

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

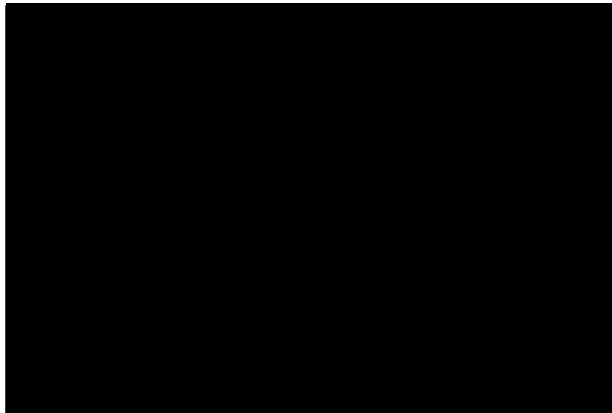
Attn: [REDACTED]

Date: 3 April 2009

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.



3 April 09
Date

3/20/2009
Date

SIGNATURE PAGE

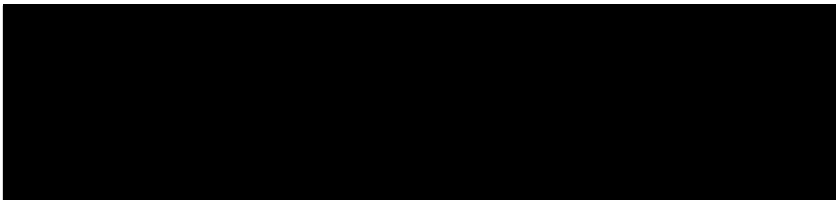
SCIENTISTS

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).



3 APR 09

Date

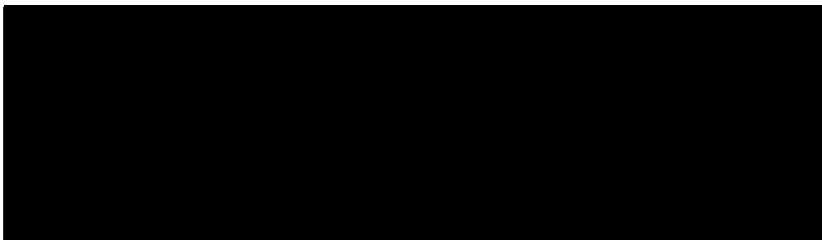


2 Apr 09

Date

SCIENTIFIC REVIEW

The following Scientist has reviewed and approved this report:



2 APR 09

Date

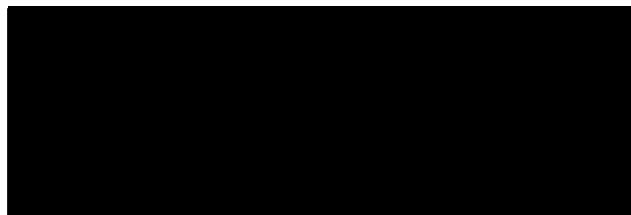
¹ Wanda B. High was the Study Pathologist for this study and for submission of the draft report and is no longer employed at the Testing Facility. Dianne Creasy is assuming responsibility for finalization of the pathology evaluation of this report.

² 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 F₁ 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 ± 4.6 , 99.4 ± 13.9 , and 300.7 ± 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 μ 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/m³ 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/m³ 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/m³ (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/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. 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/m³ coupled with the single female with a low number of implantation sites and no viable fetuses were considered exposure-related.

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/m³ 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

[REDACTED]

2.1.3. TESTING FACILITY

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

2.1.4. STUDY DIRECTOR

[REDACTED]

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

Group	Group Designation	Exposure Levels (mg/m ³)	Treatment Schedule Pre-mating Period		Number of Animals	
			Male Rats ^b	Female Rats ^c	Male Rats ^b	Female Rats ^c
1	Air Control ^a	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

^a Control animals were exposed to air only with the same treatment regimen as the test substance exposed groups.

^b 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.

^c 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.

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).

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. The 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 two-week 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/m³ 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/m³ and the NOAEL for females was 75 mg/m³. There were no systemic effects observed, consequently the systemic NOAEL for both males and females was 200 mg/m³. 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/m³ 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[®]
Sprague-Dawley Derived (CD[®])
CrI:CD[®] (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[®] 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 pre-mating period and continuing through euthanasia.

Female rats had a detailed physical observation performed weekly during the pre-mating 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) =

$$\frac{\text{grams of feed consumed} \div \# \text{ days}}{\text{body weight (kg)}^a}$$

^aFor 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. F₁ PUP EVALUATIONS

Physical Examinations

Each F₁ pup was given a gross examination on lactation days 0 and 4. Pups were also observed for any abnormal behavior.

Body Weight

Individual F₁ 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.

TABLE I

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 ^b		X	X	X
Lungs (with mainstem bronchi)	X	X	X	X
Lymph node (mediastinal)		X	X	X
Nasopharynx ^c		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	

^aThe 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.

^bThe 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.

