5454
4511/F 4/1	304.8	5.7339	100.0000	128.3181	3,9708	4.6947	0.8324
4512/F 4/1	325.6	4.3483	100.0000	132.3693	3.9179	3.7378	0.8306
Mean:	313.7	5.2311	100.0000	125.1319	3.8962	4.1192	0.8626
Standard deviation:	10.5	1.0093	0.0000	18,5441	0.3781	0.4245	0.1516
Number of observ. :	(8)	(8)	(8)	(8)	(8)	(8)	. (8)

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Huntingdon Life Sciences
Princeton Research Center
East Millstone, New Jersey
Appendix T (pregnant animals)

# Summary Statistics for % Organ to Brain Weight Study number: 034246

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Animal Group/	Terminal		us w/vagina		
No/sex Subgroup Bo	oay wt. (g)	Thymus			
			Female	Animals	
1501/F 1/1	306.7	13.8421	49.1214		
1502/F 1/1	277.8	15.0047	44.6301		
1503/F 1/1	302.4	12.6306	55.8938		
1505/F 1/1	304.4	23.4897	63.3081		
1506/F 1/1	287.4	12.2297	52.7537		
1507/F 1/1	319.5	17.1038	45.0488		
1508/F 1/1	312.6	11.4362	46.2658		
1509/F 1/1	284.0	18.4648	44.9972		
1510/F 1/1	303.5	10.8696	49.3384		
1511/F 1/1	299.8	11.5270	60.8419		
1512/F 1/1	308.6	17.8922	48.0859		
Mean:	300.6	14.9537	50.9350		
Standard deviation:	12.6	3.9154	6.5158		
Number of observ. :	(11)	(11)	(11)		
		,	,,		
2501/F 2/1	319.5	11.8640	48.2399		
2502/F 2/1	305.3	10.9567	43.3516		
2503/F 2/1	309.1	11.8177	51.3829		
2504/F 2/1	328.9	20.6387	55.7048		
2505/F 2/1	329.8	19.0006	49.3908		
2506/F 2/1	345.4	26.1402	57.4312		
2507/F 2/1	307.8	21.2385	44.9829		
2508/F 2/1	314.6	18.8558	44.6708		
2509/F 2/1	287.9	14.6721	42.9190		
2510/F 2/1	316.0	11.7443	53.4281		
2511/F 2/1	327.1	15.6990	50.0377		
2512/F 2/1	335.8	11.9582	51.5465		
Mean:	318.9	16.2155	49.4238		
Standard deviation:	15.6	4.9057	4.7790		
Number of observ. :	(12)	(12)	(12)		
3501/F 3/1	260.6	15.5953	40.2146		
3502/F 3/1	328.6	13.7014	51.7465		
3503/F 3/1	329.3	10.6356	51.9179		
3504/F 3/1	306.7	22.7776	46.6834		
3505/F 3/1	314.7	14.2952	50.5615		
3506/F 3/1	331.2	24.0136	48.7132		
3507/F 3/1	286.5	12.0275	58.2948		
3508/F 3/1	301.2	15.3126	59.5704		
3509/F 3/1	308.5	17.1699	51.1464		
3510/F 3/1	304.7	13.0433	37.9992		
3511/F 3/1	346.2	21.7150	63.8639		
3512/F 3/1	295.3	18.4652	37.6890		
Mean:	309.5	16.5627	49.8667		
Standard deviation:	23.0	4.3546			
	23.0	4,5540	8.3380		

#### Summary Statistics for % Organ to Brain Weight Study number: 034246

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	Terminal	Uter	us w/vagina	
No/sex Subgroup Bo	dy wt. (g)	Thymus		
Number of observ. :	(12)	(12)	(12)	
4501/F 4/1	301.8	14.3607	55.7350	
4502/F 4/1	323.4	12.0715	64.3447	
4505/F 4/1	305.7	19.3701	52.9722	
4506/F 4/1	328.3	18.0503	55.1819	
4507/F 4/1	307.4	15.2792	40.2332	
4508/F 4/1	312.2	16.2836	57.8719	
4511/F 4/1	304.8	8.6707	53.7201	
4512/F 4/1	325.6	13.5502	42.6120	
Mean:	313.7	14.7045	52.8339	
Standard deviation:	10.5	3.3928	7.8911	
Number of observ. :	(8)	(8)	(8)	

## Summary Statistics for % Organ to Brain Weight Study number: 034246

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				ve	rsion 4.2.2
)					
	Brain		Ovary Left	Pitu	itary gland
Adrenal Glands		Lungs	2	Ovary Right	
	Female	Animal	s		
3.7887	100.0000	92.7542	3.4361	3.2256	0.7156
3.7887	100.0000	92.7542	3.4361	3.2256	0.7156
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
(1)	(1)	(1)	(1)	(1)	(1)
5.3896	100.0000	122.1438	3.5511	4.3336	0.7879
3.9210	100.0000	117.6840	2.9481	3.3827	0.5926
4.4090	100.0000	136.1847	4.5574	3.4524	0.5333
4.4785	100.0000	122.2082	4.8837	3.7259	0.9946
4.5495	100.0000	124.5552	3.9851	3.7237	0.7271
0.6125	0.0000	8.0371	0.8942	0.4327	0.2089
(4)	(4)	(4)	(4)	(4)	(4)
	3.7887 3.7887 0.0000 (1) 5.3896 3.9210 4.4090 4.4785 4.5495 0.6125	Brain  Adrenal Glands  Female  3.7887 100.0000 3.7887 100.0000 0.0000 0.0000 (1) (1)  5.3896 100.0000 3.9210 100.0000 4.4090 100.0000 4.4785 100.0000 4.5495 100.0000 0.6125 0.0000	### Adrenal Glands #### Lungs    Fe m a l e	Brain	Brain Ovary Left Pitus Adrenal Glands Lungs Ovary Left Ovary Right  Female Animals  3.7887 100.0000 92.7542 3.4361 3.2256 3.7887 100.0000 92.7542 3.4361 3.2256 0.0000 0.0000 0.0000 0.0000 0.0000 (1) (1) (1) (1) (1) (1)  5.3896 100.0000 122.1438 3.5511 4.3336 3.9210 100.0000 122.1438 3.5511 4.3336 3.9210 100.0000 126.1847 4.5574 3.4524 4.4090 100.0000 136.1847 4.5574 3.4524 4.4785 100.0000 122.2082 4.8837 3.7259 4.5495 100.0000 124.5552 3.9851 3.7237 0.6125 0.0000 8.0371 0.8942 0.4327

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Appendix T (non-pregna	ant animals)				version 4.2.2
Animal Group/ 1	[erminal	Uter	us w/vagina		
No/sex Subgroup Boo	ly wt. (g)	Thymus			
			Female 1	nimals	
1504/F 1/1	289.6	19.8748	43.1225		
Mean:	289.6	19.8748	43.1225		
Standard deviation:	0.0	0.0000	0.0000		
Number of observ. :	(1)	(1)	(1)		
4503/F 4/1	306.1	30.3075	37.3276		
4504/F 4/1	269.4	23.6840	51.4222		
4509/F 4/1	296.8	20.5992	57.4986		
4510/F 4/1	270.7	25.4710	75.3921		
Mean:	285.8	25.0154	55.4101		
Standard deviation:	18.5	4.0616	15,7747		
Number of observ. :	(4)	(4)	(4)		

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Page 272 Final Report

Individual Animal Gross and	
Microscopic Observations	
Preface	Appendix U

### **Key to Abbreviations**

LN = Lymph Node

Nose/Turb Sec 1 = Nose/Turbinates Section 1
Nose/Turb Sec 2 = Nose/Turbinates Section 2
Nose/Turb Sec 3 = Nose/Turbinates Section 3
Nose/Turb Sec 4 = Nose/Turbinates Section 4
Oviducts/Fallop = Oviducts/Fallopian Tubes

V-DVTC = Ventral Diverticlum and Thyroid Cartilage

V-SM-G = Ventral Seromucinous Gland

## Corresponding exposure levels for each group were as follows:

Group 1 - 0 mg/m³
Group 2 - 30 mg/m³
Group 3 - 100 mg/m³
Group 4 - 300 mg/m³

#### **Notes**

- 1. Unless otherwise specified in a histopathology note, the organ/tissue examined was the required (routine) section.
- 2. The two sections of the larynx examined included the epithelium covering the base of the epiglottis (V-SM-G), the ventral pouch (V-DVTC) and the medial surfaces of the vocal processes of the arytenoid cartilages (both V-SM-G and V-DVTC).
- 3. Microscopic observations for Animal No. 2011 were not documented due to error and are therefore not reported.

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## Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

	US: Final phase sacrifice	SEX: Male ANIMAL: 1001	
PHASE DAY OF DEAT		PHASE: Dosing phase GROUP: 1	
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, BILATERAL, Multifocal, Minimal.	
Mediastinal LN	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Minimal.	
		- PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.	
Lungs	No gross observations on tissue.	SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Minimal.	
		HEMORRHAGE(S), Minimal.	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Minimal.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.	
Nose/Turb Sec 1 .	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 4 .	No gross observations on tissue.	PERIODONTAL DISEASE, Slight.	

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice ANIMAL: 1001 SEX: Male PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 1 Tissue Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 2 Nose/Turb Sec 3 Prostate

Seminal vesicles Testes

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Trachea

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 1002 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 1 **-----**Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . No gross observations on tissue. PROMINENT HISTIOCYTES, Slight. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT. Lungs . . . . . . . . . No gross observations on tissue. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, UNILATERAL, Focal, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy.

The following tissues were unremarkable microscopically:

Epididymides Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate

-

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

	individual Anima	al Gross and Microscopic Observations	
PHASE DA	STATUS: Final phase sacrifice AY OF DEATH: 31	SEX: Male PHASE: Dosing phase	ANIMAL: 1002 GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	Seminal vesicles Testes Trachea		

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 1003 GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Minima - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.	
Lungs	No gross observations on tissue.	SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Focal, Moderate.	AND
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Multifocal Minimal.	
Nose/Turb Sec 1 .	No gross observations on tissue.	NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGAT Minimal.	
Nose/Turb Sec 2 .	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INFLAMMATOR CELLS WITH OR WITHOUT LYMPHOID AGGREGAT Slight.	
Nose/Turb Sec 3 .	No gross observations on tissue.	PALATE: ECTOPIC SEBACEOUS GLAND, Preser	nt.

#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 1003 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 1 Tissue Gross Observations/Comments Microscopic Observations/Comments 

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides Nose/Turb Sec 4 Prostate

Seminal vesicles Testes

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Trachea

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 1004 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 1 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Testes . . . . . . . No gross observations on tissue. GERM CELL LOSS/DEPLETION, UNILATERAL, Multifocal, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy.

The following tissues were unremarkable microscopically:

Epididymides Lungs Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate

# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice

SEX: Male
PHASE DAY OF DEATH: 31

PHASE: Dosing phase

GROUP: 1

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Seminal vesicles Trachea

## Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations Page: 281

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 1005 GROUP: 1
	Gross Observations/Comments	Microscopic Observations/Commen	ts
Mediastinal LN	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARIT	
		PROMINENT HISTIOCYTES, Minimal	
		FREE ERYTHROCYTS/ERYTHROPHAGOC Slight.	YTOSIS,
•		PROMINENT PLASMA CELLS, Slight	
Lungs	No gross observations on tissue.	SUBACUTE (CHRONIC ACTIVE)/CHRO	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CEL WITHOUT LYMPHOID AGGREGATES, M Minimal.	
Lårynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CEL. WITHOUT LYMPHOID AGGREGATES, M	
Nose/Turb Sec 2	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INC CELLS WITH OR WITHOUT LYMPHOID	

Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy.

The following tissues were unremarkable microscopically:

Epididymides Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate

# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice SEX: Male ANIMAL: 1005
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 1

Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Seminal vesicles Testes Trachea

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#### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations			
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 1006 GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Mini	.mal.
		PROMINENT PLASMA CELLS, Slight.	
		- PROCESSING ARTIFACTS/ACCORDION FOLE PRESENT.	os
Lungs	No gross observations on tissue.	SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifoom Minimal.	
		GLANDULAR DILATATION, Minimal.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifoc	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 2	No gross observations on tissue.	Tissue is unremarkable (with comment)	•
		- POOR SECTION QUALITY: RECUT NO IMPROVEMENT.	

#### Petroleum Coke:

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#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Male

PHASE DAY OF DEATH: 31

PHASE: Dosing phase

GROUP: 1

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Seminal vesicles

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate

Testes Trachea

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

		_	
· · · · · · · · · · · · · · · · · · ·		SEX: Male PHASE: Dosing phase	ANIMAL: 1007 GROUP: 1
issue		Microscopic Observations/Comments	
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight.	
Lungs ,	Discolored, All lobes, Tan, Foci, 0.2 - 0.5 cm, Slight/ (post-fixation observation)	Examined; 1 correlation found: SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.	
Garynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.	
		GLANDULAR DILATATION, Minimal.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Minimal.	TD
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, BILATERA Multifocal, Slight.	

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#### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Male
PHASE DAY OF DEATH: 31

PHASE: Dosing phase

GROUP: 1

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate

Seminal vesicles

Testes Trachea

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

**----**STATUS: Final phase sacrifice SEX: Male ANIMAL: 1008 PHASE DAY OF DEATH: 31 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . No gross observations on tissue. PROMINENT HISTIOCYTES, Slight. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. PROMINENT PLASMA CELLS, Slight. Lungs . . . . . . . . . No gross observations on tissue. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight. GLANDULAR DILATATION, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Slight. Prostate . . . . . . No gross observations on tissue. MONONUCLEAR CELL AGGREGATES, Multifocal, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy.

The following tissues were unremarkable microscopically:

Epididymides Nose/Turb Sec 1 Nose/Turb Sec 2 Nose/Turb Sec 3 Nose/Turb Sec 4

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Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

	Individual Anima	l Gross and Microscopic Observations	
S' PHASE DAY OF	TATUS: Final phase sacrifice DEATH: 31	SEX: Male PHASE: Dosing phase	ANIMAL: 1008 GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Semi	nal vesicles Testes Trachea		

### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 1009 GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight.	
Gungs	Discolored, Right diaphragmatic lobe, Red, Focus, 0.2 - 0.5 cm, Slight		
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.	
arynx: V-SM-G .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.	
Nose/Turb Sec 1 .	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 2 .	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATE Slight.	

#### Petroleum Coke:

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### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 1009 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 1 Tissue Gross Observations/Comments Microscopic Observations/Comments 

Seminal vesicles

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate

Trachea

Testes

### Petroleum Coke:

PHASE DAY OF DE	ATUS: Final phase sacrifice EATH: 31	SEX: Male PHASE: Dosing phase	ANIMAL: 1010 GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comment	S
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY	
		PROMINENT HISTIOCYTES, Minimal.	
		FREE ERYTHROCYTS/ERYTHROPHAGOCY Minimal.	TOSIS,
		PROMINENT PLASMA CELLS, Slight.	
		- PROCESSING ARTIFACTS/ACCORDIO PRESENT.	N FOLDS
ungs	No gross observations on tissue.	SUBACUTE (CHRONIC ACTIVE)/CHRONINFLAMMATION, Multifocal, Minim	
arynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELL WITHOUT LYMPHOID AGGREGATES, Mu Minimal.	
arynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELL WITHOUT LYMPHOID AGGREGATES, Mu Minimal.	
Nose/Turb Sec 1	l No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minima	1.
Nose/Turb Sec 2	2 No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTI: JUNCTION): MIXED INFLAMMATORY C OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight.	

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_

STATUS: Final phase sacrifice

SEX: Male

ANIMAL: 1010

PHASE DAY OF DEATH: 31

PHASE: Dosing phase

Gross Observations/Comments

Microscopic Observations/Comments

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\_\_\_\_\_\_ Nose/Turb Sec 2 . . . .

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

Multifocal, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides

Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate

Seminal vesicles

Testes

Trachea

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### Petroleum Coke:

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STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male ANIMAL PHASE: Dosing phase GROUP	
Tissue		Microscopic Observations/Commer	nts
Epididymides .		Examined; 1 correlation found: ASPERMIA/LUMINAL CELLULAR DE UNILATERAL, Marked.	:
Mediastinal LN	No gross observations on tissue.	FREE ERYTHROCYTS/ERYTHROPHAGOO	CYTOSIS,
		PROMINENT PLASMA CELLS, Slight	<b>.</b> .
Lungs	No gross observations on tissue.	SUBACUTE (CHRONIC ACTIVE)/CHRO	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CEI WITHOUT LYMPHOID AGGREGATES, M Minimal.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CEI WITHOUT LYMPHOID AGGREGATES, S	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minim	mal.
Nose/Turb Sec 2	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED IN CELLS WITH OR WITHOUT LYMPHOID BILATERAL, Multifocal, Slight.	AGGREGATES,

Petroleum Coke:

### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Male
PHASE: Dosing phase

GROUP: 1

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Testes . . . . . .

Small, Left, Moderate

Examined; 1 correlation found:
GERM CELL LOSS/DEPLETION, UNILATERAL,

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate

Seminal vesicles Trachea

Marked.

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#### Petroleum Coke:

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### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 1012 PHASE DAY OF DEATH: 31 PHASE: Dosing phase \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Epididymides . . . . . No gross observations on tissue. MONONUCLEAR CELL AGGREGATES, UNILATERAL, Focal, Minimal. Mediastinal LN . . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal. PROMINENT PLASMA CELLS, Minimal. Lungs . . . . . . . . . No gross observations on tissue. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 1012 PHASE: Dosing phase GROUP: 1 PHASE DAY OF DEATH: 31 \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments Nose/Turb Sec 2 . . . . No gross observations on tissue. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. ODONTOPATHY, UNILATERAL, Moderate. Trachea . . . . . . . . No gross observations on tissue. MONONUCLEAR CELL AGGREGATES, Focal, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Nose/Turb Sec 4 Prostate Seminal vesicles Testes

.

### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

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Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 2001 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. BROWN-BLACK PIGMENT DEPOSITS, Minimal. PROMINENT HISTIOCYTES, Slight. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. Lungs . . . . . . . . Discolored, All lobes, Black, Slight Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal. Larynx: V-DVTC . . . . No gross observations on tissue. Tissue is inadequate and unreadable. - INSUFFICIENT TISSUE PRESENT FOR EVALUATION.

#### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2001

PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2

Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 1 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):
EPITHELIAL-GOBLET CELL
HYPERTROPHY/HYPERPLASIA, Minimal.