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

2.14.6. MACROSCOPIC POSTMORTEM EXAMINATION - F₁ PUPS

Macroscopic post-mortem examinations (internal and external) were performed on all F₁ 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 F₁ pups found dead on the day of birth were identified by the

lung floatation test, examination of the lungs or ductus arteriosus, or other appropriate method as stillborn or alive at birth. F₁ 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 F₁ 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
- F₁ 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/m ³)	Gravimetric Concentration (mg/m ³)	Nominal Concentration (mg/m ³)
1	0	0.001 ± 0.01	-
2	30	31.2 ± 4.6	56 ± 9
3	100	99.4 ± 13.9	131 ± 10
4	300	300.7 ± 34.7	798 ± 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 (μm)	Geometric Standard Deviation	% of Particles		
			≤ 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 pre-mating, 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 pre-mating, mating, gestation and lactation periods for the females. At terminal sacrifice, the 30mg/m³ 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 pre-mating, 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/m³ 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/m³ (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/m³ 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/m³ 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/m³, 7/12 males and 3/12 females administered 100 mg/m³, and 1/11 males and 1/12 females administered the 30 mg/m³ 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/m³ 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/m³ exposure and in 2/12 females of the 100 mg/m³ exposure-level. Some nasal turbinates from the 30 mg/m³ 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 brown-black 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 exposure-related 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/m³ 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 pharynx. Exposure-level-dependent, test substance-related 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 (F₁ 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/m³ 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/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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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 summarize 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

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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):		1 0	2 30	3 100	4 300
No. of males at start	N	12	12	12	12
Premating					
- Died/sacrificed	N	0	0	0	0
Postmating					
- Died/sacrificed	N	0	0	0	0
No. of females at start	N	12	12	12	12
No. of females cohabitated	N	12	12	12	12
- Without evidence of mating	N	1	0	1	1
Pregnant	N	0	0	1	0
Nonpregnant	N	1	0	0	1
Pregnant	N	11	12	12	9
- Died/sacrificed	N	0	0	0	0
- Died delivering	N	0	0	0	0
- Died/sacrificed post partum	N	0	0	0	0
- Aborted died/sacrificed	N	0	0	0	0
Nonpregnant	N	1	0	0	3
- Died/sacrificed	N	0	0	0	0
Total females died/sacrificed	N	0	0	0	0
	%	0.0	0.0	0.0	0.0
Dams delivering	N	11	12	12	8
- With liveborn pups	N	11	12	12	8
	%	100.0	100.0	100.0	100.0
- With all pups stillborn	N	0	0	0	0
	%	0.0	0.0	0.0	0.0

No statistically significant differences

	Summary of Weekly Clinical Observations Preface	Table 2
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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/m³
- Group 2 - 30 mg/m³
- Group 3 - 100 mg/m³
- Group 4 - 300 mg/m³

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TABLE 3

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

SUMMARY OF CLINICAL OBSERVATIONS DURING GESTATION - (frequency/animals)

	1	2	3	4
DOSE GROUP:	1	2	3	4
DOSE LEVEL (MG/M3):	0	30	100	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

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TABLE 4

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

SUMMARY OF MATERNAL CLINICAL OBSERVATIONS DURING LACTATION - (frequency/animals)

	1	2	3	4
DOSE GROUP:				
DOSE LEVEL (MG/M3):	0	30	100	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	5/ 3	0/ 0	3/ 1	0/ 0
RED/BROWN STAINS - AG AREA	0/ 0	2/ 2	1/ 1	1/ 1
ALOPECIA - GENERAL	0/ 0	0/ 0	2/ 1	0/ 0

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TABLE 5

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

MALES		MEAN BODY WEIGHT VALUES (GRAMS)			
		1	2	3	4
DOSE GROUP:		0	30	100	300
DOSE LEVEL (MG/M3):					
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
	N	12	12	12	12
DAY 7	MEAN	293	289	290	286
	S.D.	16.9	16.3	14.0	18.2
	N	12	12	12	12
DAY 14	MEAN	322	317	319	313
	S.D.	20.6	22.1	21.5	25.9
	N	12	12	12	12
DAY 21	MEAN	346	345	345	338
	S.D.	23.5	26.1	24.8	32.5
	N	12	12	12	12
DAY 28	MEAN	372	373	371	363
	S.D.	22.9	27.8	30.5	35.0
	N	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

No statistically significant differences

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TABLE 5

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

FEMALES		MEAN BODY WEIGHT VALUES (GRAMS)			
DOSE GROUP: DOSE LEVEL (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

 No statistically significant differences

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TABLE 6

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

MALES			MEAN BODY WEIGHT GAIN (GRAMS)				
DOSE GROUP:			1	2	3	4	
DOSE 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	0 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
			N	12	12	12	12
DAY	28 TO	31	MEAN	9	8	9	11
			S.D.	6.1	4.2	3.3	7.9
			N	12	12	12	12
DAY	0 TO	31	MEAN	121	123	123	117
			S.D.	13.0	19.7	24.8	32.3
			N	12	12	12	12

No statistically significant differences

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TABLE 6

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

FEMALES			MEAN BODY WEIGHT GAIN (GRAMS)				
DOSE GROUP: DOSE LEVEL (MG/M3):			1 0	2 30	3 100	4 300	
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	0 TO	7	MEAN	10	14	16	14
			S.D.	6.5	4.7	9.6	5.6
			N	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

 No statistically significant differences

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TABLE 7

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

SUMMARY OF GESTATION BODY WEIGHTS (GRAMS)

DOSE GROUP:		1	2	3	4
DOSE LEVEL (MG/M3):		0	30	100	300
DAY 0	MEAN	238	245	243	241
	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
	N	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	9
DAY 20	MEAN	369	379	371	365
	S.D.	16.2	21.4	37.9	44.2
	N	11	12	11	9

No statistically significant differences

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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:		1	2	3	4
DOSE LEVEL (MG/M3):		0	30	100	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

No statistically significant differences

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TABLE 9

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

SUMMARY OF MATERNAL LACTATION BODY WEIGHTS (GRAMS)

		1	2	3	4
DOSE GROUP:					
DOSE LEVEL (MG/M3):		0	30	100	300
DAY 1	MEAN	279	293	289	289
	S.D.	11.4	15.6	20.6	11.4
	N	11	12	12	8
DAY 4	MEAN	301	319	309	314
	S.D.	12.6	15.6	23.0	10.5
	N	11	12	12	8

No statistically significant differences

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

No statistically significant differences

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TABLE 11

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

MALES		MEAN FEED CONSUMPTION (GRAMS/KG/DAY)			
DOSE GROUP: DOSE LEVEL (MG/M3):		1 0	2 30	3 100	4 300
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

 No statistically significant differences

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TABLE 11

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

FEMALES		MEAN FEED CONSUMPTION (GRAMS/KG/DAY)			
		1	2	3	4
DOSE GROUP:		0	30	100	300
DOSE LEVEL (MG/M3):					
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

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TABLE 12

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

SUMMARY OF GESTATION FEED CONSUMPTION (GRAMS/KG/DAY)

DOSE 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
	N	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

No statistically significant differences

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

No statistically significant differences

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TABLE 14
 PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
 SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

		SUMMARY OF COHABITATION DATA			
DOSE GROUP: DOSE LEVEL (MG/M3):		1 0	2 30	3 100	4 300
Females paired with males	N	12	12	12	12
Total number mated	N	11	12	12	11
female mating index	%	91.7	100.0	100.0	91.7
pregnant	N	11	12	12	9 ^a
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	N	12	12	12	12
Total number mated	N	11	12	12	11
male mating index	%	91.7	100.0	100.0	91.7
with females pregnant	N	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 ^b	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	N	11	12	10	10
	%	100.0	100.0	90.9	90.9
Day 5 to 8	N	0	0	1	1
	%	0.0	0.0	9.1	9.1
Day 9 to 14	N	0	0	0	0
	%	0.0	0.0	0.0	0.0

No statistically significant differences

^aFor 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.

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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):		1 0	2 30	3 100	4 300
Females on Study	N	12	12	12	12
Females Mated	N	11	12	12	11
Mating Index	%	91.7	100.0	100.0	91.7
Females Pregnant	N	11	12	12	9 ^a
Female Fertility Index	%	91.7	100.0	100.0	75.0
Females with Liveborn	N	11	12	12	8
Gestation Index	%	100.0	100.0	100.0	88.9
Females Completing Delivery	N	11	12	12	8
	%	100.0	100.0	100.0	88.9
with Stillborn Pups	N	2	3	3	4
	%	18.2	25.0	25.0	50.0
with all Stillborn	N	0	0	0	0
	%	0.0	0.0	0.0	0.0
Litters with Liveborn, but no Pups Alive					
day 4	N	0	0	0	0
	%	0.0	0.0	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
	N	11	12	11	8

No statistically significant differences

^aFor 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.

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TABLE 15

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

		SUMMARY OF DELIVERY AND LITTER DATA			
DOSE GROUP:		1	2	3	4
DOSE LEVEL (MG/M3):		0	30	100	300
Litters with Liveborn Pups	N	11	12	12	8
Pups Delivered (total)	N	143	163	138	103
	MEAN	13.0	13.6	11.5	12.9
	S.D.	1.10	1.38	3.87	4.36
Liveborn	N	141	158	133	98
Live Birth Index	%	98.6	96.9	96.4	95.1
Stillborn	N	2	5	5	5
	%	1.4	3.1	3.6	4.9
Liveborn, not culled prior to day 4	N	141	158	133	98
Pups Dying, Missing, and/or Cannibalized day 0	N	0	1	0	0
	%	0.0	0.6	0.0	0.0
days 1-4	N	0	1	1	1
	%	0.0	0.6	0.8	1.0
Pups Surviving 4 days	N	141	156	132	97
Viability Index	%	100.0	98.7	99.2	99.0