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Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-SM-G Nose/Turb Sec 2 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

### Petroleum Coke:

	5: Final phase sacrifice H: 31	SEX: Male PHASE: Dosing phase	ANIMAL: 2002 GROUP: 2
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN .			
	Discolored, Black, Slight	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minim	al.
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slig	ht.
		PROMINENT HISTIOCYTES, Minimal.	
Lungs	Discolored, All lobes, Black, Slight	Examined; 2 correlations found:	
		BRONCHIOLAR ASSOCIATED LYMPHOID TIS (BALT): BROWN-BLACK PIGMENT DEPOSIT Multifocal, Slight.	
		ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight.	
		PROMINENT BRONCHIOLAR ASSOCIATED LYMFTISSUE (BALT), Multifocal, Moderate.	HOID
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH	AND
		WITHOUT LYMPHOID AGGREGATES, Slight.	
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Minimal.	
Nose/Turb Sec 1 .	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL	

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### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male ANIMAL PHASE: Dosing phase GROUP	
Tissue	Gross Observations/Comments	Microscopic Observations/Commen	
Nose/Turb Sec 1 .		NASAL LACRIMAL DUCT: MIXED INF CELLS WITH OR WITHOUT LYMPHOID Minimal.	
Nose/Turb Sec 2 No gross observations on tissue.		NASAL MUCOSA (RESPIRATORY/VEST JUNCTION): MIXED INFLAMMATORY OR WITHOUT LYMPHOID AGGREGATES	CELLS WITH
		NASOLACRIMAL DUCT(S): MIXED IN CELLS WITH OR WITHOUT LYMPHOID Slight.	
Nose/Turb Sec 4 .	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BR	COWN-BLACK
Trachea No gross observations on tissue.		MONONUCLEAR CELL AGGREGATES, M	Jinimal.
		MUCOSA: GLANDULAR DILATATION,	Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 2003 GROUP: 2
Tissue		Microscopic Observations/Comme	nts
Mediastinal LN		Examined; 1 correlation found BROWN-BLACK PIGMENT DEPOSIT	:
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARI	TY, Slight.
		PROMINENT HISTIOCYTES, Minima	1.
Lungs	Discolored, All lobes, Black, Slight	Examined; 2 correlations found BRONCHIOLAR ASSOCIATED LYMPI (BALT): BROWN-BLACK PIGMENT Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN PIGMENT, Multifocal, Slight	HOID TISSUE DEPOSITS, -BLACK
		PROMINENT BRONCHIOLAR ASSOCIA' TISSUE (BALT), Multifocal, S1.	
		BRONCHIOLO-ALVEOLAR EPITHELIA: HYPERPLASIA/HYPERTROPHY, Mult: Minimal.	
		SUBACUTE (CHRONIC ACTIVE)/CHROINFLAMMATION, Multifocal, Min.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CE: WITHOUT LYMPHOID AGGREGATES, I	
Nose/Turb Sec 1	No gross observations on tissue.	Tissue is missing.	
		- NO SLIDE.	

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### Petroleum Coke:

### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS PHASE DAY OF DEATH	: Final phase sacrifice : 31	SEX: Male PHASE: Dosing phase	ANIMAL: 2003 GROUP: 2
	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	Tissue is missing.	
		- NO SLIDE.	
Nose/Turb Sec 3 .	No gross observations on tissue.	Tissue is missing.	
		- NO SLIDE.	
Nose/Turb Sec 4 .	No gross observations on tissue.	Tissue is missing.	
		- NO SLIDE.	
Trachea	No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION, Slight.	

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC

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### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
PHASE DAY OF DE	TUS: Final phase sacrifice	SEX: Male PHASE: Dosing phase	ANIMAL: 2004 GROUP: 2
	Gross Observations/Comments		
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight BROWN-BLACK PIGMENT DEPOSITS, Minimal. PROMINENT HISTIOCYTES, Slight.	
_		PROMINENT HISTIOCTIES, SITURE.	
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found:  BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight.  ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Slight.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.	

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### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Male
PHASE: Dosing phase

GROUP: 2

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR
JUNCTION): MIXED INFLAMMATORY CELLS WITH
OR WITHOUT LYMPHOID AGGREGATES, Slight.

Trachea . . . . . . . No gross observations on tissue.

MUCOSA: GLANDULAR DILATATION, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 3 Nose/Turb Sec 4

### Petroleum Coke:

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Individual Animal Gross and Microscopic Observations			
STAT	US: Final phase sacrifice	SEX: Male PHASE: Dosing phase	ANIMAL: 2005 GROUP: 2
Tissue		Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minima	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight	÷.
		PROMINENT HISTIOCYTES, Minimal.	
		PROMINENT PLASMA CELLS, Slight.	
Lungs	Discolored, All lobes, Black, Slight	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSO (BALT): BROWN-BLACK PIGMENT DEPOSITS Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight.	
		PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Moderate.	DID
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Minimal.	AND
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Minimal.	AND
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.	

## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2005

PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP:

Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 2 . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR

JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight.

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Nose/Turb Sec 3 . . . . No gross observations on tissue.

MAXILLARY GLANDULAR DILATATION, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 4 Trachea

### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31	SEX: Male PHASE: Dosing phase	ANIMAL: 2006 GROUP: 2
Cissue Gross Observations/Comments	Microscopic Observations/Comments	
fediastinal LN		
Discolored, Black, Slight	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minim	nal.
	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slig	ght.
	PROMINENT HISTIOCYTES, Slight.	
	PROMINENT PLASMA CELLS, Minimal.	
oungs Discolored, All lobes, Black, Slight	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TIS (BALT): BROWN-BLACK PIGMENT DEPOSIT Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight.	
	PROMINENT BRONCHIOLAR ASSOCIATED LYMETISSUE (BALT), Multifocal, Moderate.	PHOID
	SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.	
arynx: V-SM-G No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Minimal.	
ose/Turb Sec 2 No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS W OR WITHOUT LYMPHOID AGGREGATES, Minim	
	NASOLACRIMAL DUCT(S): MIXED INFLAMMAT CELLS WITH OR WITHOUT LYMPHOID AGGREG Slight.	

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2006
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2

Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

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DUAGE DAW OF DEAM	S: Final phase sacrifice H: 31	SEX: Male PHASE: Dosing phase	ANIMAL: 2007 GROUP: 2
	Gross Observations/Comments		
Mediastinal LN .			l:
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARI	TY, Slight.
		PROMINENT PLASMA CELLS, Minim	nal.
		- PROCESSING ARTIFACTS/ACCORD PRESENT.	DION FOLDS
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations foun BRONCHIOLAR ASSOCIATED LYMF (BALT): BROWN-BLACK PIGMENT Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN PIGMENT, Multifocal, Slight	PHOID TISSUE DEPOSITS, I-BLACK
		PROMINENT BRONCHIOLAR ASSOCIATISSUE (BALT), Multifocal, Mo	
		SUBACUTE (CHRONIC ACTIVE)/CHRINFLAMMATION, Multifocal, Min	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CE WITHOUT LYMPHOID AGGREGATES,	
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CE WITHOUT LYMPHOID AGGREGATES, Minimal.	

### Petroleum Coke:

### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2007
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2

Nose/Turb Sec 1 . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL Page: 310

HYPERTROPHY/HYPERPLASIA, Minimal.

Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 2 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

Gross Observations/Comments

### Petroleum Coke:

Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

	Individual Animal Gross and Microscopic Observations			
	TUS: Final phase sacrifice	SEX: Male	ANIMAL: 2008	
Tissue		Microscopic Observations/Comments		
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slig		
		BROWN-BLACK PIGMENT DEPOSITS, Minimal	•	
		PROMINENT HISTIOCYTES, Minimal.		
		PROMINENT PLASMA CELLS, Minimal.		
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TIS (BALT): BROWN-BLACK PIGMENT DEPOSIT Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight.  PROMINENT BRONCHIOLAR ASSOCIATED LYMP TISSUE (BALT), Multifocal, Moderate.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.	s,	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Focal, Minimal.	AND	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS W OR WITHOUT LYMPHOID AGGREGATES, Minim		
		NASOLACRIMAL DUCT(S): MIXED INFLAMMAT CELLS WITH OR WITHOUT LYMPHOID AGGREG Minimal.		

### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Male

PHASE DAY OF DEATH: 31

PHASE: Dosing phase

GROUP: 2

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Trachea . . . . . . . . No gross observations on tissue.

MONONUCLEAR CELL AGGREGATES, Minimal.

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Larynx: V-DVTC Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4

### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31			ANIMAL: 2009 GROUP: 2
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN .	· ·	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minima	
•		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Modera	ate.
		PROMINENT HISTIOCYTES, Minimal.	•
Lungs	Discolored, All lobes, Black, Slight	Examined; 2 correlations found:  BRONCHIOLAR ASSOCIATED LYMPHOID TISSU (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight.  ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Moderate.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Minimal.	AND
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Slight.	ND

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### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2009
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2

Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 2010 GROUP: 2
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight	
		PROMINENT HISTIOCYTES, Minimal.	
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSU (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Minimal. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight.	Е
		PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Moderate.	ID
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA Minimal.	,
		MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Minimal.	ND

### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations

\_\_\_\_\_

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2010 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2

Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 1 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL

HYPERTROPHY/HYPERPLASIA, Slight.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Page: 316

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 2011 GROUP: 2
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, S	
Lungs	No gross observations on tissue.	PROMINENT BRONCHIOLAR ASSOCIATED LYTISSUE (BALT), Multifocal, Slight.	AWBHOID
		BRONCHIOLAR ASSOCIATED LYMPHOID TIS (BALT): BROWN-BLACK PIGMENT DEPOSIT Multifocal, Minimal.	
		ALVEOLAR MACROPHAGES: BROWN-BLACK Multifocal, Slight.	PIGMENT,
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WINTHOUT LYMPHOID AGGREGATES, Minima	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WI WITHOUT LYMPHOID AGGREGATES, Minima	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULA JUNCTION): MIXED INFLAMMATORY CELLS OR WITHOUT LYMPHOID AGGREGATES, Mir	S WITH

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## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2011
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2

Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 2 . . . . NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY

CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

### Petroleum Coke:

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### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2012 PHASE: Dosing phase PHASE DAY OF DEATH: 31 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Slight Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal. Lungs . . . . . . . . . Discolored, All lobes, Black, Moderate Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. PERIODONTAL DISEASE, Slight.

### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Male
PHASE DAY OF DEATH: 31
PHASE: Dosing phase

GROUP: 2

Tissue
Gross Observations/Comments
Microscopic Observations/Comments

Trachea . . . . . . . . No gross observations on tissue.

MUCOSA: GLANDULAR DILATATION, Minimal.

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Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 1 Nose/Turb Sec 2 Nose/Turb Sec 3

### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
STATUS: Final phase sacrifice		SEX: Male PHASE: Dosing phase	ANIMAL: 3001 GROUP: 3
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN .			
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked.	
		PROMINENT HISTIOCYTES, Minimal.	
		PROMINENT PLASMA CELLS, Minimal.	
Lungs	Discolored, All lobes, Black, Severe	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOITISSUE (BALT), Multifocal, Moderate.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Minimal.	dio
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Minimal.	

### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 3001 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 3 Gross Observations/Comments Microscopic Observations/Comments Larynx: V-SM-G . . . . MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 1 . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Focal, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. No micropathology observations on tissue. Thymus . . . . . . . Discolored, Red, Slight

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Trachea

### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 3002 GROUP: 3
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN .		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Mir	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, MC	oderate.
		PROMINENT HISTIOCYTES, Minimal.	
		PROMINENT PLASMA CELLS, Slight.	
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TO (BALT): BROWN-BLACK PIGMENT DEPOSE MULTIFOCAL, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LY	sits,
		TISSUE (BALT), Multifocal, Moderate BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal Slight.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WI WITHOUT LYMPHOID AGGREGATES, Minima	
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WI WITHOUT LYMPHOID AGGREGATES, Minima	

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#### Petroleum Coke:

### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 3002 PHASE DAY OF DEATH: 31 PHASE: Dosing phase \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Nose/Turb Sec 1 . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 3 . . . . No gross observations on tissue. NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. Trachea . . . . . . . No gross observations on tissue. MUCOSA: GLANDULAR DILATATION, Moderate.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

No tissues examined.

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### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 3003 PHASE DAY OF DEATH: 31 PHASE: Dosing phase Microscopic Observations/Comments Gross Observations/Comments Mediastinal LN . . . . Discolored, Black, Moderate Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT. Lungs . . . . . . . . Examined; 2 correlations found: Discolored, All lobes, Black, Severe BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Focal, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND

.

WITHOUT LYMPHOID AGGREGATES, Minimal.

Petroleum Coke: Reproduction/Developmental Toxicity Screening

> Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 3003
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 3

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Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 1 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL

HYPERTROPHY/HYPERPLASIA, Minimal.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

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Multifocal, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

### Petroleum Coke:

	Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 3004 GROUP: 3		
Tissue		Microscopic Observations/Comments			
Mediastinal LN					
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY,	Moderate.		
		PROMINENT HISTIOCYTES, Minimal.			
Lungs	Discolored, All lobes, Black, Severe	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOII (BALT): BROWN-BLACK PIGMENT DEI Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLA PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED TISSUE (BALT), Multifocal, Moderate BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal Slight.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate	POSITS,  ACK  LYMPHOID  ate.  cal,		
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITHOUT LYMPHOID AGGREGATES, Min	WITH AND		
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal			

### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 3004 PHASE DAY OF DEATH: 31 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Nose/Turb Sec 2 . . . . No gross observations on tissue. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Trachea . . . . . . . . No gross observations on tissue. MONONUCLEAR CELL AGGREGATES, Focal, Minimal.

MUCOSA: GLANDULAR DILATATION, Moderate.

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Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 3 Nose/Turb Sec 4

### Petroleum Coke:

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Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 3005 GROUP: 3	
Tissue		Microscopic Observations/Comments		
Mediastinal LN				
	Discolored, Black, Slight	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, M	inimal.	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY,	Moderate.	
		PROMINENT HISTIOCYTES, Minimal.		
		FREE ERYTHROCYTS/ERYTHROPHAGOCYTO Slight.	sis,	
		PROMINENT PLASMA CELLS, Minimal.		
		YELLOW-BROWN PIGMENT, Minimal.		
Lungs				
	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID (BALT): BROWN-BLACK PIGMENT DEP Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLA PIGMENT, Multifocal, Moderate.	OSITS,	
		PROMINENT BRONCHIOLAR ASSOCIATED TISSUE (BALT), Multifocal, Modera		
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifoc Slight.	al,	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderat		

### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31			ANIMAL: 3005 GROUP: 3
Tissue	Gross Observations/Comments	Microscopic Observations/Comment	s
	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELL WITHOUT LYMPHOID AGGREGATES, Mi	s with and
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID ME Minimal.	TAPLASIA,
		MUCOSA: MIXED INFLAMMATORY CELL WITHOUT LYMPHOID AGGREGATES, Mu Slight.	
Nose/Turb Sec 1 .	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minima	1.
Nose/Turb Sec 2 .	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTI JUNCTION): MIXED INFLAMMATORY C OR WITHOUT LYMPHOID AGGREGATES, Minimal.	ELLS WITH
		NASOLACRIMAL DUCT(S): MIXED INF CELLS WITH OR WITHOUT LYMPHOID Minimal.	
Nose/Turb Sec 4 .	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BRO	WN-BLACK
Trachea	No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION, M	oderate.

Petroleum Coke:
Reproduction/Developmental Toxicity Screening

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Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Male
PHASE DAY OF DEATH: 31

PHASE: Dosing phase

GROUP: 3

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3

### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
PHASE DAY OF DE	TUS: Final phase sacrifice ATH: 31	PHASE: Dosing phase	ANIMAL: 3006 GROUP: 3
Tissue		Microscopic Observations/Comments	
Mediastinal LN			
	Discolored, Black, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight.	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight	
		PROMINENT HISTIOCYTES, Minimal.	
Lungs ,	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUM (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.	3
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, slight.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Minimal.	ai
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight.	ι

### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

..... STATUS: Final phase sacrifice SEX: Male ANIMAL: 3006 GROUP: 3 PHASE DAY OF DEATH: 31 PHASE: Dosing phase \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments Nose/Turb Sec 2 . . . . NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 3 . . . . No gross observations on tissue. NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal.

PERIODONTAL DISEASE, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Trachea

### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
PHASE DAY OF DEATH	: Final phase sacrifice	SEX: Male PHASE: Dosing phase	ANIMAL: 3007 GROUP: 3
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN .		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight.	
		- MARGINAL TISSUE PRESENT/EVALUATED. RECUT, NO IMPROVEMENT.	
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSU (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK	
		PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHO TISSUE (BALT), Multifocal, Slight.  BRONCHIOLO-ALVEOLAR EPITHELIAL	ID
		HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Multifocal Minimal.	
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Minimal.	ND

Petroleum Coke:

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### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice ANIMAL: 3007 PHASE: Dosing phase PHASE DAY OF DEATH: 31 Gross Observations/Comments Microscopic Observations/Comments Tissue Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. PERIODONTAL DISEASE, Minimal. Trachea . . . . . . . . No gross observations on tissue. MONONUCLEAR CELL AGGREGATES, Focal, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 2 Nose/Turb Sec 3

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 3008 GROUP: 3
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Min	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, MO	derate.
		PROMINENT HISTIOCYTES, Minimal.	
		FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSI Minimal.	5,
		PROMINENT PLASMA CELLS, Minimal.	
Lungs	Discolored, All lobes, Black, Severe	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID T (BALT): BROWN-BLACK PIGMENT DEPOS Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.	ITS,
		PROMINENT BRONCHIOLAR ASSOCIATED LY TISSUE (BALT), Multifocal, Slight.	MPHOID
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal Minimal.	,
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WI WITHOUT LYMPHOID AGGREGATES, Minima	

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### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations 

ANIMAL: 3008 STATUS: Final phase sacrifice

PHASE: Dosing phase PHASE DAY OF DEATH: 31 

Gross Observations/Comments Microscopic Observations/Comments Tissue

Larynx: V-SM-G . . . . No gross observations on tissue. Tissue is inadequate and unreadable.

- INADEQUATE TISSUE FOR EVALUATION.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

Minimal.

Nose/Turb Sec 4 . . . . No gross observations on tissue.