No statistically significant differences

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TABLE 15

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

SUMMARY OF DELIVERY AND LITTER DATA

DOSE GROUP:		1	2	3	4
DOSE LEVEL (MG/M3):		0	30	100	300
Implantation Sites per Litter	N	153	173	150	112
	MEAN	13.9	14.4	12.5	14.0
	S.D.	1.22	1.51	4.03	3.85
Corpora Lutea	TOTAL	166	185	173	121
	MEAN	15.1	15.4	14.4	15.1
	S.D.	2.34	1.73	2.11	3.40
Preimplantation Loss	MEAN	1.2	1.0	1.9	1.1
	S.D.	1.8	1.6	2.9	1.0
Postimplantation Loss	MEAN	0.9	0.8	1.0	1.1
	S.D.	0.8	0.8	1.0	1.4
Live 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	MEAN	12.8	13.1	11.1	12.3
	S.D.	1.17	1.00	3.73	4.13
	N	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
Sex Ratio - Male Pups:Total Pups day 0	N	88	68**	76	53
	%	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

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TABLE 16

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

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

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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:		1	2	3	4
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	12	8
1 females	MEAN	7.2	7.3	7.7	6.8
	S.D.	0.63	0.68	0.93	0.62
	N	11	12	12	8
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	12	8
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	8
4 females	MEAN	10.6	10.9	11.1	10.2
	S.D.	1.03	0.97	1.44	1.14
	N	11	12	12	8
4 males+females	MEAN	10.8	11.0	11.3	10.4
	S.D.	0.99	0.96	1.38	1.06
	N	11	12	12	8

No statistically significant differences

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TABLE 18

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

SUMMARY OF PUP BODY WEIGHT GAIN -- GRAMS

DOSE GROUP:		1	2	3	4
DOSE LEVEL (MG/M3):		0	30	100	300
day 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

No statistically significant differences

	Mean Organ Weights Preface	Table 19
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Absolute Organ Weights	72
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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/m ³
Group 2	-	30 mg/m ³
Group 3	-	100 mg/m ³
Group 4	-	300 mg/m ³

Note:

Ovaries w/Oviduct were weighed together.

Table 19

Group	Terminal Body wt. (g)	Adrenal Glands	Brain Epididymis Left	Epididymis Right	Pituitary gland Lungs	Prostate		

M a l e A n i m a l s								
1								
M e a n:	381.1	0.0641	2.0049	0.5437	0.5668	1.8946	0.0115	0.8305
Standard deviation:	23.3	0.0076	0.0870	0.0690	0.0395	0.2369	0.0017	0.1992
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
2								
M e a n:	381.2	0.0625	1.9897	0.5721	0.5926	2.0350	0.0116	0.8947
Standard deviation:	28.8	0.0076	0.0441	0.0271	0.0318	0.1676	0.0021	0.2051
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
M e a n:	380.1	0.0599	2.0184	0.5750	0.5849	2.2448+	0.0118	0.8200
Standard deviation:	31.0	0.0136	0.0819	0.0394	0.0525	0.2521	0.0018	0.1419
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
M e a n:	374.0	0.0654	1.9934	0.5562	0.5753	2.6007+	0.0118	0.8358
Standard 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)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

Huntingdon Life Sciences
Princeton Research Center
East Millstone, New Jersey

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

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Table 19

Group	Terminal Body wt. (g)	Semis w/Coag Gl	Testis		Thymus
			Left	Right	
			Male	Animals	
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)

* (+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
% (\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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 Body wt. (g)	Adrenal Glands	Brain	Lungs	Ovary Left	Ovary Right	Pituitary gland	Thymus
----- F e m a l e A n i m a l s -----								
1								
M e a n:	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								
M e a n:	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
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
M e a n:	309.5	0.0841	1.9587	1.9869\$	0.0732	0.0737	0.0175	0.3241
Standard 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								
M e a n:	313.7	0.0996	1.9135	2.3923\$	0.0746	0.0787*	0.0166	0.2804
Standard deviation:	10.5	0.0163	0.0732	0.3519	0.0087	0.0069	0.0031	0.0602
Number of observ. :	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

Group	Terminal Body wt. (g)	Uterus w/vagina

F e m a l e A n i m a l s		
1		
M e a n:	300.6	0.9995
Standard deviation:	12.6	0.1196
Number of observ. :	(11)	(11)
2		
M e a n:	318.9*	0.9571
Standard deviation:	15.6	0.1038
Number of observ. :	(12)	(12)
3		
M e a n:	309.5	0.9757
Standard deviation:	23.0	0.1618
Number of observ. :	(12)	(12)
4		
M e a n:	313.7	1.0076
Standard deviation:	10.5	0.1325
Number of observ. :	(8)	(8)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

Table 19

Group	Terminal Body wt. (g)	Adrenal Glands	Brain Epididymis Left	Epididymis Right	Pituitary gland Lungs	Prostate		
			M a l e	A n i m a l s				
1								
M e a n:	381.1	0.0169	0.5272	0.1431	0.1492	0.4965	0.0030	0.2182
Standard deviation:	23.3	0.0025	0.0283	0.0200	0.0140	0.0463	0.0005	0.0520
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
2								
M e a n:	381.2	0.0165	0.5244	0.1507	0.1561	0.5349	0.0030	0.2352
Standard deviation:	28.8	0.0024	0.0377	0.0111	0.0119	0.0398	0.0005	0.0551
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
M e a n:	380.1	0.0157	0.5338	0.1520	0.1546	0.5917+	0.0031	0.2162
Standard deviation:	31.0	0.0030	0.0428	0.0142	0.0166	0.0607	0.0004	0.0375
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
M e a n:	374.0	0.0177	0.5383	0.1504	0.1555	0.7010+	0.0032	0.2250
Standard deviation:	41.0	0.0032	0.0580	0.0199	0.0200	0.0825	0.0004	0.0344
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)

* (+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 % (\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

Table 19

Group	Terminal Body wt. (g)	Semis w/Coag Gl	Testis		Thymus	
			Left	Right		

			M a l e	A n i m a l s		
1						
M e a n:	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						
M e a n:	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						
M e a n:	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						
M e a n:	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)	

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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)	Adrenal Glands	Brain	Lungs	Ovary Left	Ovary Right	Pituitary gland	Thymus
----- F e m a l e A n i m a l s -----								
1								
M e a n:	300.6	0.0305	0.6548	0.5013	0.0247	0.0227	0.0054	0.0973
Standard deviation:	12.6	0.0043	0.0388	0.0581	0.0039	0.0026	0.0011	0.0228
Number of observ. :	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
2								
M e a n:	318.9*	0.0267*	0.6079*	0.5224	0.0236	0.0237	0.0053	0.0980
Standard deviation:	15.6	0.0022	0.0303	0.0298	0.0038	0.0026	0.0011	0.0274
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
3								
M e a n:	309.5	0.0272	0.6361	0.6445\$	0.0237	0.0238	0.0057	0.1047
Standard deviation:	23.0	0.0029	0.0520	0.0744	0.0033	0.0029	0.0014	0.0254
Number of observ. :	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
4								
M e a n:	313.7	0.0317	0.6107	0.7647\$	0.0239	0.0251	0.0053	0.0894
Standard 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)

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

Group	Terminal Body wt. (g)	Uterus w/vagina
----- F e m a l e A n i m a l s -----		
1		
M e a n:	300.6	0.3327
Standard deviation:	12.6	0.0393
Number of observ. :	(11)	(11)
2		
M e a n:	318.9*	0.2996
Standard deviation:	15.6	0.0228
Number of observ. :	(12)	(12)
3		
M e a n:	309.5	0.3150
Standard deviation:	23.0	0.0445
Number of observ. :	(12)	(12)
4		
M e a n:	313.7	0.3215
Standard deviation:	10.5	0.0424
Number of observ. :	(8)	(8)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

Huntingdon Life Sciences
Princeton Research Center
East Millstone, New Jersey

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

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Table 19

Group	Terminal Body wt. (g)	Adrenal Glands	Epididymis		Lungs	Pituitary gland	Prostate	Semis w/Coag Gl	
			Left	Right					

M a l e A n i m a l s									
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)

* (+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 % (\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

Huntingdon Life Sciences
Princeton Research Center
East Millstone, New Jersey

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

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Table 19

Group	Terminal Body wt. (g)	Testis Left	Testis Right	Thymus
			M a l e	A n i m a l s
1				
M e a n:	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				
M e a n:	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				
M e a n:	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				
M e a n:	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)

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

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

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 Body wt. (g)	Adrenal Glands	Lungs	Ovary Left	Ovary Right	Pituitary gland	Thymus	Uterus w/vagina	

				F e m a l e	A n 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
	Number 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
	Number 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
	Number 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	7.8911
	Number of observ. :	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)

*(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

	Incidence Summary Report for Gross Necropsy Observations Preface	Table 20
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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.

	Group: Number in group:	-- Males --				-- Females --			
		1	2	3	4	1	2	3	4
Within normal limits		12	12	12	12	11	12	12	8
Testes									
Small		1	0	0	0	0	0	0	0
Epididymides									
Small		1	0	0	0	0	0	0	0
Vagina									
Mass		0	0	0	0	0	0	1	0
Thymus									
Discolored		0	0	1	0	0	0	0	0
Lungs									
Discolored		2	11	12	12	1	12	12	8
Mediastinal LN									
Discolored		0	8	11	12	0	9	12	8
Enlarged		0	0	0	3	0	0	4	6
Kidneys									
Dilated Pelvis		0	0	0	2	0	0	0	0

Table 20 (animals with no viable fetuses or non-pregnant)

	-- Females --			
Group:	1	2	3	4
Number in group:	1	0	0	4

Within normal limits	1	0	0	0
Uterus				
Distended	0	0	0	2
Abnormal Contents	0	0	0	1
Lungs				
Discolored	0	0	0	4
Trachea				
Abnormal Contents	0	0	0	1
Mediastinal LN				
Discolored	0	0	0	4
Ear(s)				
Discolored	0	0	0	1

	Incidence Summary of Microscopic Findings with Severity Levels Preface	Table 21
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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 Diverticulum and Thyroid Cartilage
V-SM-G	=	Ventral Seromucinous Gland

Corresponding exposure levels for each group were as follows:

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

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).