PERIODONTAL DISEASE, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 3 Trachea

### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
STA PHASE DAY OF DE	TUS: Final phase sacrifice	SEX: Male PHASE: Dosing phase	ANIMAL: 3009 GROUP: 3
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marke	d.
		PROMINENT HISTIOCYTES, Minimal.	
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISS (BALT): BROWN-BLACK PIGMENT DEPOSITS Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPH TISSUE (BALT), Multifocal, Moderate.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.	,
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Minimal.	AND
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASI Multifocal, Minimal.	Α,

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### Petroleum Coke:

### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 3009 GROUP: 3
Tissue	Gross Observations/Comments	Microscopic Observations/Comment	
Larynx: V-SM-G		MUCOSA: MIXED INFLAMMATORY CELI WITHOUT LYMPHOID AGGREGATES, Mt Slight.	LS WITH AND
Nose/Turb Sec 1 .	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minima	al.
Nose/Turb Sec 2 No gross observations on tissue.		NASAL MUCOSA (RESPIRATORY/VESTI JUNCTION): MIXED INFLAMMATORY O OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.	CELLS WITH
		NASOLACRIMAL DUCT(S): MIXED INF CELLS WITH OR WITHOUT LYMPHOID Multifocal, Slight.	
Nose/Turb Sec 4 .	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROPIGMENT, Minimal.	DWN-BLACK
Trachea	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Fo	ocal, Slight.
		MUCOSA: GLANDULAR DILATATION, S	Glight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3

### Petroleum Coke:

		d Microscopic Observations	
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		DUACE. Doging phace	ANIMAL: 3010 GROUP: 3
Tissue		Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked	1.
		PROMINENT HISTIOCYTES, Minimal.	
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSI (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Slight.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Minimal.	and ,
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA Multifocal, Minimal.	Δ,

### Petroleum Coke:

### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 3

Tissue Gross Observations/Comments Microscopic Observations/Comments

Larynx: V-SM-G . . . . MUCOSA: MIXED INFLAMMATORY CELLS WITH AND

WITHOUT LYMPHOID AGGREGATES, Minimal.

Nose/Turb Sec 1 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):

EPITHELIAL-GOBLET CELL

HYPERTROPHY/HYPERPLASIA, Minimal.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

STATUS: Final phase sacrifice

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

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ANIMAL: 3010

Minimal.

SEX: Male

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

### Petroleum Coke:

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### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

-SEX: Male ANIMAL: 3011 STATUS: Final phase sacrifice PHASE: Dosing phase PHASE DAY OF DEATH: 31 - -Microscopic Observations/Comments Gross Observations/Comments -Mediastinal LN . . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. BROWN-BLACK PIGMENT DEPOSITS, Minimal. PROMINENT HISTIOCYTES, Minimal. Lungs . . . . . . . . Examined; 2 correlations found: Discolored, All lobes, Black, Moderate BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. BRONCHIAL EPITHELIAL HYPERPLASIA, Focal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

### Petroleum Coke:

### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_\_ ANIMAL: 3011 SEX: Male STATUS: Final phase sacrifice

PHASE: Dosing phase

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PHASE DAY OF DEATH: 31

\_\_\_\_\_\_

Gross Observations/Comments

Microscopic Observations/Comments

\_\_\_\_\_\_\_

Nose/Turb Sec 1 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):

EPITHELIAL-GOBLET CELL

HYPERTROPHY/HYPERPLASIA, Minimal.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH

OR WITHOUT LYMPHOID AGGREGATES,

Multifocal, Minimal.

Nose/Turb Sec 4 . . . . No gross observations on tissue.

PERIODONTAL DISEASE, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Larynx: V-DVTC Nose/Turb Sec 3 Trachea

## Petroleum Coke: Reproduction/Developmental Toxicity Screening

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Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations SEX: Male ANIMAL: 3012 STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31 PHASE: Dosing phase \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Slight. PROMINENT PLASMA CELLS, Minimal. Lungs . . . . . . . . . Examined; 2 correlations found: Discolored, All lobes, Black, Severe BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate. HEMORRHAGE(S), Minimal. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. SUBMUCOSAL GLAND: LUMINAL ACUTE INFLAMMATION, Focal, Slight.

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# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice ANTMAL: 3012 SEX: Male PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 3 Microscopic Observations/Comments Gross Observations/Comments Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Moderate. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK

PIGMENT, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Trachea

# Petroleum Coke:

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STATUS: Final phase sacrifice	SEX: Male PHASE: Dosing phase	ANIMAL: 4001 GROUP: 4
Gross Observations/Commen	·	ts
pididymides No gross observations on		
Kidneys Dilated Pelvis, Right, M	oderate Examined; 1 correlation found: PELVIS: DILATED, UNILATERAL,	Moderate.
	MONONONUCLEAR CELL AGGREGATES, Minimal.	Focal,
Mediastinal LN Discolored, Black, Sever	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS	
	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARIT	Y, Marked.
	PROMINENT HISTIOCYTES, Multifor	cal, Minimal.
	FREE ERYTHROCYTS/ERYTHROPHAGOC Minimal.	YTOSIS,
	PROMINENT PLASMA CELLS, Minima	1.
Gungs Discolored, All lobes, B	lack, Severe Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN- PIGMENT, Multifocal, Marked.	BLACK
	BRONCHIOLAR ASSOCIATED LYMPHOI (BALT): BROWN-BLACK PIGMENT DE Multifocal, Moderate.	
	BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multi Moderate.	

### Petroleum Coke:

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	TUS: Final phase sacrifice	SEX: Male	ANIMAL: 4001
PHASE DAY OF DEATH: 31			GROUP: 4
Tiggue	Gross Observations/Comments	Microscopic Observations/Comment	
Lungs		SUBACUTE (CHRONIC ACTIVE)/CHRON INFLAMMATION, Multifocal, Marke	IIC
Larynx: V-DVTC No gross observations on tissue.		MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID ME Minimal.	ETAPLASIA,
		MUCOSA: MIXED INFLAMMATORY CELI WITHOUT LYMPHOID AGGREGATES, Mi	
Nose/Turb Sec 2	e No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTI JUNCTION): MIXED INFLAMMATORY ( OR WITHOUT LYMPHOID AGGREGATES, Minimal.	CELLS WITH
		NASOLACRIMAL DUCT(S): MIXED INF CELLS WITH OR WITHOUT LYMPHOID Slight.	
Nose/Turb Sec 3	3 No gross observations on tissue.	NASAL MUCOSAL-SURFACE/LUMEN: BE	ROWN-BLACK
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROPIGMENT, UNILATERAL, Moderate.	DWN-BLACK

Petroleum Coke:

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### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 4001 PHASE: Dosing phase PHASE DAY OF DEATH: 31 Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_\_ Trachea . . . . . . . No gross observations on tissue. MUCOSA: GLANDULAR DILATATION, Moderate.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Seminal vesicles Testes

Nose/Turb Sec 1 Prostate

### Petroleum Coke:

Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations			
STAT	TUS: Final phase sacrifice	SEX: Male PHASE: Dosing phase	ANIMAL: 4002 GROUP: 4
-1	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight.	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Mar	ked.
		PROMINENT HISTIOCYTES, Multifocal, M	inimal.
Lungs	Discolored, All lobes, Black, Severe	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked.	
		PROMINENT BRONCHIOLAR ASSOCIATED LYM TISSUE (BALT), Multifocal, Moderate.	PHOID
		BRONCHIOLAR ASSOCIATED LYMPHOID TISS (BALT): BROWN-BLACK PIGMENT DEPOSITS Multifocal, Moderate.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WIT WITHOUT LYMPHOID AGGREGATES, Multifo Slight.	

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#### Petroleum Coke:

### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

ANIMAL: 4002 STATUS: Final phase sacrifice GROUP: 4 PHASE: Dosing phase PHASE DAY OF DEATH: 31 Microscopic Observations/Comments Gross Observations/Comments Tissue -Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight. Nose/Turb Sec 3 . . . . No gross observations on tissue. NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Slight. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight. NASAL PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides

Prostate

Seminal vesicles Testes

Trachea

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### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31	SEX: Male PHASE: Dosing phase	ANIMAL: 4003 GROUP: 4
Pissue Gross Observations/Comments	Microscopic Observations/Commen	its
Epididymides No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, U Focal, Minimal.	
Cidneys Dilated Pelvis, Right, Moderate	Examined; 1 correlation found: PELVIS: DILATED, UNILATERAL,	
Mediastinal LN  Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS Multifocal, Slight.	
	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARIT	Y, Marked.
	PROMINENT HISTIOCYTES, Multifo	cal, Minimal.
	FREE ERYTHROCYTS/ERYTHROPHAGOC Minimal.	YYTOSIS,
Discolored, All lobes, Black, Severe	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN- PIGMENT, Multifocal, Marked.	BLACK
	PROMINENT BRONCHIOLAR ASSOCIAT TISSUE (BALT), Multifocal, Mod	
	BRONCHIOLAR ASSOCIATED LYMPHOI (BALT): BROWN-BLACK PIGMENT DE Multifocal, Moderate.	
	BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multislight.	

### Petroleum Coke:

Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 4003 GROUP: 4	
Tissue		Microscopic Observations/Commen		
Lungs		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked.		
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.		
Larynx: V-SM-G No gross observations on tissue.		MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID M. Focal, Minimal.	ETAPLASIA,	
		MUCOSA: MIXED INFLAMMATORY CELL WITHOUT LYMPHOID AGGREGATES, M Slight.		
Nose/Turb Sec 1	l No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minima	al.	
Nose/Turb Sec 2	2 No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, BILATERAL, Minimal.		
Nose/Turb Sec 3	3 No gross observations on tissue.	NASAL MUCOSAL-SURFACE/LUMEN: BI	ROWN-BLACK	
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Moderate.		

### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 4003 GROUP: 4	
Tissue	Gross Observations/Comments	Microscopic Observations/Comments		
Prostate	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Moderate.	ONUCLEAR CELL AGGREGATES, Multifocal, lerate.	
Trachea	No gross observations on tissue.	MIJCOSA - GLANDILAR DILATATION	Moderate	

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Seminal vesicles Testes

um Coke:

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### Petroleum Coke:

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STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 4004 GROUP: 4
Tissue		Microscopic Observations/Comment	s
	No gross observations on tissue.	SUBACUTE/CHRONIC INFLAMMATORY C INFILTRATE, UNILATERAL, Focal,	CELL
Mediastinal LN	Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate.	
	Enlarged, Slight	Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARI	TY, Marked.
		PROMINENT HISTIOCYTES, Multifoo	cal, Minimal.
Lungs Discolored, All lobes, Black, Severe		Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-B PIGMENT, Multifocal, Marked.	BLACK
		PROMINENT BRONCHIOLAR ASSOCIATE TISSUE (BALT), Multifocal, Mode	
		BRONCHIOLAR ASSOCIATED LYMPHOID (BALT): BROWN-BLACK PIGMENT DEP Multifocal, Moderate.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multif Slight.	ocal,
		SUBACUTE (CHRONIC ACTIVE)/CHRONINFLAMMATION, Multifocal, Marke	

### Petroleum Coke:

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### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 4004 PHASE DAY OF DEATH: 31 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight. Nose/Turb Sec 3 . . . . No gross observations on tissue. NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. - TISSUE IS FRAGMENTED, BUT READABLE. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Moderate.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 2 Prostate

Seminal vesicles Testes

Trachea

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations STATUS: Final phase sacrifice SEX: Male PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 4 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Severe. PROMINENT HISTIOCYTES, Multifocal, Minimal. Lungs . . . . . . . . . Discolored, All lobes, Black, Severe Examined: 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 4005 GROUP: 4	
Tissue	Gross Observations/Comments	Microscopic Observations/Comments		
	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID META Minimal.  MUCOSA: MIXED INFLAMMATORY CELLS WITHOUT LYMPHOID AGGREGATES, Mult Slight.	PLASIA, WITH AND	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.		
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBU JUNCTION): MIXED INFLAMMATORY CEL OR WITHOUT LYMPHOID AGGREGATES, B Minimal.	LS WITH	
Nose/Turb Sec 3	No gross observations on tissue.	NASAL MUCOSAL-SURFACE/LUMEN: BROW	N-BLACK	
		PALATE: ECTOPIC SEBACEOUS GLAND,	Present.	
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN PIGMENT, BILATERAL, Multifocal, S		
Trachea	No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION, Sli	ght.	

# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice

SEX: Male

PHASE DAY OF DEATH: 31

PHASE: Dosing phase

GROUP: 4

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides Prostate Seminal vesicles Testes

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Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 4006 GROUP: 4	
Tissue	Gross Observations/Comments	Microscopic Observations/Comments		
Mediastinal LN		Examined; 1 correlation found:  BROWN-BLACK PIGMENT DEPOSITS,  Multifocal, Slight.		
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Market	d.	
		PROMINENT HISTIOCYTES, Multifocal, Min.	imal.	
Lungs Discolored, All lobes, Black, Severe		Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked.		
		PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Moderate.	DIC	
		BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate.		
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.		
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked.		
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Multifocal Minimal.		

### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ SEX: Male

STATUS: Final phase sacrifice

PHASE: Dosing phase

ANIMAL: 4006

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PHASE DAY OF DEATH: 31

Gross Observations/Comments

Microscopic Observations/Comments

Nose/Turb Sec 1 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):

EPITHELIAL-GOBLET CELL

HYPERTROPHY/HYPERPLASIA, Minimal.

Nose/Turb Sec 3 . . . . No gross observations on tissue.

NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK

PIGMENT, Slight.

Nose/Turb Sec 4 . . . . No gross observations on tissue.

NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy.

The following tissues were unremarkable microscopically:

Epididymides Larynx: V-DVTC

Nose/Turb Sec 2 Prostate

Seminal vesicles

Testes

Trachea

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## Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
DUNCE DAY OF DE	TUS: Final phase sacrifice	SEX: Male	ANIMAL: 4007
	Gross Observations/Comments		
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight.	
	Enlarged, Slight	Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Se	evere.
		PROMINENT HISTIOCYTES, Multifocal, M.	inimal.
		PROMINENT PLASMA CELLS, Minimal.	
Lungs	Discolored, All lobes, Black, Severe	Examined; 1 correlation found:    ALVEOLAR MACROPHAGES: BROWN-BLACK    PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMITISSUE (BALT), Multifocal, Moderate.  BRONCHIOLAR ASSOCIATED LYMPHOID TISSI (BALT): BROWN-BLACK PIGMENT DEPOSITS Multifocal, Slight.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked.	JE
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifood Minimal.	

## Petroleum Coke: Reproduction/Developmental Toxicity Screening

Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

-----STATUS: Final phase sacrifice SEX: Male ANTMAL: 4007 PHASE DAY OF DEATH: 31 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, BILATERAL, Multifocal, Minimal. Nose/Turb Sec 3 . . . . No gross observations on tissue.

Nose/Turb Sec 4 . . . . No gross observations on tissue.

NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight.

NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK

PIGMENT, Slight.

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Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Trachea

Epididymides Prostate Seminal vesicles Testes

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Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 4008 GROUP: 4	
Tissue	Gross Observations/Comments	Microscopic Observations/Comments		
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight.		
	Enlarged, Slight	Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY,	Severe.	
		PROMINENT HISTIOCYTES, Multifocal, PROMINENT PLASMA CELLS, Minimal.	Minimal.	
Lungs	Discolored, All lobes, Black, Severe	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLAC PIGMENT, Multifocal, Marked.	'K	
		PROMINENT BRONCHIOLAR ASSOCIATED I TISSUE (BALT), Multifocal, Moderat		
		BRONCHIOLAR ASSOCIATED LYMPHOID TI (BALT): BROWN-BLACK PIGMENT DEPOSI Multifocal, Moderate.		
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifoca Slight.	1,	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked.		
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITHOUT LYMPHOID AGGREGATES, Multislight.		

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## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 4008

PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 4

Tissue Gross Observations/Comments Microscopic Observations/Comments

Larynx: V-SM-G . . . . No gross observations on tissue.

MUCOSA (SEROMUCOUS GLANDS):

EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Minimal.

MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal,

Slight.

Nose/Turb Sec 1 . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):

EPITHELIAL-GOBLET CELL

HYPERTROPHY/HYPERPLASIA, Slight.

NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK

PIGMENT, Minimal.

Nose/Turb Sec 2 . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight.

NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight.

Nose/Turb Sec 3 . . . . No gross observations on tissue.

NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Slight.

Nose/Turb Sec 4 . . . . No gross observations on tissue.

NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Moderate.

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Male ANIMAL: 4008

PHASE DAY OF DEATH: 31

PHASE: Dosing phase

GROUP: 4

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Microscopic Observations/Comments

Gross Observations/Comments \_\_\_\_\_\_

Trachea . . . . . . . No gross observations on tissue.

MONONUCLEAR CELL AGGREGATES, Focal,

Minimal.

MUCOSA: GLANDULAR DILATATION, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides

Prostate

Seminal vesicles Testes

## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

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Individual Animal Gross and Microscopic Observations

------STATUS: Final phase sacrifice SEX: Male ANIMAL: 4009 PHASE DAY OF DEATH: 31 PHASE: Dosing phase Microscopic Observations/Comments Gross Observations/Comments \_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS. Multifocal, Moderate. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Severe. PROMINENT HISTIOCYTES, Multifocal, Minimal. Lungs . . . . . . . . Discolored, All lobes, Black, Severe Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Moderate. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

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### Petroleum Coke:

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## Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 4009 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 4 \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Multifocal, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal. Nose/Turb Sec 3 . . . . No gross observations on tissue. NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Slight. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides

Nose/Turb Sec 2 Prostate

Seminal vesicles Testes

Trachea

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### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations STATUS: Final phase sacrifice SEX: Male ANTMAL: 4010 PHASE: Dosing phase PHASE DAY OF DEATH: 31 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS. Multifocal, Slight. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Multifocal, Minimal. PROMINENT PLASMA CELLS, Minimal. Lungs . . . . . . . . Discolored, All lobes, Black, Severe Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

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Individual Animal Gross and Microscopic Observations			
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 4010 GROUP: 4
Tissue		Microscopic Observations/Comments	3
Larynx: V-SM-G No gross observations on tissue.		MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID MET Focal, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS	'APLASIA,
		WITHOUT LYMPHOID AGGREGATES, Mul Minimal.	tifocal,
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal	
Nose/Turb Sec 2	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INFL CELLS WITH OR WITHOUT LYMPHOID A Multifocal, Slight.	
Nose/Turb Sec 3	No gross observations on tissue.	e.  NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Slight.	
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight.	
Prostate	No gross observations on tissue.	ATROPHY, slight.	
Irachea	No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION, Sl	ight.

Petroleum Coke:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice

SEX: Male
PHASE DAY OF DEATH: 31

PHASE: Dosing phase

GROUP: 4

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides Seminal vesicles Testes

## Petroleum Coke:

Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

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Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Male ANIMAL: 4011 PHASE DAY OF DEATH: 31 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Red, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Marked. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Multifocal, Minimal. Lungs . . . . . . . . . Discolored, All lobes, Black, Severe Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA,

Focal, Minimal.

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## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice SEX: Male ANIMAL: 4011 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 4 \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Larynx: V-SM-G . . . . MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL SINUS: BROWN-BLACK PIGMENT, Minimal. Nose/Turb Sec 3 . . . . No gross observations on tissue. NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight. Prostate . . . . . . No gross observations on tissue. MONONUCLEAR CELL AGGREGATES, Multifocal, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides Seminal vesicles Testes Trachea

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations STATUS: Final phase sacrifice SEX: Male ANIMAL: 4012 PHASE: Dosing phase PHASE DAY OF DEATH: 31 Microscopic Observations/Comments Gross Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Severe. PROMINENT HISTIOCYTES, Multifocal, Minimal. Lungs . . . . . . . . . Discolored, All lobes, Black, Severe Examined: 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Moderate. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

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## Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31		SEX: Male PHASE: Dosing phase	ANIMAL: 4012 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comme	ents
	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID FOCAl, Minimal.	
		MUCOSA: MIXED INFLAMMATORY CE WITHOUT LYMPHOID AGGREGATES, Slight.	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Mini	mal.
Nose/Turb Sec 2	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED I CELLS WITH OR WITHOUT LYMPHOI BILATERAL, Multifocal, Slight	D AGGREGATES,
Nose/Turb Sec 3 No gross observations on tissue.		NASAL MUCOSAL-SURFACE/LUMEN: PIGMENT, Minimal.	BROWN-BLACK
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: B PIGMENT, Multifocal, Minimal.	
		NASAL PHARYNGEAL LUMEN: BROWN PIGMENT, Multifocal, Minimal.	
!rachea	No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION,	Slight.

Petroleum Coke:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice SEX: Male ANIMAL: 4012 PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 4

Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Epididymides Prostate Seminal vesicles Testes

## Petroleum Coke:

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	Individual Animal Gross and Microscopic Observations			
STATUS: Final phase sacrifice SEX: Female ANIMAL: 1501 PHASE DAY OF DEATH: 44 PHASE: Dosing phase GROUP: 1				
Tissue		Microscopic Observations/Comments		
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Sligh		
		PROMINENT PLASMA CELLS, Slight.		
		- PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.		
Lungs	Discolored, Left lobe(s), Red, Foci, 0.2 - 0.5 cm, Slight	Examined; no correlation found		
		PROMINENT BRONCHIOLAR ASSOCIATED LYMPH TISSUE (BALT), Multifocal, Slight.	DIC	
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifoca Minimal.		
Larynx: V-SM-G .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifoca Slight.		
Nose/Turb Sec 1 .	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.		
		PERIODONTAL TISSUE (AMELOBLAST EPITHELIUM): CELLULAR DISORGANIZATION/DEGENERATION, UNILATER Slight.	AL,	

### Petroleum Coke:

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## Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female PHASE DAY OF DEATH: 44 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, BILATERAL, Multifocal, Minimal. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. PERIODONTAL DISEASE, Slight. Ovaries . . . . . . . . No gross observations on tissue. PROMINENT ATRETIC FOLLICLES, BILATERAL, Slight. FOLLICULAR CYST(S), UNILATERAL, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE. Trachea . . . . . . . No gross observations on tissue. MUCOSA: GLANDULAR DILATATION, Slight. Uterus . . . . . . . No gross observations on tissue. Tissue is unremarkable (with comment). - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE. Vagina . . . . . . . No gross observations on tissue. Tissue is unremarkable (with comment). - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 1501
PHASE DAY OF DEATH: 44 PHASE: Dosing phase GROUP: 1
Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Oviducts/Fallop

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## Page: 379

## Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 41		SEX: Female PHASE: Dosing phase		1502 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comments		
	No gross observations on tissue.	PROMINENT HISTIOCYTES, Minimal.		
		FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal.		
		- POOR SECTION QUALITY: RECUT, NO IMPROVEMENT.		
ungs	No gross observations on tissue.	SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.		
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.		
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.		
ose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.		
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.	ī	
		NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATE Slight.		

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## Petroleum Coke:

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STATUS: Final phase sacrifice PHASE DAY OF DEATH: 41		SEX: Female PHASE: Dosing phase	ANIMAL: 1502 GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Commen	nts
	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, E Slight.	
		FOLLICULAR CYST(S), UNILATERAL	s, Slight.
		INTERSTITIAL HEMORRHAGE, BILAT Multifocal, Moderate.	reral,
		- NORMAL MORPHOLOGY FOR VARIOUTHE ESTRUS CYCLE.	JS PHASES OF
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATE Moderate.	ERAL, Focal,
		HEMORRHAGE, UNILATERAL, Focal,	Moderate.
		- NORMAL MORPHOLOGY FOR VARIOU THE ESTRUS CYCLE.	JS PHASES OF
Vagina	No gross observations on tissue.		
		ACUTE INFLAMMATORY CELL INFILT Multifocal, Slight.	RATE,
		LUMINAL INFLAMMATORY/CELLULAR Moderate.	DEBRIS,
		- NORMAL MORPHOLOGY FOR VARIOU THE ESTRUS CYCLE.	US PHASES OF

## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice SEX: Female ANIMAL: 1502

PHASE DAY OF DEATH: 41 PHASE: Dosing phase GROUP: 1

Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop Trachea

## Petroleum Coke:

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STATUS: Final phase sacrifice PHASE DAY OF DEATH: 42		SEX: Female ANIMA PHASE: Dosing phase GROU	
issue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.		le.
arynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITHOUT LYMPHOID AGGREGATES, Multi-	
arynx: V-SM-G	No gross observations on tissue.	ssue.  MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifoca Minimal.	
lose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
lose/Turb Sec 2	No gross observations on tissue.	ue.  NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY  CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,  Multifocal, Slight.	
Nose/Turb Sec 3	No gross observations on tissue.	PALATE: ECTOPIC SEBACEOUS GLAND, I	Present.
varies	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, UNILA Minimal.	ATERAL,
		- NORMAL MORPHOLOGY FOR VARIOUS PRICESTRUS CYCLE.	NASES OF

### Petroleum Coke:

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## Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 1503 PHASE DAY OF DEATH: 42 PHASE: Dosing phase Microscopic Observations/Comments Gross Observations/Comments Uterus . . . . . . . No gross observations on tissue. STROMAL HYALINIZATION, BILATERAL, Moderate. HEMORRHAGE, UNILATERAL, Multifocal, Minimal. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE. Vagina . . . . . . . No gross observations on tissue. ACUTE INFLAMMATORY CELL INFILTRATE, Multifocal, Slight. LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Moderate. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Lungs Nose/Turb Sec 4 Oviducts/Fallop Trachea

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## Petroleum Coke:

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STATUS: Final phase sacrifice PHASE DAY OF DEATH: 52		SEX: Female PHASE: Dosing phase	ANIMAL: 1504 GROUP: 1
 Tissue	Gross Observations/Comments	Microscopic Observations/Commer	nts
	No gross observations on tissue.	PROMINENT PLASMA CELLS, Slight	· · · · · · · · · · · · · · · · · · ·
ungs	No gross observations on tissue.	SUBACUTE (CHRONIC ACTIVE)/CHRO	
Larynx: V-DVTC	No gross observations on tissue.	Tissue is missing.	
		- MISSING AT TRIM.	
Larynx: V-SM-G	No gross observations on tissue.	Tissue is missing.	
		- MISSING AT TRIM.	
Nose/Turb Sec 2	2 No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, BILATERAL, Multifocal, Slight.	
Trachea	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Multifocal, Minimal.	
Vagina	No gross observations on tissue.	LUMINAL INFLAMMATORY/CELLULAR Slight.	DEBRIS,
		- NORMAL MORPHOLOGY FOR VARIOUTHE ESTRUS CYCLE.	JS PHASES OF

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## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 1504

PHASE DAY OF DEATH: 52

SEX: Female

ANIMAL: 15

PHASE Day OF DEATH: 52

PHASE: Dosing phase

GROUP: 1

Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop Ovaries
Uterus

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### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANTMAL: 1505 PHASE: Dosing phase PHASE DAY OF DEATH: 43 \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Minimal. PROMINENT PLASMA CELLS, Slight. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Slight. GLANDULAR DILATATION, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. GLANDULAR DILATATION, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (VESTIBULAR): EPITHELIAL-EROSION(S), Focal, Slight. NASAL MUCOSA (VESTIBULAR EPITHELIUM): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Focal, Moderate. Nose/Turb Sec 2 . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH

OR WITHOUT LYMPHOID AGGREGATES, BILATERAL,

Multifocal, Slight.

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## Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final pha PHASE DAY OF DEATH: 43		SEX: Female PHASE: Dosing phase	ANIMAL: 1505 GROUP: 1
	Observations/Comments	Microscopic Observations/Commen	nts
Ovaries No gross observations on tissue.		PROMINENT ATRETIC FOLLICLES, UNILATERAL, Slight.  - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.	
Trachea No gross observations on tissue.		MONONUCLEAR CELL AGGREGATES, M Minimal.	Multifocal,
Uterus No gross observations on tissue.		STROMAL HYALINIZATION, BILATER Multifocal, Slight.	RAL,
		- NORMAL MORPHOLOGY FOR VARIOUTHE ESTRUS CYCLE.	JS PHASES OF
Vagina No gross observations on tissue.		ACUTE INFLAMMATORY CELL INFILT Multifocal, Slight.	TRATE,
		LUMINAL INFLAMMATORY/CELLULAR Slight.	DEBRIS,
		- NORMAL MORPHOLOGY FOR VARIOUTHE ESTRUS CYCLE.	JS PHASES OF

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Lungs Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop

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Individual Annial Gloss and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 43	SEX: Female PHASE: Dosing phase	ANIMAL: 1506 GROUP: 1		
	Microscopic Observations/Comment	S		
Mediastinal LN No gross observations on tissue.	PROMINENT HISTIOCYTES, Slight.  PROMINENT PLASMA CELLS, Slight.			
Lungs No gross observations on tissue.	PROMINENT BRONCHIOLAR ASSOCIATE TISSUE (BALT), Multifocal, Slig			
	SUBACUTE (CHRONIC ACTIVE)/CHRON INFLAMMATION, Multifocal, Minim			
Larynx: V-DVTC No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELL WITHOUT LYMPHOID AGGREGATES, Mu Minimal.			
	- TISSUE IS FRAGMENTED, BUT REA	DABLE.		
Larynx: V-SM-G No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELL WITHOUT LYMPHOID AGGREGATES, Mu Minimal.			
Nose/Turb Sec 2 No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INF CELLS WITH OR WITHOUT LYMPHOID . BILATERAL, Multifocal, Minimal.	AGGREGATES,		
Trachea No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Mu Minimal.	ltifocal,		
Uterus No gross observations on tissue.	STROMAL HYALINIZATION, UNILATER Multifocal, Moderate.	AL,		

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### Petroleum Coke:

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## Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 1506 PHASE: Dosing phase PHASE DAY OF DEATH: 43 Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Uterus . . . . . . . HEMORRHAGE, UNILATERAL, Focal, Moderate. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE. Vagina . . . . . . . No gross observations on tissue. ACUTE INFLAMMATORY CELL INFILTRATE, Multifocal, Slight. LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Moderate. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF

THE ESTRUS CYCLE.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop Ovaries

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Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 1507 PHASE DAY OF DEATH: 41 PHASE: Dosing phase GROUP: 1 Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_ Mediastinal LN . . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal. PROMINENT PLASMA CELLS, Minimal. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Slight. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 3 . . . . No gross observations on tissue. PERIODONTAL DISEASE, Minimal. Uterus . . . . . . . No gross observations on tissue. STROMAL HYALINIZATION, BILATERAL, Multifocal, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE. Vagina . . . . . . . No gross observations on tissue. ACUTE INFLAMMATORY CELL INFILTRATE, Multifocal, Slight.

## Petroleum Coke: Reproduction/Developmental Toxicity Screening

Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 1507 PHASE DAY OF DEATH: 41 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Slight.

> - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

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Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Lungs Nose/Turb Sec 2 Nose/Turb Sec 4 Oviducts/Fallop Ovaries

Trachea

## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 1508

PHASE DAY OF DEATH: 44

PHASE: Dosing phase

GROUP: 1

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Mediastinal LN . . . . No gross observations on tissue.

Papagon

PARACORTICAL AREA: INCREASED
[T-LYMPHOCYTE] SIZE CELLULARITY, Slight.

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PROMINENT HISTIOCYTES, Minimal.

PROMINENT PLASMA CELLS, Slight.

Lungs . . . . . . . . No gross observations on tissue.

SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.

Larynx: V-DVTC . . . . No gross observations on tissue.

MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal,

Slight.

Larynx: V-SM-G . . . . No gross observations on tissue.

Tissue is inadequate and unreadable.

- TISSUE FRAGMENTED AND NOT READABLE. RECUT: NO IMPROVEMENT.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

BILATERAL, Multifocal, Slight.

Nose/Turb Sec 3 . . . . No gross observations on tissue.

MAXILLARY GLANDULAR DILATATION, Minimal.

Ovaries . . . . . . . No gross observations on tissue.

PROMINENT ATRETIC FOLLICLES, BILATERAL, Slight.

- NORMAL MORPHOLOGY FOR VARIOUS PHASES OF

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## Petroleum Coke:

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## Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 1508 PHASE: Dosing phase PHASE DAY OF DEATH: 44 Gross Observations/Comments Microscopic Observations/Comments THE ESTRUS CYCLE. Trachea . . . . . . . No gross observations on tissue. MUCOSA: GLANDULAR DILATATION, Slight. Uterus . . . . . . . No gross observations on tissue. HEMORRHAGE, UNILATERAL, Focal, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE. Vagina . . . . . . . No gross observations on tissue. ACUTE INFLAMMATORY CELL INFILTRATE, Multifocal, Slight. LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Minimal. MONONUCLEAR CELL AGGREGATES, Multifocal, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 4 Oviducts/Fallop

## Petroleum Coke:

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STATUS: Final phase sacrifice PHASE DAY OF DEATH: 44	PHASE: Dosing phase	ANIMAL: 1509 GROUP: 1
Gross Observations/Comments		s
Mediastinal LN No gross observations on tis		
Jungs No gross observations on tis	ssue.  PROMINENT BRONCHIOLAR ASSOCIATE TISSUE (BALT), Multifocal, Slig	
warynx: V-DVTC No gross observations on tis	MUCOSA: MIXED INFLAMMATORY CELL WITHOUT LYMPHOID AGGREGATES, Mu Minimal.	
arynx: V-SM-G No gross observations on tis	MUCOSA: MIXED INFLAMMATORY CELLA WITHOUT LYMPHOID AGGREGATES, Mu Minimal.	
Ovaries No gross observations on tis	ssue. PROMINENT ATRETIC FOLLICLES, BI Slight.	LATERAL,
	- NORMAL MORPHOLOGY FOR VARIOUS THE ESTRUS CYCLE.	PHASES OF
Jterus No gross observations on tis	ssue. STROMAL HYALINIZATION, Multifoc Probably Incidental.	al, Slight,
	- NORMAL MORPHOLOGY FOR VARIOUS THE ESTRUS CYCLE.	PHASES OF
Vagina No gross observations on tis	ssue. ACUTE INFLAMMATORY CELL INFILTR Multifocal, Slight.	ATE,

### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 44		SEX: Female PHASE: Dosing phase	ANIMAL: 1509 GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Vagina		LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Minimal.	
		MONONUCLEAR CELL AGGREGATES, Minimal.	Multifocal,
		- NORMAL MORPHOLOGY FOR VARIO	US PHASES OF

THE ESTRUS CYCLE.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 2 Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop Trachea

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### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 1510 PHASE DAY OF DEATH: 42 PHASE: Dosing phase GROUP: 1 \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. Lungs . . . . . . . . . No gross observations on tissue. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Slight. GLANDULAR DILATATION, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, BILATERAL, Minimal. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight.

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 42		SEX: Female ANII PHASE: Dosing phase GRO	
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILD	
		INTERSTITIAL HEMORRHAGE, UNILATED Multifocal, Slight.	RAL,
		- NORMAL MORPHOLOGY FOR VARIOUS I	PHASES OF
Trachea	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Mult	tifocal,
Jterus	No gross observations on tissue.	STROMAL HYALINIZATION, BILATERAL, Multifocal, Slight.	,
		HEMORRHAGE, UNILATERAL, Focal, Mo	oderate.
		- NORMAL MORPHOLOGY FOR VARIOUS I	PHASES OF
Vagina No gross observations on tissue.	No gross observations on tissue.	ACUTE INFLAMMATORY CELL INFILTRATE Multifocal, Slight.	ΓE,
		LUMINAL INFLAMMATORY/CELLULAR DE	BRIS,
		- NORMAL MORPHOLOGY FOR VARIOUS DITHE ESTRUS CYCLE.	PHASES OF

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

PHASE DAY OF	STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 1510
	DEATH: 42	PHASE: Dosing phase	GROUP: 1
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop

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#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANTMAL: 1511 PHASE DAY OF DEATH: 44 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT PLASMA CELLS, Slight. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight. Ovaries . . . . . . . No gross observations on tissue. PROMINENT ATRETIC FOLLICLES, UNILATERAL, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE. Uterus . . . . . . . No gross observations on tissue. STROMAL HYALINIZATION, BILATERAL, Multifocal, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 1511

PHASE DAY OF DEATH: 44 PHASE: Dosing phase GROUP: 1

Tissue Gross Observations/Comments Microscopic Observations/Comments

Vagina . . . . . . No gross observations on tissue.

ACUTE INFLAMMATORY CELL INFILTRATE,
Multifocal, Minimal.

- NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

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Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Lungs Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop Trachea

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### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 44		SEX: Female PHASE: Dosing phase	ANIMAL: 1512 GROUP: 1	
Tissue		Microscopic Observations/Comments		
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, PROMINENT PLASMA CELLS, Slight.		
		- PROCESSING ARTIFACTS/ACCORDION PRESENT.	FOLDS	
Lungs	No gross observations on tissue.	PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight.		
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.		
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.		
Nose/Turb Sec 2	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal.		
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, BILATERAL Multifocal, Slight.	,	
		- NORMAL MORPHOLOGY FOR VARIOUS THE ESTRUS CYCLE.	PHASES OF	

#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Female
PHASE DAY OF DEATH: 44

PHASE: Dosing phase

GROUP: 1

Tissue

Gross Observations/Comments

Microscopic Observations/Comments

Vagina . . . . . . . No gross observations on tissue.

ACUTE INFLAMMATORY CELL INFILTRATE,

Multifocal, Minimal.

- NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

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Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop Ovaries Trachea

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#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female PHASE DAY OF DEATH: 42 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Slight Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT PLASMA CELLS, Minimal. Lungs . . . . . . . . . Discolored, All lobes, Black, Moderate Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.

## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice SEX: Female ANIMAL: 2501

PHASE DAY OF DEATH: 42 PHASE: Dosing phase GROUP: 2

Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 1 Nose/Turb Sec 2 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 2502 PHASE DAY OF DEATH: 43 PHASE: Dosing phase \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Slight Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal. PROMINENT PLASMA CELLS, Minimal. - POOR SECTION OUALITY: RECUT, NO IMPROVEMENT. Lungs . . . . . . . Discolored, All lobes, Black, Slight Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.

Trachea . . . . . . . . No gross observations on tissue.

Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

PHASE DAY OF DEATH: 43

Gross Observations/Comments

Microscopic Observations/Comments

Nose/Turb Sec 1 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):
EPITHELIAL-GOBLET CELL
HYPERTROPHY/HYPERPLASIA, Minimal.

Nose/Turb Sec 3 . . . . No gross observations on tissue.

PALATE: ECTOPIC SEBACEOUS GLAND, Present.

MUCOSA: GLANDULAR DILATATION, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 2 Nose/Turb Sec 4

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#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 2503 PHASE DAY OF DEATH: 42 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Slight Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight. - POOR SECTION QUALITY: RECUT, NO IMPROVEMENT. Lungs . . . . . . . . . Discolored, All lobes, Black, Moderate Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Marked. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH

OR WITHOUT LYMPHOID AGGREGATES, Minimal.

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_

STATUS: Final phase sacrifice

SEX: Female

ANIMAL: 2503

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PHASE DAY OF DEATH: 42

PHASE: Dosing phase

Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 3 . . . . No gross observations on tissue.

PALATE: ECTOPIC SEBACEOUS GLAND, Present.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-SM-G Nose/Turb Sec 1 Nose/Turb Sec 4 Trachea

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#### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations				
			ANIMAL: 2504	
Tissue		Microscopic Observations/Comments		
	No gross observations on tissue.	BROWN-BLACK PIGMENT DEPOSITS, Minima		
		PROMINENT HISTIOCYTES, Minimal.		
		PROMINENT PLASMA CELLS, Slight.		
		- POOR SECTION QUALITY: RECUT, NO IMPROVEMENT.		
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TI (BALT): BROWN-BLACK PIGMENT DEPOSI Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.		
		PROMINENT BRONCHIOLAR ASSOCIATED LYMTISSUE (BALT), Multifocal, Slight.	PHOID	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.		
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WIT WITHOUT LYMPHOID AGGREGATES, Minimal		
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WIT WITHOUT LYMPHOID AGGREGATES, Minimal		
Nose/Turb Sec 2	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INFLAMMA CELLS WITH OR WITHOUT LYMPHOID AGGRE Minimal.		

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## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Female
PHASE DAY OF DEATH: 44
PHASE: Dosing phase
GROUP: 2

Tissue
Gross Observations/Comments
Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

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#### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 44		SEX: Female PHASE: Dosing phase	ANIMAL: 2505 GROUP: 2	
	Gross Observations/Comments			
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal		
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Modera	te.	
		PROMINENT HISTIOCYTES, Minimal.		
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSU (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Slight.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.		
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Focal, Slight.	ND	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WIT	н	

OR WITHOUT LYMPHOID AGGREGATES, Minimal.

Petroleum Coke:

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#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 2505 PHASE DAY OF DEATH: 44 PHASE: Dosing phase GROUP: 2 Tissue Gross Observations/Comments Microscopic Observations/Comments Nose/Turb Sec 2 . . . . NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight. Trachea . . . . . . . . No gross observations on tissue. MONONUCLEAR CELL AGGREGATES, Focal,

Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4

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HYPERTROPHY/HYPERPLASIA, Minimal.

#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female PHASE DAY OF DEATH: 43 PHASE: Dosing phase \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . No gross observations on tissue. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. BROWN-BLACK PIGMENT DEPOSITS, Minimal. PROMINENT HISTIOCYTES, Slight. PROMINENT PLASMA CELLS, Slight. Lungs . . . . . . . . . Discolored, All lobes, Black, Foci, </= 0.1 Examined: 2 correlations found: cm, Moderate BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Minimal. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Slight. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL

Petroleum Coke:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 2506

PHASE DAY OF DEATH: 43 PHASE: Dosing phase GROUP: 2

Tissue Gross Observations/Comments Microscopic Observations/Comments

insue Gloss Observations/comments are to be a second of the comments of the co

Nose/Turb Sec 2 . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Page: 414

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

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#### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ SEX: Female STATUS: Final phase sacrifice ANIMAL: 2507 PHASE DAY OF DEATH: 44 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Moderate Examined; no correlation found PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. PROMINENT HISTIOCYTES, Slight. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Slight. PROMINENT PLASMA CELLS, Slight. YELLOW-BROWN PIGMENT, Slight. Lungs . . . . . . . . Examined: 2 correlations found: Discolored, All lobes, Black, Severe BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND

WITHOUT LYMPHOID AGGREGATES, Minimal.

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Female

ANIMAL: 2507

PHASE DAY OF DEATH: 44

PHASE: Dosing phase

Gross Observations/Comments 

Microscopic Observations/Comments

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Larynx: V-SM-G . . . . No gross observations on tissue.

MUCOSA (SEROMUCOUS GLANDS):

EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA,

Minimal.

MUCOSA: MIXED INFLAMMATORY CELLS WITH AND

WITHOUT LYMPHOID AGGREGATES, Minimal.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH

OR WITHOUT LYMPHOID AGGREGATES, Minimal.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES.

Minimal.

Nose/Turb Sec 4 . . . . No gross observations on tissue.

NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK

PIGMENT, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 3 Trachea

### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

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PHASE DAY OF DEATH: 41		PHASE: Dosing phase	ANIMAL: 2508 GROUP: 2
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moder	rate.
		PROMINENT PLASMA CELLS, Slight.	
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISS (BALT): BROWN-BLACK PIGMENT DEPOSITS Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPH TISSUE (BALT), Multifocal, Slight.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Minimal.	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.	

Petroleum Coke:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice SEX: Female ANIMAL: 2508

PHASE DAY OF DEATH: 41 PHASE: Dosing phase GROUP: 2

Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 2 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ SEX: Female ANIMAL: 2509 STATUS: Final phase sacrifice PHASE: Dosing phase PHASE DAY OF DEATH: 42 \_\_\_\_\_\_\_ Microscopic Observations/Comments Gross Observations/Comments Mediastinal LN . . . . Examined; 1 correlation found: Discolored, Black, Moderate BROWN-BLACK PIGMENT DEPOSITS, Slight. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. PROMINENT PLASMA CELLS, Slight. Lungs . . . . . . . . . . Discolored, All lobes, Black, Moderate Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.

#### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

SEX: Female ANIMAL: 2509 STATUS: Final phase sacrifice PHASE: Dosing phase PHASE DAY OF DEATH: 42

Gross Observations/Comments Microscopic Observations/Comments 

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Page: 420

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Aprimal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ SEX: Female ANIMAL: 2510 STATUS: Final phase sacrifice PHASE: Dosing phase PHASE DAY OF DEATH: 42 \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Examined: 1 correlation found: Discolored, Black, Slight BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. PROMINENT HISTIOCYTES, Minimal. Lungs . . . . . . . . Discolored, All lobes, Black, Moderate Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.

Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_

STATUS: Final phase sacrifice SEX: Female ANIMAL: 2510 PHASE DAY OF DEATH: 42

PHASE DAY OF DEATH: 42 PHASE: Dosing phase GROUP: 2 Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight.

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NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

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# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 44			ANIMAL: 2511 GROUP: 2
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Min	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Mo	derate.
		PROMINENT PLASMA CELLS, Minimal.	
		- PROCESSING ARTIFACTS/ACCORDION FO PRESENT.	LDS
Lungs Discolored, All lobes, Black, Moderate		Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID T (BALT): BROWN-BLACK PIGMENT DEPOS Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.	ITS,
		PROMINENT BRONCHIOLAR ASSOCIATED LY TISSUE (BALT), Multifocal, Moderate	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal Minimal.	,
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WI WITHOUT LYMPHOID AGGREGATES, Focal, Slight.	

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_

STATUS: Final phase sacrifice

SEX: Female

ANIMAL: 2511

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PHASE DAY OF DEATH: 44

PHASE: Dosing phase

Gross Observations/Comments Microscopic Observations/Comments

Larynx: V-SM-G . . . . No gross observations on tissue.

MUCOSA (SEROMUCOUS GLANDS):

EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA,

Minimal.

MUCOSA: MIXED INFLAMMATORY CELLS WITH AND

WITHOUT LYMPHOID AGGREGATES, Focal,

Minimal.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

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Lungs . . . . . . . .

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#### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice SEX: Female ANIMAL: 2512 PHASE DAY OF DEATH: 42 PHASE: Dosing phase

Microscopic Observations/Comments Gross Observations/Comments

\_\_\_\_\_\_

Mediastinal LN . . . .

Discolored, Black, Moderate Examined; 1 correlation found:

BROWN-BLACK PIGMENT DEPOSITS, Slight.

PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. Page: 425

PROMINENT PLASMA CELLS, Slight.

- PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.

Examined; 2 correlations found: Discolored, All lobes, Black, Moderate

BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS,

Multifocal, Moderate.

ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.

PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight.

BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.

SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.

Larynx: V-SM-G . . . . No gross observations on tissue.

MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight.

CHONDROMALACIA, Focal, Slight.

Petroleum Coke:

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#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

------STATUS: Final phase sacrifice SEX: Female ANIMAL: 2512 PHASE DAY OF DEATH: 42 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Slight. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Trachea . . . . . . . . No gross observations on tissue. MUCOSA: GLANDULAR DILATATION, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 3 Nose/Turb Sec 4

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Petroleum Coke:
Reproduction/Developmental Toxicity Screening

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Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_\_ SEX: Female ANTMAL: 3501 STATUS: Final phase sacrifice PHASE: Dosing phase PHASE DAY OF DEATH: 44 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Moderate Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Minimal. PROMINENT PLASMA CELLS, Minimal. Lungs . . . . . . . . . Examined; 2 correlations found: Discolored, All lobes, Black, Severe BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

Multifocal, Minimal.

### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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\_\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 3501 PHASE: Dosing phase PHASE DAY OF DEATH: 44 Microscopic Observations/Comments Gross Observations/Comments Nose/Turb Sec 3 . . . . No gross observations on tissue. PERIODONTAL DISEASE, Slight. Nose/Turb Sec 4 . . . . No gross observations on tissue. PERIODONTAL DISEASE, Slight. Trachea . . . . . . . No gross observations on tissue. MUCOSA: GLANDULAR DILATATION, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Larynx: V-DVTC Nose/Turb Sec 1

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# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 43		SEX: Female PHASE: Dosing phase	ANIMAL: 3502 GROUP: 3
	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slig	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Mod	lerate.
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TI (BALT): BROWN-BLACK PIGMENT DEPOSI Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.	
		PROMINENT BRONCHIOLAR ASSOCIATED LYMTISSUE (BALT), Multifocal, Moderate.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Moderate.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLA Multifocal, Minimal.	SIA,
		MUCOSA: MIXED INFLAMMATORY CELLS WIT WITHOUT LYMPHOID AGGREGATES, Multifo Minimal.	

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Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ SEX: Female

STATUS: Final phase sacrifice

ANIMAL: 3502

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PHASE DAY OF DEATH: 43 

PHASE: Dosing phase

GROUP: 3

Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 1 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

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## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 45		SEX: Female	ANIMAL: 3503	
Tissue		Microscopic Observations/Comment	s	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS,		
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY	, Moderate.	
		PROMINENT HISTIOCYTES, Minimal.		
		PROMINENT PLASMA CELLS, Minimal		
Lungs	Discolored, All lobes, Black, Moderate	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHO: (BALT): BROWN-BLACK PIGMENT DI Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BI PIGMENT, Multifocal, Moderate  PROMINENT BRONCHIOLAR ASSOCIATED TISSUE (BALT), Multifocal, Moderate  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocalight.  SUBACUTE (CHRONIC ACTIVE)/CHRONCINFLAMMATION, Multifocal, Moderate	ID TISSUE EPOSITS,  LACK  D LYMPHOID rate.  DCal,	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITHOUT LYMPHOID AGGREGATES, Min		
Nose/Turb Sec 1 No gross observations on tissue.		NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal	1.	

> Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

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STATUS: Final phase sacrifice SEX: Female ANIMAL: 3503 PHASE DAY OF DEATH: 45 PHASE: Dosing phase \_\_\_\_\_ Tissue Gross Observations/Comments Microscopic Observations/Comments

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 2 Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

## Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations SEX: Female STATUS: Final phase sacrifice ANIMAL: 3504 PHASE: Dosing phase PHASE DAY OF DEATH: 41 Microscopic Observations/Comments Gross Observations/Comments Mediastinal LN . . . . Examined; 1 correlation found: Discolored, Black, Moderate BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. Lungs . . . . . . . . Examined; 2 correlations found: Discolored, All lobes, Black, Severe BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Focal, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 3504 PHASE: Dosing phase PHASE DAY OF DEATH: 41 Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK

PIGMENT, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 3 Trachea

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

ANIMAL: 3505 SEX: Female STATUS: Final phase sacrifice PHASE: Dosing phase GROUP: 3 PHASE DAY OF DEATH: 42 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Moderate Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight. Examined; 1 correlation found: Enlarged, Slight PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Minimal. PROMINENT PLASMA CELLS, Minimal. Lungs . . . . . . . Examined; 2 correlations found: Discolored, All lobes, Black, Moderate BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Marked. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Focal, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND

WITHOUT LYMPHOID AGGREGATES, Minimal.

#### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 3505 PHASE: Dosing phase

PHASE DAY OF DEATH: 42

Microscopic Observations/Comments Gross Observations/Comments

Nose/Turb Sec 1 . . . . No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):

EPITHELIAL-GOBLET CELL

HYPERTROPHY/HYPERPLASIA, Slight.

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Page: 436

Multifocal, Slight.

Nose/Turb Sec 3 . . . . No gross observations on tissue.

PALATE: ECTOPIC SEBACEOUS GLAND, Present.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 4 Trachea

# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations			
D GD D GD D	TUS: Final phase sacrifice	SEX: Female	ANIMAL: 3506
Tissue		Microscopic Observations/Comments	
Mediastinal LN			
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked	
		PROMINENT HISTIOCYTES, Minimal.	
		PROMINENT PLASMA CELLS, Slight.	
Lungs	Discolored, All lobes, Black, Severe	Examined; 2 correlations found:  BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate.  ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Moderate.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Minimal.	di
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Multifocal, Slight.	

#### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 3506 PHASE DAY OF DEATH: 44 PHASE: Dosing phase \_\_\_\_\_\_ Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal. Nose/Turb Sec 2 . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. Trachea . . . . . . . . No gross observations on tissue. MUCOSA: GLANDULAR DILATATION, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3

#### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
STA	TUS: Final phase sacrifice	SEX: Female PHASE: Dosing phase	ANIMAL: 3507 GROUP: 3
Tissue		Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight.	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked	
		PROMINENT HISTIOCYTES, Minimal.	
		PROMINENT PLASMA CELLS, Minimal.	
Lungs	Discolored, All lobes, Black, Severe	Examined; 2 correlations found:  BRONCHIOLAR ASSOCIATED LYMPHOID TISSU (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate.  ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHO TISSUE (BALT), Multifocal, Moderate.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AN WITHOUT LYMPHOID AGGREGATES, Minimal.	ND
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ ANIMAL: 3507

STATUS: Final phase sacrifice

SEX: Female

GROUP: 3

PHASE DAY OF DEATH: 44

PHASE: Dosing phase 

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Gross Observations/Comments

Microscopic Observations/Comments

Nose/Turb Sec 2 . . . . No gross observations on tissue.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

Minimal.

Nose/Turb Sec 4 . . . . No gross observations on tissue.

PERIODONTAL DISEASE, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Larynx: V-DVTC Nose/Turb Sec 3 Trachea

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Petroleum Coke:

Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 3508 PHASE DAY OF DEATH: 41 PHASE: Dosing phase GROUP: 3 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Moderate Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. PROMINENT PLASMA CELLS, Minimal. Lungs . . . . . . . . . Discolored, All lobes, Black, Moderate Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Multifocal, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female PHASE DAY OF DEATH: 41 PHASE: Dosing phase GROUP: 3 Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 3 . . . . No gross observations on tissue. NASAL-PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT, Minimal. Vagina . . . . . . . . . No micropathology observations on tissue. Mass, Mucosa, Black, Soft, 0.2 - 0.5 cm

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 1 Trachea

#### Petroleum Coke:

PHASE DAY OF DE	TUS: Final phase sacrifice ATH: 41	SEX: Female PHASE: Dosing phase	ANIMAL: 3509 GROUP: 3
	Gross Observations/Comments		
Mediastinal LN			
	Discolored, Black, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slig	ght.
	Enlarged, Moderate	Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, N	Marked.
		PROMINENT HISTIOCYTES, Minimal.	
		PROMINENT PLASMA CELLS, Minimal.	
		- PROCESSING ARTIFACTS/ACCORDION FOI PRESENT.	LDS
Lungs	Discolored, All lobes, Black, Severe	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TI (BALT): BROWN-BLACK PIGMENT DEPOSI Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked.	
		PROMINENT BRONCHIOLAR ASSOCIATED LYMTISSUE (BALT), Multifocal, Moderate.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WIT WITHOUT LYMPHOID AGGREGATES, Minimal	

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female PHASE DAY OF DEATH: 41 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Focal, Minimal. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 4 . . . . No gross observations on tissue. NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. PERIODONTAL DISEASE, Slight. Trachea . . . . . . . . No gross observations on tissue. MONONUCLEAR CELL AGGREGATES, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3

Individual Animal Gross and Microscopic Observations			
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 44		SEX: Female PHASE: Dosing phase	ANIMAL: 3510 GROUP: 3
Tissue	Gross Observations/Comments	Microscopic Observations/Comme	nts
Mediastinal LN			:
	Enlarged, Slight	Examined; 1 correlation found PARACORTICAL AREA: INCREASE [T-LYMPHOCYTE] SIZE CELLULA	D
		PROMINENT HISTIOCYTES, Minima	1.
		PROMINENT PLASMA CELLS, Sligh	t.
Lungs	Discolored, All lobes, Black, Severe	Examined; 2 correlations foun- BRONCHIOLAR ASSOCIATED LYMP: (BALT): BROWN-BLACK PIGMENT Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN PIGMENT, Multifocal, Marked	HOID TISSUE DEPOSITS, -BLACK
		PROMINENT BRONCHIOLAR ASSOCIATISSUE (BALT), Multifocal, Mo	
		BRONCHIOLO-ALVEOLAR EPITHELIA HYPERPLASIA/HYPERTROPHY, Mult Slight.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Mode	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CE WITHOUT LYMPHOID AGGREGATES, Minimal.	

Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 3510 PHASE DAY OF DEATH: 44 PHASE: Dosing phase GROUP: 3 Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY

CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

Multifocal, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Nose/Turb Sec 4 Trachea

> Petroleum Coke: Reproduction/Developmental Toxicity Screening

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Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations STATUS: Final phase sacrifice PHASE: Dosing phase GROUP: 3 PHASE DAY OF DEATH: 44 Microscopic Observations/Comments Gross Observations/Comments Tissue \_\_\_\_\_\_ Mediastinal LN . . . . Examined: 1 correlation found: Discolored, Black, Moderate BROWN-BLACK PIGMENT DEPOSITS, Moderate. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Slight. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. PROMINENT PLASMA CELLS, Slight. Lungs . . . . . . . . Discolored, All lobes, Black, Moderate Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight. Larynx: V-SM-G . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

SEX: Female

STATUS: Final phase sacrifice

ANIMAL: 3511

PHASE DAY OF DEATH: 44

PHASE: Dosing phase

GROUP: 3

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Gross Observations/Comments \_\_\_\_\_\_

Nose/Turb Sec 2 . . . . No gross observations on tissue.

Microscopic Observations/Comments

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,

Minimal.

Nose/Turb Sec 4 . . . . No gross observations on tissue.

NASAL PHARYNGEAL LUMEN: BROWN-BLACK

PIGMENT, Minimal.

Trachea . . . . . . . . No gross observations on tissue.

MUCOSA: GLANDULAR DILATATION, Slight.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Larynx: V-DVTC Nose/Turb Sec 1 Nose/Turb Sec 3

#### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
DUACE DAY OF DE	TUS: Final phase sacrifice	SEX: Female	ANIMAL: 3512
Tissue		Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Moderat	
	Enlarged, Slight	Examined; 1 correlation found:  PARACORTICAL AREA: INCREASED  [T-LYMPHOCYTE] SIZE CELLULARITY,  Moderate.	
		PROMINENT HISTIOCYTES, Minimal.	
Lungs	Discolored, All lobes, Black, Severe	Examined; 2 correlations found:  BRONCHIOLAR ASSOCIATED LYMPHOID TISSU (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight.  ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate.  PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOTISSUE (BALT), Multifocal, Moderate.  BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal.  SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Slight.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Minimal.	ND
Larynx: V-SM-G No gross observations on tissue.		MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA FOCAl, Minimal.	

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female PHASE DAY OF DEATH: 42 PHASE: Dosing phase GROUP: 3 Gross Observations/Comments Microscopic Observations/Comments Larynx: V-SM-G . . . . MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. Nose/Turb Sec 1 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight. Nose/Turb Sec 2 . . . . No gross observations on tissue. NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Minimal.

PERIODONTAL DISEASE, Minimal.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Trachea

Nose/Turb Sec 4 . . . . No gross observations on tissue.

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#### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
STATE PHASE DAY OF DE	TUS: Final phase sacrifice	SEX: Female PHASE: Dosing phase	ANIMAL: 4501 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN			
	Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate.	
	Enlarged, Severe	Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY	, Severe.
		PROMINENT HISTIOCYTES, Multifocal	, Minimal.
Lungs	Discolored, All lobes, Black, Severe	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLA PIGMENT, Multifocal, Marked.	CK
		PROMINENT BRONCHIOLAR ASSOCIATED : TISSUE (BALT), Multifocal, Modera	
		BRONCHIOLAR ASSOCIATED LYMPHOID T (BALT): BROWN-BLACK PIGMENT DEPOS Multifocal, Marked.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifoc Minimal.	al,
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITHOUT LYMPHOID AGGREGATES, Mult.	

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#### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 47		SEX: Female PHASE: Dosing phase	ANIMAL: 4501 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITHOUT LYMPHOID AGGREGATES, Multiforminal.	H AND
Nose/Turb Sec	1 No gross observations on tissue.	PERIODONTAL TISSUE (AMELOBLAST EPITHELIUM): CELLULAR DISORGANIZATION/DEGENERATION, BILATE: Multifocal, Slight.	RAL,
Nose/Turb Sec	2 No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INFLAMMA CELLS WITH OR WITHOUT LYMPHOID AGGREGMINIMAL.	
Nose/Turb Sec	3 No gross observations on tissue.	PALATE: ECTOPIC SEBACEOUS GLAND, Pre	sent.
Nose/Turb Sec	4 No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BL PIGMENT, BILATERAL, Multifocal, Minit	
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, UNILATED Multifocal, Slight.	RAL,
		- NORMAL MORPHOLOGY FOR VARIOUS PHAST THE ESTRUS CYCLE.	ES OF
Jterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, Multifocal, Slight.	
		- NORMAL MORPHOLOGY FOR VARIOUS PHASE	ES OF

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Female
PHASE: Dosing phase

GROUP: 4

Tissue

Gross Observations/Comments

THE ESTRUS CYCLE.

Vagina . . . . . No gross observations on tissue.

ACUTE INFLAMMATORY CELL INFILTRATE,
Multifocal, Slight.

LUMINAL INFLAMMATORY/CELLULAR DEBRIS,
Moderate.

- NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

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Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Kidneys Oviducts/Fallop Trachea

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#### Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 4502 PHASE DAY OF DEATH: 42 PHASE: Dosing phase GROUP: 4 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. Enlarged, Moderate Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Severe. PROMINENT HISTIOCYTES, Multifocal, Minimal. PROMINENT PLASMA CELLS, Moderate. Lungs . . . . . . . . Discolored, All lobes, Black, Severe Examined: 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

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#### Petroleum Coke:

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Individual Animal Gross and Microscopic Observations			
STAT	TUS: Final phase sacrifice ATH: 42	SEX: Female PHASE: Dosing phase	ANIMAL: 4502 GROUP: 4
	Gross Observations/Comments	Microscopic Observations/Comments	
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifoca	and
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WI OR WITHOUT LYMPHOID AGGREGATES, UNILATERAL, Focal, Minimal.	тн
		NASOLACRIMAL DUCT(S): MIXED INFLAMMATO CELLS WITH OR WITHOUT LYMPHOID AGGREGA BILATERAL, Multifocal, Slight.	
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLAC PIGMENT, BILATERAL, Multifocal, Minima	
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, UNILATERA Slight.	L,
		- NORMAL MORPHOLOGY FOR VARIOUS PHASES THE ESTRUS CYCLE.	OF
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, Foc	al,

Petroleum Coke:
Reproduction/Developmental Toxicity Screening

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Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

	individual Animal Globs and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 42		SEX: Female PHASE: Dosing phase	ANIMAL: 4502 GROUP: 4		
Tissue	Gross Observations/Comments	Microscopic Observations/Comments			
Uterus		- NORMAL MORPHOLOGY FOR VARIOUS PH	ASES OF		
Vagina	No gross observations on tissue.	ACUTE INFLAMMATORY CELL INFILTRATE Multifocal, Slight.	•		
		LUMINAL INFLAMMATORY/CELLULAR DEBR Slight.	IS,		
		- NORMAL MORPHOLOGY FOR VARIOUS PH	ASES OF		

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Oviducts/Fallop Trachea

#### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
STAT	US: Final phase sacrifice	SEX: Female	ANIMAL: 4503
Tissue		Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Mo	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, S	evere.
		PROMINENT HISTIOCYTES, Multifocal,	Minimal.
Lungs	Discolored, All lobes, Black, Foci, 0.2 - 0.5 cm, Severe	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLAC PIGMENT, Multifocal, Marked.	к
		PROMINENT BRONCHIOLAR ASSOCIATED L TISSUE (BALT), Multifocal, Moderat	
		BRONCHIOLAR ASSOCIATED LYMPHOID TI (BALT): BROWN-BLACK PIGMENT DEPOSI Multifocal, Slight.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifoca Moderate.	1,
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS W WITHOUT LYMPHOID AGGREGATES, MultiMinimal.	
Larynx: V-SM-G No gross observations on tissue.		MUCOSA: MIXED INFLAMMATORY CELLS W WITHOUT LYMPHOID AGGREGATES, MultiMinimal.	

### Petroleum Coke: Reproduction/Developmental Toxicity Screening

Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

PHASE DAY OF DEAT	US: Final phase sacrifice TH: 43	SEX: Female PHASE: Dosing phase	ANIMAL: 4503 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal. NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGAT	ı,
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WITOR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.  NASOLACRIMAL DUCT(S): MIXED INFLAMMATOR CELLS WITH OR WITHOUT LYMPHOID AGGREGAT Multifocal, Slight.	RY
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Minimal	
Ovaries	No gross observations on tissue.	FOLLICULAR CYST(S), BILATERAL, Slight.	
		- NORMAL MORPHOLOGY FOR VARIOUS PHASES THE ESTRUS CYCLE.	OF
Uterus	Distended, Bilateral horns, elongated, Severe/ (post-fixation observation)	Tissue is unremarkable (with comment). Examined; no correlation found	
		- NORMAL MORPHOLOGY FOR VARIOUS PHASES	OF

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# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 4503 PHASE: Dosing phase PHASE DAY OF DEATH: 43 GROUP: 4 Tissue Gross Observations/Comments Microscopic Observations/Comments THE ESTRUS CYCLE. Vagina . . . . . . . No gross observations on tissue. LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Moderate. MONONUCLEAR CELL AGGREGATES, Multifocal, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Oviducts/Fallop Trachea

#### Petroleum Coke:

Individual Animal Gross and Microscopic Observations			
PHASE DAY OF DE	ATUS: Final phase sacrifice	SEX: Female PHASE: Dosing phase	ANIMAL: 4504 GROUP: 4
Tissue		Microscopic Observations/Comments	
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Mc	
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, S	Severe.
		PROMINENT HISTIOCYTES, Multifocal,	Minimal.
		FREE ERYTHROCYTS/ERYTHROPHAGOCYTOS Minimal.	BIS,
Lungs	Discolored, All lobes, Black, Foci, 0.2 - 0.5 cm, Moderate	Examined; 1 correlation found:  ALVEOLAR MACROPHAGES: BROWN-BLAC PIGMENT, Multifocal, Marked.	ck
		PROMINENT BRONCHIOLAR ASSOCIATED I TISSUE (BALT), Multifocal, Slight.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifoca Slight.	al,
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate	2.
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS W WITHOUT LYMPHOID AGGREGATES, Multi Minimal.	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	

#### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 43		SEX: Female PHASE: Dosing phase	ANIMAL: 4504 GROUP: 4
	Gross Observations/Comments		ts
Nose/Turb Sec 2 .	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VEST JUNCTION): MIXED INFLAMMATORY OR WITHOUT LYMPHOID AGGREGATES Multifocal, Slight. NASOLACRIMAL DUCT(S): MIXED IN CELLS WITH OR WITHOUT LYMPHOID BILATERAL, Multifocal, Slight.	IBULAR CELLS WITH , BILATERAL, FLAMMATORY AGGREGATES,
Nose/Turb Sec 3 .	No gross observations on tissue.	NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal.	
Nose/Turb Sec 4 .	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight.	
ovaries No gross observations on tissue.		PROMINENT ATRETIC FOLLICLES, U Minimal NORMAL MORPHOLOGY FOR VARIOU	

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Oviducts/Fallop Trachea Uterus Vagina

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#### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

-----STATUS: Final phase sacrifice SEX: Female PHASE: Dosing phase GROUP: 4 PHASE DAY OF DEATH: 42 Gross Observations/Comments Microscopic Observations/Comments Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Marked. Enlarged, Moderate Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Multifocal, Moderate. PROMINENT HISTIOCYTES, Multifocal, Minimal. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. PROMINENT PLASMA CELLS, Slight. Lungs . . . . . . . . . Discolored, All lobes, Black, Severe Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Moderate.

#### Petroleum Coke:

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 42		SEX: Female PHASE: Dosing phase	ANIMAL: 4505 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comme	ents
	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID Minimal.  MUCOSA: MIXED INFLAMMATORY CE WITHOUT LYMPHOID AGGREGATES, Minimal.	METAPLASIA, BLLS WITH AND
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Mini	.mal.
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VES JUNCTION): MIXED INFLAMMATORY OR WITHOUT LYMPHOID AGGREGATE Multifocal, Slight.	CELLS WITH SS, BILATERAL,
		NASOLACRIMAL DUCT(S): MIXED I CELLS WITH OR WITHOUT LYMPHOI BILATERAL, Multifocal, Minima	D AGGREGATES,
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: B	
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, Slight.	BILATERAL,
		- NORMAL MORPHOLOGY FOR VARIO	OUS PHASES OF

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: F PHASE DAY OF DEATH: 4	inal phase sacrifice 2	SEX: Female PHASE: Dosing phase	ANIMAL: 4505 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Trachea	. No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION, Minimal.	
Jterus	. No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, Multifocal, Slight.	
		- NORMAL MORPHOLOGY FOR VARIOUS PHASE THE ESTRUS CYCLE.	S OF
/agina	. No gross observations on tissue.	ACUTE INFLAMMATORY CELL INFILTRATE, Multifocal, Slight.	
		LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Minimal.	
		- NORMAL MORPHOLOGY FOR VARIOUS PHASE THE ESTRUS CYCLE.	S OF

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Larynx: V-DVTC Nose/Turb Sec 3 Oviducts/Fallop

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#### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 4506 PHASE: Dosing phase PHASE DAY OF DEATH: 42 Microscopic Observations/Comments Gross Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. Enlarged, Moderate Examined: 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Severe. PROMINENT HISTIOCYTES, Multifocal, Minimal. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. Lungs . . . . . . . Examined; 1 correlation found: Discolored, All lobes, Black, Severe ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

#### Petroleum Coke:

Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 42		SEX: Female	ANIMAL: 4506	
Tissue	Gross Observations/Comments	Microscopic Observations/Comments		
	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifoo Minimal TISSUE IS FRAGMENTED, BUT READABLE.	AND	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.		
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WOR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.	ITH	
		NASOLACRIMAL DUCT(S): MIXED INFLAMMAT CELLS WITH OR WITHOUT LYMPHOID AGGREG BILATERAL, Multifocal, Slight.		
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLA PIGMENT, BILATERAL, Multifocal, Minim		
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILATERA Slight.	L,	
		- NORMAL MORPHOLOGY FOR VARIOUS PHASE THE ESTRUS CYCLE.	S OF	
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, Multifocal, Slight.		

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#### Petroleum Coke:

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#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

\_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female PHASE DAY OF DEATH: 42 PHASE: Dosing phase GROUP: 4 Gross Observations/Comments Microscopic Observations/Comments Uterus - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE. Vagina . . . . . . . No gross observations on tissue. ACUTE INFLAMMATORY CELL INFILTRATE, Multifocal, Slight. LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Minimal. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Oviducts/Fallop Trachea

Petroleum Coke:

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Individual Animal Gross and Microscopic Observations			
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 41		SEX: Female PHASE: Dosing phase	ANIMAL: 4507 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Mediastinal LN			
	Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate.	
	Enlarged, Moderate	Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, S	devere.
		PROMINENT HISTIOCYTES, Multifocal, M	Jinimal.
Lungs	Discolored, All lobes, Black, Severe	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked.	
		PROMINENT BRONCHIOLAR ASSOCIATED LYMTISSUE (BALT), Multifocal, Slight.	IPHOID
		BRONCHIOLAR ASSOCIATED LYMPHOID TISS (BALT): BROWN-BLACK PIGMENT DEPOSITS Multifocal, Slight.	
		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked.	
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WIT WITHOUT LYMPHOID AGGREGATES, Multifo Minimal.	

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#### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

	TUS: Final phase sacrifice ATH: 41		ANIMAL: 4507 GROUP: 4
Tissue	Gross Observations/Comments		
	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASI Multifocal, Minimal.	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WI'OR WITHOUT LYMPHOID AGGREGATES, BILATE Multifocal, Minimal.	
		NASOLACRIMAL DUCT(S): MIXED INFLAMMATO CELLS WITH OR WITHOUT LYMPHOID AGGREGA Minimal.	
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLAC. PIGMENT, Multifocal, Slight.	K
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILATERAL Slight.	,
		- NORMAL MORPHOLOGY FOR VARIOUS PHASES THE ESTRUS CYCLE.	OF
Crachea	No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION, Moderate	

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#### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 41		SEX: Female PHASE: Dosing phase	ANIMAL: 4507 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, BILATERAL Multifocal, Slight.  - NORMAL MORPHOLOGY FOR VARIOUS : THE ESTRUS CYCLE.	
Vagina No gross observations on tissue.		ACUTE INFLAMMATORY CELL INFILTRA' Multifocal, Slight.	TE,
		LUMINAL INFLAMMATORY/CELLULAR DE Slight.	BRIS,
		SUPERFICIAL CELLULAR BALLOONING DEGENERATION, Multifocal, Slight	
		- NORMAL MORPHOLOGY FOR VARIOUS : THE ESTRUS CYCLE.	PHASES OF

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Oviducts/Fallop

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#### Petroleum Coke:

Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Apimal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations				
STATUS: Final phase sacrifice PHASE DAY OF DEATH: 43		SEX: Female PHASE: Dosing phase	ANIMAL: 4508 GROUP: 4	
Tissue		Microscopic Observations/Comments		
Mediastinal LN		Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate.		
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Se	vere.	
		PROMINENT HISTIOCYTES, Multifocal,	Minimal.	
Lungs	Discolored, All lobes, Black, Moderate	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked.		
		PROMINENT BRONCHIOLAR ASSOCIATED LY TISSUE (BALT), Multifocal, Moderate		
		BRONCHIOLAR ASSOCIATED LYMPHOID TIS (BALT): BROWN-BLACK PIGMENT DEPOSIT Multifocal, Moderate.		
·		BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal Slight.	,	
		SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked.		
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WI WITHOUT LYMPHOID AGGREGATES, Multif		

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#### Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

PHASE DAY OF DE	TUS: Final phase sacrifice ATH: 43	SEX: Female ANIMAL: 4508 PHASE: Dosing phase GROUP: 4		
Tissue	Gross Observations/Comments	Microscopic Observations/Comments		
	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH WITHOUT LYMPHOID AGGREGATES, Multifoca	AND	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.		
		PERIODONTAL TISSUE (AMELOBLAST EPITHELIUM): CELLULAR DISORGANIZATION/DEGENERATION, UNILATED Focal, Slight.	RAL,	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WIOR WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.	тн	
		NASOLACRIMAL DUCT(S): MIXED INFLAMMATO CELLS WITH OR WITHOUT LYMPHOID AGGREGA UNILATERAL, Focal, Moderate.		
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLAG		
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILATERAL Slight.	J.,	
		- NORMAL MORPHOLOGY FOR VARIOUS PHASES	OF	

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# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

PHASE DAY OF DEATH: 43

Gross Observations/Comments

Tissue

Gross Observations/Comments

THE ESTRUS CYCLE.