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

Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

Controls from group(s): 1		-- Animals				Affected --			
Animal sex:		-- Males --				-- Females --			
Dosage group:		Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	No. in group:	12	12	12	12	11	12	12	8
Ear(s)	Number examined:	0	0	0	0	0	0	0	0
Epididymides	Number examined:	12	0	0	12				
ASPERMIA/LUMINAL CELLULAR DEBRIS									
	Nad>	11	0	0	12				
	Marked>	1	0	0	0				
.....Total Incidence of Finding Observed:		1	0	0	0				
SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE									
	Nad>	12	0	0	11				
	Minimal>	0	0	0	1				
.....Total Incidence of Finding Observed:		0	0	0	1				
MONONUCLEAR CELL AGGREGATES									
	Nad>	10	0	0	10				
	Minimal>	2	0	0	2				
.....Total Incidence of Finding Observed:		2	0	0	2				
Kidneys	Number examined:	0	0	0	2	0	0	0	1
PELVIS: DILATED									
	Nad>	0	0	0	0	0	0	0	1
	Moderate>	0	0	0	1	0	0	0	0
	Marked>	0	0	0	1	0	0	0	0
.....Total Incidence of Finding 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	0	0	0	0
.....Total Incidence of Finding Observed:		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

Petroleum Coke:
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Study in Rats via Nose-Only Inhalation Exposures

Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

Controls from group(s): 1		-- Animals				Affected --				
		-- Males --				-- Females --				
Tissues With Diagnoses	Animal sex: Dosage group: No. in group:	Ctls	2	3	4	Ctls	2	3	4	
Larynx: V-DVTC	Number examined:	12	12	12	12	11	12	12	8	
MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID -AGGREGATES										
	Nad>	0	6	4	1	0	5	8	1	
	Minimal>	9	4	8	8	8	4	4	7	
	Slight>	2	1	0	3	3	3	0	0	
	Moderate>	1	0	0	0	0	0	0	0	
.....Total Incidence of Finding Observed:		12	5	8	11	11	7	4	7	
SUBMUCOSAL GLAND: LUMINAL ACUTE INFLAMMATION										
	Nad>	12	11	11	12	11	12	12	8	
	Slight>	0	0	1	0	0	0	0	0	
.....Total Incidence of Finding Observed:		0	0	1	0	0	0	0	0	
GLANDULAR DILATATION										
	Nad>	9	11	12	12	9	12	12	8	
	Minimal>	3	0	0	0	1	0	0	0	
	Slight>	0	0	0	0	1	0	0	0	
.....Total Incidence of Finding Observed:		3	0	0	0	2	0	0	0	
Larynx: V-SM-G	Number examined:	12	12	11	12	10	12	12	8	
MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID -METAPLASIA										
	Nad>	11	11	4	3	10	10	6	6	
	Minimal>	1	1	7	9	0	2	6	2	
.....Total Incidence of Finding Observed:		1	1	7	9	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	6	8	11	7	
	Slight>	3	1	2	5	4	3	1	0	
.....Total Incidence of Finding Observed:		12	11	11	12	10	11	12	7	

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

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Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

		-- Animals				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:									
Dosage group:		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s W i t h D i a g n o s e s	No. in group:	12	12	12	12	11	12	12	8
Larynx: V-SM-G	Number examined:	12	12	11	12	10	12	12	8
CHONDROMALACIA									
	Nad>	12	12	11	12	10	11	12	8
	Slight>	0	0	0	0	0	1	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	0	1	0	0
GLANDULAR DILATATION									
	Nad>	12	12	11	12	9	12	12	8
	Minimal>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0
Lungs	Number examined:	12	12	12	12	11	12	12	8
PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT)									
	Nad>	12	0	1	1	6	0	0	0
	Slight>	0	3	4	2	5	5	1	4
	Moderate>	0	9	7	9	0	7	11	4
.....Total Incidence of Finding Observed:		0	12	11	11	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	0	8	2	3
	Moderate>	0	2	8	6	0	2	9	4
	Marked>	0	0	0	0	0	1	1	1
.....Total Incidence of Finding Observed:		0	12	12	12	0	12	12	8
ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT									
	Nad>	12	0	0	0	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
.....Total Incidence of Finding Observed:		0	12	12	12	0	12	12	8

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

Petroleum Coke:
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Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