Vagina . . . . . . No gross observations on tissue.

ACUTE INFLAMMATORY CELL INFILTRATE, Multifocal, Slight.

LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Slight.

- NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Oviducts/Fallop Trachea Uterus

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# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations					
PHASE DAY OF DEAT	JS: Final phase sacrifice TH: 52	SEX: Female PHASE: Dosing phase	ANIMAL: 4509 GROUP: 4		
rissue	Gross Observations/Comments	Microscopic Observations/Comm	ents		
Ear(s)		Tissue is unremarkable.			
Mediastinal LN .	Discolored, Black, Severe	Examined; 1 correlation foun BROWN-BLACK PIGMENT DEPOSI Multifocal, Marked.			
		PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULAR			
		PROMINENT HISTIOCYTES, Multi	focal, Minimal.		
Lungs	Discolored, All lobes, Black, Severe	Examined; 1 correlation foun ALVEOLAR MACROPHAGES: BROW PIGMENT, Multifocal, Moder	IN-BLACK		
		PROMINENT BRONCHIOLAR ASSOCI TISSUE (BALT), Multifocal, M			
		BRONCHIOLAR ASSOCIATED LYMPH (BALT): BROWN-BLACK PIGMENT Multifocal, Marked.			
		BRONCHIOLO-ALVEOLAR EPITHELI HYPERPLASIA/HYPERTROPHY, Mul Slight.			
		SUBACUTE (CHRONIC ACTIVE)/CHINFLAMMATION, Multifocal, Ma			
Larynx: V-DVTC .	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY C WITHOUT LYMPHOID AGGREGATES, Minimal.			

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# Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

	Final phase sacrifice 52	SEX: Female PHASE: Dosing phase	ANIMAL: 4509 GROUP: 4
Tissue		Microscopic Observations/Comme	ents
	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID Minimal.	
		MUCOSA: MIXED INFLAMMATORY CE WITHOUT LYMPHOID AGGREGATES, Minimal.	
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/OLE JUNCTION): SUBMUCOSAL GLANDUI EOSINOPHILIC SECRETORY MATERI UNILATERAL, FOCAl, Moderate.	LAR
		NASAL MUCOSA (RESPIRATORY/VES JUNCTION): MIXED INFLAMMATORY OR WITHOUT LYMPHOID AGGREGATE Multifocal, Minimal.	CELLS WITH
		NASOLACRIMAL DUCT(S): MIXED I CELLS WITH OR WITHOUT LYMPHOI Minimal.	
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: E	
Jagina	No gross observations on tissue.	LUMINAL INFLAMMATORY/CELLULAR Slight.	R DEBRIS,
		- NORMAL MORPHOLOGY FOR VARIOUTHE ESTRUS CYCLE.	OUS PHASES OF

Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 4509
PHASE DAY OF DEATH: 52 PHASE: Dosing phase GROUP: 4

Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 1 Nose/Turb Sec 3 Oviducts/Fallop Ovaries
Uterus

Trachea

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erus

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INFLAMMATION, Multifocal, Marked.

### Petroleum Coke: Reproduction/Developmental Toxicity Screening

Study in Rats via Nose-Only Inhalation Exposures

Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female ANIMAL: 4510 PHASE DAY OF DEATH: 43 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Moderate Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS. Multifocal, Marked. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Multifocal, Slight. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Slight. PROMINENT PLASMA CELLS, Minimal. Lungs . . . . . . . Discolored, All lobes, Black, Moderate Examined: 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC

#### Petroleum Coke:

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# Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

PHASE DAY OF DEATH: 43		SEX: Female PHASE: Dosing phase	ANIMAL: 4510 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
	. No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH A WITHOUT LYMPHOID AGGREGATES, Multifocal Minimal.	ND
Nose/Turb Sec 1	. No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY):  EPITHELIAL-GOBLET CELL  HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 2	. No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED INFLAMMATORY CELLS WIT OR WITHOUT LYMPHOID AGGREGATES, BILATER Slight.	
Nose/Turb Sec 4	. No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight.	
Trachea	. Abnormal Contents, Black, Thin fluid, Moderate/ (post-fixation observation)	Examined; no correlation found	
		MUCOSA: GLANDULAR DILATATION, Slight.	
Uterus	. Distended, Bilateral horns, Moderate	Examined; 1 correlation found: LUMINAL DILATATION, Moderate.	
	Distended, Cervix, Severe	Examined; 1 correlation found: LUMINAL DILATATION, Moderate.	
	Abnormal Contents, Bilateral horns, Tan, Thin fluid	Examined; 1 correlation found: LUMINAL CELLULAR DEBRIS, Slight.	

#### Petroleum Coke:

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#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

PHASE DAY C	STATUS: Final phase sacrifice OF DEATH: 43	SEX: Female PHASE: Dosing phase	ANIMAL: 4510 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comme	ents
Uterus		- NORMAL MORPHOLOGY FOR VARIO	DUS PHASES OF
Vagina	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Minimal.	Multifocal,
		- NORMAL MORPHOLOGY FOR VARIO THE ESTRUS CYCLE.	DUS PHASES OF

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically: Larynx: V-DVTC Nose/Turb Sec 3 Oviducts/Fallop Ovaries

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#### Petroleum Coke:

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# Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

Individual Animal Gross and Microscopic Observations STATUS: Final phase sacrifice SEX: Female ANIMAL: 4511 PHASE DAY OF DEATH: 43 PHASE: Dosing phase Microscopic Observations/Comments Gross Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Moderate Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Marked. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Multifocal, Minimal. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. Lungs . . . . . . . . . Discolored, All lobes, Black, Areas, 0.6 -Examined; 1 correlation found: 0.9 cm, Moderate ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

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#### Petroleum Coke:

#### Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice PHASE DAY OF DEATH: 43	SEX: Female PHASE: Dosing phase	ANIMAL: 4511 GROUP: 4
Tissue Gross Observations/Comments	Microscopic Observations/Comments	
Larynx: V-SM-G No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS W WITHOUT LYMPHOID AGGREGATES, Multi: Minimal.	ITH AND
Nose/Turb Sec 1 No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.	
Nose/Turb Sec 4 No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-PIGMENT, Multifocal, Minimal.	BLACK
Ovaries No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILATE Slight.	ERAL,
	- NORMAL MORPHOLOGY FOR VARIOUS PHATHE ESTRUS CYCLE.	ASES OF
Uterus No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL,	Slight.
	- NORMAL MORPHOLOGY FOR VARIOUS PHATHE ESTRUS CYCLE.	ASES OF
Vagina No gross observations on tissue.	ACUTE INFLAMMATORY CELL INFILTRATE Multifocal, Slight.	,
	LUMINAL INFLAMMATORY/CELLULAR DEBR. Slight.	ıs,
	SUPERFICIAL CELLULAR BALLOONING DEGENERATION, Multifocal, Minimal.	

> Petroleum Coke: Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures

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Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Female ANIMAL: 4511 PHASE DAY OF DEATH: 43 PHASE: Dosing phase GROUP: 4

Tissue Gross Observations/Comments Microscopic Observations/Comments

Vagina - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

 $\begin{tabular}{ll} Tissues without comment under Gross Observations were within normal limits at necropsy. \\ The following tissues were unremarkable microscopically: \\ \end{tabular}$ 

Nose/Turb Sec 2 Nose/Turb Sec 3 Oviducts/Fallop Trachea

Petroleum Coke:
Reproduction/Developmental Toxicity Screening

Study in Rats via Nose-Only Inhalation Exposures

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Individual Animal Gross and Microscopic Observations \_\_\_\_\_\_ STATUS: Final phase sacrifice SEX: Female PHASE DAY OF DEATH: 42 PHASE: Dosing phase Gross Observations/Comments Microscopic Observations/Comments \_\_\_\_\_\_ Mediastinal LN . . . . Discolored, Black, Severe Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS. Multifocal, Moderate. Examined; 1 correlation found: Enlarged, Moderate PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Severe. PROMINENT HISTIOCYTES, Multifocal, Minimal. PROMINENT PLASMA CELLS, Slight. Lungs . . . . . . . . . Discolored, All lobes, Black, Severe Examined: 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Marked. Larynx: V-DVTC . . . . No gross observations on tissue. MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

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#### Petroleum Coke:

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Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

		and Microscopic Observations	
	TUS: Final phase sacrifice TATH: 42	SEX: Female PHASE: Dosing phase	ANIMAL: 4512 GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Commen	
	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CEI WITHOUT LYMPHOID AGGREGATES, M Minimal.	
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLET CELL HYPERTROPHY/HYPERPLASIA, Sligh	nt.
Nose/Turb Sec 2	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY/VEST JUNCTION): MIXED INFLAMMATORY OR WITHOUT LYMPHOID AGGREGATES Minimal.	CELLS WITH
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BR PIGMENT, BILATERAL, Multifocal	
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, U	NILATERAL,
		- NORMAL MORPHOLOGY FOR VARIOUTHE ESTRUS CYCLE.	S PHASES OF
Jterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATE	GRAL, Slight.
		- NORMAL MORPHOLOGY FOR VARIOU THE ESTRUS CYCLE.	JS PHASES OF
'agina	No gross observations on tissue.	ACUTE INFLAMMATORY CELL INFILT Multifocal, Slight.	CRATE,

Petroleum Coke:

Reproduction/Developmental Toxicity Screening Study in Rats via Nose-Only Inhalation Exposures Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice

SEX: Female

PHASE DAY OF DEATH: 42

PHASE: Dosing phase

GROUP: 4

Tissue Gross Observations/Comments Microscopic Observations/Comments

\_\_\_\_\_\_

Vagina - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.

Tissues without comment under Gross Observations were within normal limits at necropsy. The following tissues were unremarkable microscopically:

Nose/Turb Sec 3 Oviducts/Fallop Trachea

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#### APPENDIX V

#### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 1	0 MG/M3			INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP# S	TATUS I	DAY ORGAN	OBSERVATION
				OBBERVATION
1501	1.M	к	4	NO REMARKABLE OBSERVATIONS
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	3M	ĸ	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	8M	ĸ	4	NO REMARKABLE OBSERVATIONS
	9M	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
1502	1M	ĸ	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7F	K	4	NO REMARKABLE OBSERVATIONS
	8F	K	4	NO REMARKABLE OBSERVATIONS
	9 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	llF	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	K ·	4	NO REMARKABLE OBSERVATIONS
1503	1M	K	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4 .	NO REMARKABLE OBSERVATIONS
	5 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	6 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 1	0 MG/M3			INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP# S	ratus :	DAY ORGAN	OBSERVATION
1503	(CONTINUE)	D)		
	7F	ĸ	4	NO REMARKABLE OBSERVATIONS
	8F	K	4	NO REMARKABLE OBSERVATIONS
	9F	K	4	NO REMARKABLE OBSERVATIONS
	10M	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
1505	1F	s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	ĸ	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	· 8M	K	4	NO REMARKABLE OBSERVATIONS
	9M	K	4	NO REMARKABLE OBSERVATIONS
	10M	K	4	NO REMARKABLE OBSERVATIONS
	11M	K	4	NO REMARKABLE OBSERVATIONS
	12M	ĸ	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
1506	1M	K	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5F	K	4	NO REMARKABLE OBSERVATIONS
	6 F	ĸ	4	NO REMARKABLE OBSERVATIONS
	7 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	8 <b>F</b>	К	4	NO REMARKABLE OBSERVATIONS
	9F	K	4	NO REMARKABLE OBSERVATIONS
	10F	ĸ	4	NO REMARKABLE OBSERVATIONS
	11F	ĸ	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 1	0 MG/M3			INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP# 8	STATUS	DAY ORGAN	OBSERVATION
1506	(CONTINU	ED)		
	13F	K	4	NO REMARKABLE OBSERVATIONS
1507	1M	ĸ	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	ĸ	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	8M	ĸ	4	NO REMARKABLE OBSERVATIONS
	9M	K	4	NO REMARKABLE OBSERVATIONS
	10M	K	4	NO REMARKABLE OBSERVATIONS
	llM	K	4	NO REMARKABLE OBSERVATIONS
	12M	K	4	NO REMARKABLE OBSERVATIONS
	13M	K	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
. 1508	lM	ĸ	4	NO REMARKABLE OBSERVATIONS
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	3 M	K	4	NO REMARKABLE OBSERVATIONS
	· 4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	M8	K	4	NO REMARKABLE OBSERVATIONS
	9M	K	4	NO REMARKABLE OBSERVATIONS
	10M	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
	15F	K	4	NO REMARKABLE OBSERVATIONS
				,

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: K-SCHEDULED SACRIFICE

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#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 1	0 MG/M3			
FEMALE#	PUP# S	TATUS I	DAY ORGAN	OBSERVATION
1509	1M	S	GROSS EXAM	AUTOLYSIS
	2M	к	4	NO REMARKABLE OBSERVATIONS
	3M	ĸ	4	NO REMARKABLE OBSERVATIONS
	4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M	ĸ	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	M8	ĸ	4	NO REMARKABLE OBSERVATIONS
	9F	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
1510	1M	к	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	ЗМ	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7F	K	4	NO REMARKABLE OBSERVATIONS
	8F	K	4	NO REMARKABLE OBSERVATIONS
	9F	K	4	NO REMARKABLE OBSERVATIONS
	10F	ĸ	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	ĸ	4	NO REMARKABLE OBSERVATIONS
1511	1M	ĸ	4	NO REMARKABLE OBSERVATIONS
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	ĸ	4	NO REMARKABLE OBSERVATIONS
	M8	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 1	0 MG/M3	1		INDIVIDUAL PUP NECROPSI OBSERVATIONS	
FEMALE#	PUP#	STATUS	DAY ORGAN	OBSERVATION	
1511	(CONTINU	JED)			
	9M	1 K	4	NO REMARKABLE OBSERVATIONS	
	10M		4	NO REMARKABLE OBSERVATIONS	
	11F		4	NO REMARKABLE OBSERVATIONS	
	125		4	NO REMARKABLE OBSERVATIONS	
,	13F	K	4	NO REMARKABLE OBSERVATIONS	
1512	1.M	ı ĸ	4	NO REMARKABLE OBSERVATIONS	
	2M	-	4	NO REMARKABLE OBSERVATIONS NO REMARKABLE OBSERVATIONS	
	3M		4	NO REMARKABLE OBSERVATIONS	
	4M		4	NO REMARKABLE OBSERVATIONS	
	5M	K	4	NO REMARKABLE OBSERVATIONS	
	6M	ĸ	4	NO REMARKABLE OBSERVATIONS	
	7M	ı K	4	NO REMARKABLE OBSERVATIONS	
	8F	ĸ	4	NO REMARKABLE OBSERVATIONS	
	9 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS	
	10F	K	4	NO REMARKABLE OBSERVATIONS	
	11F	ĸ	4	NO REMARKABLE OBSERVATIONS	
	12F	K	4	NO REMARKABLE OBSERVATIONS	
	13F	ĸ	4	NO REMARKABLE OBSERVATIONS	
				* *** * * * *******	

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: K-SCHEDULED SACRIFICE

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#### APPENDIX V

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 2	30 MG/M3			INDIVIDUAL TOT MECKOFSI OBSERVATIONS
FEMALE#	PUP# S'	TATUS	DAY ORGAN	OBSERVATION
2501	1M	s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	ĸ	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	ĸ	4	NO REMARKABLE OBSERVATIONS
	· 6M	K	4	NO REMARKABLE OBSERVATIONS
	7F	K	4	NO REMARKABLE OBSERVATIONS
	8F	K	4	NO REMARKABLE OBSERVATIONS
	9F	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	ĸ	4	NO REMARKABLE OBSERVATIONS
	13F	ĸ	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
2500	224	7.0		
2502	1M	K	4	NO REMARKABLE OBSERVATIONS
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5F	K	4	NO REMARKABLE OBSERVATIONS
	6 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	7F	K	4	NO REMARKABLE OBSERVATIONS
	8 F	K	4	NO REMARKABLE OBSERVATIONS
	9 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
2503	1M	ĸ	4	NO REMARKABLE OBSERVATIONS
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	3M	ĸ	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	ĸ	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 2 30 MG/M3 PUP# STATUS DAY ORGAN FEMALE# OBSERVATION 2503 (CONTINUED) 6F K NO REMARKABLE OBSERVATIONS 7F K NO REMARKABLE OBSERVATIONS 8F K NO REMARKABLE OBSERVATIONS 9F NO REMARKABLE OBSERVATIONS 10F K NO REMARKABLE OBSERVATIONS 11F K NO REMARKABLE OBSERVATIONS 12F K NO REMARKABLE OBSERVATIONS 13F K NO REMARKABLE OBSERVATIONS 14F ĸ NO REMARKABLE OBSERVATIONS 2504 1F 0 LUNGS D FLOTATION TEST- FOUND DEAD STOMACH MILK IN STOMACH 2M ĸ NO REMARKABLE OBSERVATIONS зм NO REMARKABLE OBSERVATIONS 4M K NO REMARKABLE OBSERVATIONS 5M NO REMARKABLE OBSERVATIONS бΜ к NO REMARKABLE OBSERVATIONS 7M K NO REMARKABLE OBSERVATIONS 8F K NO REMARKABLE OBSERVATIONS 9F K NO REMARKABLE OBSERVATIONS 10F ĸ NO REMARKABLE OBSERVATIONS 11F K NO REMARKABLE OBSERVATIONS 12F K NO REMARKABLE OBSERVATIONS 13F K NO REMARKABLE OBSERVATIONS 14F K NO REMARKABLE OBSERVATIONS 2505 1M K NO REMARKABLE OBSERVATIONS 2M NO REMARKABLE OBSERVATIONS 4M NO REMARKABLE OBSERVATIONS 5M NO REMARKABLE OBSERVATIONS K 6М ĸ NO REMARKABLE OBSERVATIONS 7M K NO REMARKABLE OBSERVATIONS 8 F K NO REMARKABLE OBSERVATIONS 9 F NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: D-DIED K-SCHEDULED SACRIFICE