		-- Animals				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
Animal sex:		Ctl				Ctl			
Dosage group:		2 3 4				2 3 4			
Tissues With Diagnoses		No. in group:				No. in group:			
		12	12	12	12	11	12	12	8
Lungs	Number examined:	12	12	12	12	11	12	12	8
BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY									
	Nad>	12	6	0	0	11	3	0	0
	Minimal>	0	6	5	0	0	9	2	1
	Slight>	0	0	7	9	0	0	9	7
	Moderate>	0	0	0	3	0	0	1	0
.....Total Incidence of Finding Observed:		0	6	12	12	0	9	12	8
BRONCHIAL EPITHELIAL HYPERPLASIA									
	Nad>	12	12	11	12	11	12	12	8
	Slight>	0	0	1	0	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	1	0	0	0	0	0
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION									
	Nad>	1	0	0	0	7	0	0	0
	Minimal>	8	7	0	0	4	3	0	0
	Slight>	3	5	3	0	0	9	4	0
	Moderate>	0	0	9	0	0	0	8	3
	Marked>	0	0	0	12	0	0	0	5
.....Total Incidence of Finding Observed:		11	12	12	12	4	12	12	8
HEMORRHAGE(S)									
	Nad>	11	12	11	12	11	12	12	8
	Minimal>	1	0	1	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	1	0	0	0	0	0
Mediastinal LN	Number examined:	12	12	12	12	10	12	12	8
PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE -CELLULARITY									
	Nad>	3	0	1	0	2	2	0	0
	Minimal>	4	0	0	0	2	0	0	0
	Slight>	5	11	2	0	6	3	1	0
	Moderate>	0	1	4	0	0	7	4	1
	Marked>	0	0	5	7	0	0	7	1
	Severe>	0	0	0	5	0	0	0	6
.....Total Incidence of Finding Observed:		9	12	11	12	8	10	12	8

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

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Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

		-- A n i m a l s				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:		Ctls				Ctls			
Dosage group:		2	3	4	2	3	4	4	
T i s s u e s W i t h D i a g n o s e s		12	12	12	12	11	12	12	8
No. in group:									
Mediastinal LN		12	12	12	12	10	12	12	8
BROWN-BLACK PIGMENT DEPOSITS									
Nad>		12	1	0	0	10	1	0	0
Minimal>		0	11	9	0	0	7	3	0
Slight>		0	0	3	7	0	4	5	0
Moderate>		0	0	0	4	0	0	4	6
Marked>		0	0	0	1	0	0	0	2
.....Total Incidence of Finding Observed:		0	11	12	12	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
.....Total Incidence of Finding Observed:		7	11	11	12	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	0	1	0	0
.....Total Incidence of Finding Observed:		4	1	2	2	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
.....Total Incidence of Finding Observed:		6	4	5	4	7	9	9	3
YELLOW-BROWN PIGMENT									
Nad>		12	12	11	12	10	11	12	8
Minimal>		0	0	1	0	0	0	0	0
Slight>		0	0	0	0	0	1	0	0
.....Total Incidence of Finding Observed:		0	0	1	0	0	1	0	0

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

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- Animals				Affected --			
		-- Males --				-- Females --			
		Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	No. in group:	12	12	12	12	11	12	12	8
Controls from group(s): 1									
Nose/Turb Sec 1		12	11	12	12	11	12	12	8
NASAL MUCOSA (VESTIBULAR): EPITHELIAL-EROSION(S)									
	Nad>	12	11	12	12	10	12	12	8
	Slight>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0
NASAL MUCOSA (VESTIBULAR EPITHELIUM): MIXED INFLAMMATORY -CELLS WITH OR WITHOUT LYMPHOID AGGREGATES									
	Nad>	12	11	12	12	10	12	12	8
	Moderate>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0
NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET CELL -HYPERTROPHY/HYPERPLASIA									
	Nad>	4	4	1	2	6	8	4	1
	Minimal>	6	4	8	7	2	2	4	4
	Slight>	2	3	3	3	3	2	4	3
.....Total Incidence of Finding 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	0	0	1	0	0	0	0
	Slight>	0	0	1	0	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	1	1	0	0	0	0
NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITH OR -WITHOUT LYMPHOID AGGREGATES									
	Nad>	11	10	12	12	11	12	12	8
	Minimal>	1	1	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	1	0	0	0	0	0	0

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

Petroleum Coke:
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Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

		-- Animals				A f f e c t e d --				
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --				
Animal sex:										
Dosage group:		Ctls	2	3	4	Ctls	2	3	4	
T i s s u e s	W i t h	D i a g n o s e s		No. in group:						
Nose/Turb Sec 1	Number examined:	12	11	12	12	11	12	12	8
PERIODONTAL TISSUE (AMELOBLAST EPITHELIUM): CELLULAR -DISORGANIZATION/DEGENERATION										
		Nad>	12	11	12	12	10	12	12	6
		Slight>	0	0	0	0	1	0	0	2
.....Total Incidence of Finding Observed:			0	0	0	0	1	0	0	2
Nose/Turb Sec 2	Number examined:	12	11	12	12	11	12	12	8
NASAL MUCOSA (RESPIRATORY/OLFACTORY JUNCTION): SUBMUCOSAL -GLANDULAR EOSINOPHILIC SECRETORY MATERIAL										
		Nad>	12	11	12	12	11	12	12	8
.....Total Incidence of Finding Observed:			0	0	0	0	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	3	6	6	5
		Slight>	2	2	3	1	1	2	0	1
.....Total Incidence of Finding Observed:			2	8	8	5	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	0	0	0	0
.....Total Incidence of Finding Observed:			0	0	0	1	0	0	0	0
NASAL SINUS: BROWN-BLACK PIGMENT										
		Nad>	12	11	12	11	11	12	12	8
		Minimal>	0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:			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