#### APPENDIX V

#### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 2	30 MG/M	43		INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP#	STATUS	DAY ORGAN	OBSERVATION
2505	(CONTINU	JED)		***************************************
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
2506	1M		4	NO REMARKABLE OBSERVATIONS
	2M	ı K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M		4	NO REMARKABLE OBSERVATIONS
	5M		4	NO REMARKABLE OBSERVATIONS
	6M		4	NO REMARKABLE OBSERVATIONS
	7M		4	NO REMARKABLE OBSERVATIONS
	8M		4	NO REMARKABLE OBSERVATIONS
	9M		4	NO REMARKABLE OBSERVATIONS
	10F		4	NO REMARKABLE OBSERVATIONS
	11F		4	NO REMARKABLE OBSERVATIONS
	12F		4	NO REMARKABLE OBSERVATIONS
	13F		4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
2507	1M		4	NO REMARKABLE OBSERVATIONS
	2M		4	NO REMARKABLE OBSERVATIONS
	3M		4	NO REMARKABLE OBSERVATIONS
	4M		4	NO REMARKABLE OBSERVATIONS
	5M		4	NO REMARKABLE OBSERVATIONS
	6F		4	NO REMARKABLE OBSERVATIONS
	7F		4	NO REMARKABLE OBSERVATIONS
	8F		4	NO REMARKABLE OBSERVATIONS
	9F		4	NO REMARKABLE OBSERVATIONS
	10F		4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F-Female, U-Undetermined PUP STATUS CODES: K-SCHEDULED SACRIFICE

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#### APPENDIX V

#### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

ROUP 2	30 MG/M3			INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP# Si	TATUS	DAY ORGAN	OBSERVATION
2508	1M	к	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	бМ	K	4	NO REMARKABLE OBSERVATIONS
	7F	K	4	NO REMARKABLE OBSERVATIONS
	8F	K	4	NO REMARKABLE OBSERVATIONS
	9F	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	ĸ	4	NO REMARKABLE OBSERVATIONS
2509	1M	. к	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	ЗМ	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	8F	ĸ	4	NO REMARKABLE OBSERVATIONS
	9F	K	4	NO REMARKABLE OBSERVATIONS
	10F	ĸ	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	ĸ	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
2510	1M	s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	2M	S	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

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#### APPENDIX V

#### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 2	30 MG/M3		
FEMALE#	PUP# STATUS DAY ORGAN	OBSERVATION	
0510	/cover	***************************************	

FEMALE#	PUP#	STATUS	DAY ORGAN	OBSERVATION
2510	(CONTINU	ED)		
	5M	1 K	4	NO REMARKABLE OBSERVATIONS
	6M	1 K	4	NO REMARKABLE OBSERVATIONS
	7N	1 K	4	NO REMARKABLE OBSERVATIONS
	48	1 K	4	NO REMARKABLE OBSERVATIONS
	9 F	K	4	NO REMARKABLE OBSERVATIONS
	101	r K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	121		4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
	15F		4	NO REMARKABLE OBSERVATIONS
	16F	r K	4	NO REMARKABLE OBSERVATIONS
2511	1M	ı K	4	NO REMARKABLE OBSERVATIONS
	2M		4	NO REMARKABLE OBSERVATIONS
	3M		4	NO REMARKABLE OBSERVATIONS
	4M		4	NO REMARKABLE OBSERVATIONS
	5M		4	NO REMARKABLE OBSERVATIONS
	6 F	K	4	NO REMARKABLE OBSERVATIONS
	7 F	K	4	NO REMARKABLE OBSERVATIONS
	8 F	K	4	NO REMARKABLE OBSERVATIONS
	9 F	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
2512	1M	ı s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	
	2 F		LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	3M	ı K	4	NO REMARKABLE OBSERVATIONS
	4M	ı K	4	NO REMARKABLE OBSERVATIONS
	5M	I K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined

PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

30 MG/M3			INDIVIDUAL PUP NECROPSY OBSERVATIONS	
PUP# S	TATUS	DAY ORGAN	OBSERVATION	
(CONTINUE	D)			
6M	К	4	NO REMARKABLE OBSERVATIONS	
7F	K	4	NO REMARKABLE OBSERVATIONS	
8F	ĸ	4	NO REMARKABLE OBSERVATIONS	
9F	K	4	NO REMARKABLE OBSERVATIONS	
10F	K	4	NO REMARKABLE OBSERVATIONS	
11F	K	4	NO REMARKABLE OBSERVATIONS	
12F	K	4	NO REMARKABLE OBSERVATIONS	
13F	K	4	NO REMARKABLE OBSERVATIONS	
14F	K	4		
15F	K	4	NO REMARKABLE OBSERVATIONS	
	PUP# S (CONTINUE 6M 7F 8F 9F 10F 11F 12F 13F 14F	(CONTINUED) 6M K 7F K 8F K 9F K 10F K 11F K 12F K 13F K	PUP# STATUS DAY ORGAN  (CONTINUED) 6M K 4 7F K 4 8F K 4 9F K 4 10F K 4 11F K 4 12F K 4 13F K 4 14F K 4	30 MG/M3  PUP# STATUS DAY ORGAN OBSERVATION  (CONTINUED)  6M K 4 NO REMARKABLE OBSERVATIONS 7F K 4 NO REMARKABLE OBSERVATIONS 8F K 4 NO REMARKABLE OBSERVATIONS 9F K 4 NO REMARKABLE OBSERVATIONS 10F K 4 NO REMARKABLE OBSERVATIONS 11F K 4 NO REMARKABLE OBSERVATIONS 12F K 4 NO REMARKABLE OBSERVATIONS 13F K 4 NO REMARKABLE OBSERVATIONS 13F K 4 NO REMARKABLE OBSERVATIONS 14F K 4 NO REMARKABLE OBSERVATIONS 14F K 4 NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: K-SCHEDULED SACRIFICE

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#### APPENDIX V

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 3	100 MG/M3	3		THE TABLE OF RECROEST OBSERVATIONS
FEMALE#	PUP# SI	TATUS	DAY ORGAN	OBSERVATION
3501	lM		4	NO REMARKABLE OBSERVATIONS
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	3F	K	4	NO REMARKABLE OBSERVATIONS
3502	1M	ĸ	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	ĸ	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	8M	K	4	NO REMARKABLE OBSERVATIONS
	9M	K	4	NO REMARKABLE OBSERVATIONS
	10F	ĸ	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	ĸ	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
	15F	ĸ	4	NO REMARKABLE OBSERVATIONS
3503	1M	K	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	ĸ	4	NO REMARKABLE OBSERVATIONS
	4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	ĸ	4	NO REMARKABLE OBSERVATIONS
•	7F	ĸ	4	NO REMARKABLE OBSERVATIONS
	8F	K	4	NO REMARKABLE OBSERVATIONS
	9F	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	D	3 STOMACH	MILK IN STOMACH

SEX CODES: M-Male, F-Female, U=Undetermined PUP STATUS CODES: D-DIED K-SCHEDULED SACRIFICE

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#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 3	100 MG/	М3		INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP#	STATUS	DAY ORGAN	OBSERVATION
3504	1M	s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	2F	s	LUNGS	FLOTATION TEST-STILLBORN
		_	STOMACH	NO MILK IN STOMACH
	3 F	s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	4M		4	NO REMARKABLE OBSERVATIONS
	5M		4	NO REMARKABLE OBSERVATIONS
	6M		4	NO REMARKABLE OBSERVATIONS
	7M		4	NO REMARKABLE OBSERVATIONS
	M8		4	NO REMARKABLE OBSERVATIONS
	9M		4	NO REMARKABLE OBSERVATIONS
	10F		4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	ĸ	4	NO REMARKABLE OBSERVATIONS
3505	ıM		4	NO REMARKABLE OBSERVATIONS
	2M		4	NO REMARKABLE OBSERVATIONS
	3M		4	NO REMARKABLE OBSERVATIONS
	4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	MB	K	4	NO REMARKABLE OBSERVATIONS
	9M	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	ĸ	4	NO REMARKABLE OBSERVATIONS
3506	1M	к	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined

PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL PUP NECROPSY OBSERVATIONS

100 MG/M	3		INDIVIDUAL FOF MECKOFSI OBSERVATIONS	
PUP# S	TATUS	DAY ORGAN	OBSERVATION	
(CONTINUE	 D)			· <b></b>
4M		4	NO REMARKABLE OBSERVATIONS	
5M	K	4		
6F	ĸ	4		
7F	к	4		
8F	ĸ	4		
9F	ĸ	4		
10F	K	4		
11F	K	4		
12F	K	4		
1M	K	4	NO REMARKABLE OBSERVATIONS	
2M	K	4		
ME	K	4	NO REMARKABLE OBSERVATIONS	
4M	K	<u>4</u>		
5 <b>M</b>	ĸ	4		
6M	ĸ	4		
7M	K	4		
		4	NO REMARKABLE OBSERVATIONS	
		4	NO REMARKABLE OBSERVATIONS	
	к	4	NO REMARKABLE OBSERVATIONS	
11F	ĸ	4	NO REMARKABLE OBSERVATIONS	
12F	K	4	NO REMARKABLE OBSERVATIONS	
13F	ĸ	4	NO REMARKABLE OBSERVATIONS	
14F	K	4	NO REMARKABLE OBSERVATIONS	
lM	K	4	NO REMARKABLE OBSERVATIONS	
2M		4	NO REMARKABLE OBSERVATIONS	
		4	NO REMARKABLE OBSERVATIONS	
4M	K	4	NO REMARKABLE OBSERVATIONS	
5M	K	4	NO REMARKABLE OBSERVATIONS	
6M	K	4	NO REMARKABLE OBSERVATIONS	
7M	K	4	NO REMARKABLE OBSERVATIONS	
8М	K	4	NO REMARKABLE OBSERVATIONS	
9M	K	4	NO REMARKABLE OBSERVATIONS	
	PUP# S  (CONTINUE 4M 5M 6F 7F 8F 10F 11F 12F 1M 2M 3M 4M 5M 6M 7M 8M 9F 10F 11F 12F 13F 14F 1M 2M 3M 4M 5M 6M 7M 8M 8M 9F 10F 11F 12F 13F 14F	(CONTINUED)  4M K 5M K 6F K 7F K 8F K 9F K 10F K 11F K 12F K  1M K 2M K 3M K 4M K 5M K 6M K 7M K 11F K 12F K 11F K 12F K 14F K 14F K 14F K 14F K 14F K 14F K 14F K 14M K	PUP# STATUS DAY ORGAN  (CONTINUED)  4M	DOM MS/M3

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: K-SCHEDULED SACRIFICE

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#### APPENDIX V

#### PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

SROUP 3	100 MG/	M3		INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP#	STATUS	DAY ORGAN	OBSERVATION
3508	(CONTINU	ED)		
	10F	к	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	К	4	NO REMARKABLE OBSERVATIONS
3509	1F	s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	2M		4	NO REMARKABLE OBSERVATIONS
	3M		4	NO REMARKABLE OBSERVATIONS
	· 4M		4	NO REMARKABLE OBSERVATIONS
	5M		4	NO REMARKABLE OBSERVATIONS
	6M		4	NO REMARKABLE OBSERVATIONS
	7M		4	NO REMARKABLE OBSERVATIONS
	8M		4	NO REMARKABLE OBSERVATIONS
	9M		4	NO REMARKABLE OBSERVATIONS
	10F		4	NO REMARKABLE OBSERVATIONS
	1.1M		4	NO REMARKABLE OBSERVATIONS
	12F		4	NO REMARKABLE OBSERVATIONS
	13F		4	NO REMARKABLE OBSERVATIONS
	14F		4	NO REMARKABLE OBSERVATIONS
	15F	ĸ	4	NO REMARKABLE OBSERVATIONS
3510	1M		4	NC REMARKABLE OBSERVATIONS
	2M		4	NO REMARKABLE OBSERVAȚIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M		4	NO REMARKABLE OBSERVATIONS
	6F	K	4	NO REMARKABLE OBSERVATIONS
	7F		4	NO REMARKABLE OBSERVATIONS
	8 F	к	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined

PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 3	100 MG/N	13		The state of the s
FEMALE#	PUP# S	TATUS	DAY ORGAN	OBSERVATION
3511	1F	s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	ЗМ	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	ĸ	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	ĸ	4	NO REMARKABLE OBSERVATIONS
	8F	K	4	NO REMARKABLE OBSERVATIONS
	9 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	10F	ĸ	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
3512	1.M	к	4	NO REMARKABLE OBSERVATIONS
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3 F	K	4	NO REMARKABLE OBSERVATIONS
	4 F	K	4	NO REMARKABLE OBSERVATIONS
	5 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	6 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined

PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

ROUP 4	300 MG/M	3		INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP# S	TATUS	DAY ORGAN	OBSERVATION
4501	1F	S	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	2M	K	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	бМ	K	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	8F	ĸ	4	NO REMARKABLE OBSERVATIONS
	9 <b>F</b>	D	2 GROSS EXAM	AUTOLYSIS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
4502	1M	K	4	NO REMARKABLE OBSERVATIONS
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	зм	ĸ	4	NO REMARKABLE OBSERVATIONS
	4M	K ·	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	ĸ	4	NO REMARKABLE OBSERVATIONS
	8M	ĸ	4 ,	NO REMARKABLE OBSERVATIONS
	9M	ĸ	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	ĸ	4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
	13F	ĸ	4	NO REMARKABLE OBSERVATIONS
	14F	ĸ	4	NO REMARKABLE OBSERVATIONS
	15F	ĸ	4	NO REMARKABLE OBSERVATIONS
	16F	ĸ	4	NO REMARKABLE OBSERVATIONS
	17F	ĸ	4	
	T / F	IV.	3	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined

PUP STATUS CODES: S-STILLBORN D-DIED K-SCHEDULED SACRIFICE

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#### APPENDIX V

## PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

OUP 4	300 MG/	M3		
'EMALE# 	PUP#	STATUS	DAY ORGAN	OBSERVATION
4505	1F	s	LUNGS	FLOTATION TEST-STILLBORN
		-	STOMACH	NO MILK IN STOMACH
	2M	ĸ	4	NO REMARKABLE OBSERVATIONS
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	K	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	_ 6M	ĸ	4	NO REMARKABLE OBSERVATIONS
	7 F	K	4	NO REMARKABLE OBSERVATIONS
	8F	K	4	NO REMARKABLE OBSERVATIONS
	9F	ĸ	4	NO REMARKABLE OBSERVATIONS
	10F		4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
4506	1M		4	NO REMARKABLE OBSERVATIONS
	2M		4	NO REMARKABLE OBSERVATIONS
	3M		4	NO REMARKABLE OBSERVATIONS
	4M		4	NO REMARKABLE OBSERVATIONS
	5M		4	NO REMARKABLE OBSERVATIONS
	бМ		4	NO REMARKABLE OBSERVATIONS
	7M		4	NO REMARKABLE OBSERVATIONS
	8F		4	NO REMARKABLE OBSERVATIONS
	9F		4	NO REMARKABLE OBSERVATIONS
	10F		4	NO REMARKABLE OBSERVATIONS
	11F		4	NO REMARKABLE OBSERVATIONS
	12F	K	4	NO REMARKABLE OBSERVATIONS
4507	1M		4	NO REMARKABLE OBSERVATIONS
	2M		4	NO REMARKABLE OBSERVATIONS
	`3F		4	NO REMARKABLE OBSERVATIONS
	4 F	K	4	NO REMARKABLE OBSERVATIONS
4508	1F	s	LUNGS STOMACH	FLOTATION TEST-STILLBORN NO MILK IN STOMACH
	2M	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 4	300 MG/1	мз		INDIVIDUAL PUP NECROPSY OBSERVATIONS
FEMALE#	PUP# 1	STATUS	DAY ORGAN	OBSERVATION
4508	(CONTINU	 ED)		
	3M	ĸ	4	NO REMARKABLE OBSERVATIONS
	4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	ĸ	4	NO REMARKABLE OBSERVATIONS
	7M	K	4	NO REMARKABLE OBSERVATIONS
	8M	K	4	NO REMARKABLE OBSERVATIONS
	9 <b>F</b>	K	4	NO REMARKABLE OBSERVATIONS
	10F	K	4	NO REMARKABLE OBSERVATIONS
	11F	K	4	NO REMARKABLE OBSERVATIONS
	12F	ĸ	4	NO REMARKABLE OBSERVATIONS
	13F	ĸ	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
4511	1F	S	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	2F	s	LUNGS	FLOTATION TEST-STILLBORN
			STOMACH	NO MILK IN STOMACH
	3M	K	4	NO REMARKABLE OBSERVATIONS
	4M	ĸ	4	NO REMARKABLE OBSERVATIONS
	5M	K	4	NO REMARKABLE OBSERVATIONS
	6M	K	4	NO REMARKABLE OBSERVATIONS
	7M	ĸ	4	NO REMARKABLE OBSERVATIONS
	8M	K	4	NO REMARKABLE OBSERVATIONS
	9M	K	4	NO REMARKABLE OBSERVATIONS
	10M	K	4	NO REMARKABLE OBSERVATIONS
	11M	K	4	NO REMARKABLE OBSERVATIONS
	12F	ĸ	4	NO REMARKABLE OBSERVATIONS
	13F	K	4	NO REMARKABLE OBSERVATIONS
	14F	K	4	NO REMARKABLE OBSERVATIONS
	15F	K	4	NO REMARKABLE OBSERVATIONS
	16F	ĸ	4	NO REMARKABLE OBSERVATIONS
	17F	K	4	NO REMARKABLE OBSERVATIONS
	18F	K	4	NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F=Female, U=Undetermined

PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

#### APPENDIX V

# PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

#### INDIVIDUAL PUP NECROPSY OBSERVATIONS

ROUP 4	300 MG/M:	- <b></b> .			
FEMALE#	PUP# S	ratus	DAY ORGAN	OBSERVATION	
4512	1M	ĸ	4	NO REMARKABLE OBSERVATIONS	
	2M	K	4	NO REMARKABLE OBSERVATIONS	
	3M	K	4	NO REMARKABLE OBSERVATIONS	
	4 M	K	4	NO REMARKABLE OBSERVATIONS	
	5M	K	4	NO REMARKABLE OBSERVATIONS	
	бМ	ĸ	4	NO REMARKABLE OBSERVATIONS	
	7M	ĸ	4	NO REMARKABLE OBSERVATIONS	
	8M	K	4	NO REMARKABLE OBSERVATIONS	
	9F	K	4	NO REMARKABLE OBSERVATIONS	
	10F	K	4	NO REMARKABLE OBSERVATIONS	
	11F	ĸ	4 ·	NO REMARKABLE OBSERVATIONS	
	12F	K	4	NO REMARKABLE OBSERVATIONS	
	13F	K	4	NO REMARKABLE OBSERVATIONS	
	14F	K .	4	NO REMARKABLE OBSERVATIONS	
	15F	ĸ	4	NO REMARKABLE OBSERVATIONS	

SEX CODES: M-Male, F=Female, U=Undetermined PUP STATUS CODES: K-SCHEDULED SACRIFICE