Petroleum Coke:
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Study in Rats via Nose-Only Inhalation Exposures

Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- Animals				Affected --				
Controls from group(s): 1		-- Males --				-- Females --				
Tissues With Diagnoses	Animal sex: Dosage group: No. in group:	Ctls	2	3	4	Ctls	2	3	4	
Nose/Turb Sec 2	Number examined:	12	12	12	12	11	12	12	8	
NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR -WITHOUT LYMPHOID AGGREGATES										
	Nad>	4	6	3	7	3	4	2	2	
	Minimal>	4	2	7	0	3	5	9	3	
	Slight>	4	3	1	5	5	3	1	2	
	Moderate>	0	0	1	0	0	0	0	1	
.....Total Incidence of Finding Observed:		8	5	9	5	8	8	10	6	
ODONTOPATHY										
	Nad>	11	11	12	12	11	12	12	8	
	Moderate>	1	0	0	0	0	0	0	0	
.....Total Incidence of Finding Observed:		1	0	0	0	0	0	0	0	
Nose/Turb Sec 3	Number examined:	12	11	12	12	11	12	12	8	
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT										
	Nad>	12	11	10	0	11	12	12	8	
	Minimal>	0	0	2	5	0	0	0	0	
	Slight>	0	0	0	7	0	0	0	0	
.....Total Incidence of Finding Observed:		0	0	2	12	0	0	0	0	
NASAL-PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT										
	Nad>	12	11	12	12	11	12	11	8	
	Minimal>	0	0	0	0	0	0	1	0	
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	1	0	
MAXILLARY GLANDULAR DILATATION										
	Nad>	12	10	12	12	10	12	12	8	
	Minimal>	0	1	0	0	1	0	0	0	
.....Total Incidence of Finding Observed:		0	1	0	0	1	0	0	0	
PALATE: ECTOPIC SEBACEOUS GLAND										
	Nad>	11	11	12	11	10	10	11	7	
	Present>	1	0	0	1	1	2	1	1	
.....Total Incidence of Finding Observed:		1	0	0	1	1	2	1	1	

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

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Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

		-- Animals				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
Animal sex:		Ctl's				Ctl's			
Dosage group:		2	3	4	2	3	4	4	
Tissues With Diagnoses		12	12	12	12	11	12	12	8
No. in group:		12	12	12	12	11	12	12	8
Nose/Turb Sec 3	Number examined:	12	11	12	12	11	12	12	8
PERIODONTAL DISEASE									
	Nad>	12	11	12	12	10	12	11	8
	Minimal>	0	0	0	0	1	0	0	0
	Slight>	0	0	0	0	0	0	1	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	1	0
Nose/Turb Sec 4	Number examined:	12	11	12	12	11	12	12	8
NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT									
	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	0	0	0	0
.....Total Incidence of Finding 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 Finding 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
.....Total Incidence of Finding Observed:		1	1	4	0	1	0	4	0
Ovaries	Number examined:					11	0	0	8
PROMINENT ATRETIC FOLLICLES									
	Nad>					3	0	0	0
	Minimal>					1	0	0	0
	Slight>					7	0	0	8
.....Total Incidence of Finding Observed:						8	0	0	8

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

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Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

		-- Animals				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
		Dosage group:				Dosage group:			
Tissues With Diagnoses		Ctl				Ctl			
No. in group:		12	12	12	12	11	12	12	8
Ovaries	Number examined:					11	0	0	8
	FOLLICULAR CYST(S)								
	Nad>					9	0	0	8
	Slight>					2	0	0	0
	Total Incidence of Finding Observed:					2	0	0	0
	INTERSTITIAL HEMORRHAGE								
	Nad>					9	0	0	8
	Slight>					1	0	0	0
	Moderate>					1	0	0	0
	Total Incidence of Finding Observed:					2	0	0	0
Oviducts/Fallop	Number examined:					11	0	0	8
Prostate	Number examined:	12	0	0	12				
	MONONUCLEAR CELL AGGREGATES								
	Nad>	11	0	0	10				
	Slight>	1	0	0	1				
	Moderate>	0	0	0	1				
	Total Incidence of Finding Observed:	1	0	0	2				
	ATROPHY								
	Nad>	12	0	0	11				
	Slight>	0	0	0	1				
	Total Incidence of Finding Observed:	0	0	0	1				
Seminal vesicles	Number examined:	12	0	0	12				
Testes	Number examined:	12	0	0	12				
	GERM CELL LOSS/DEPLETION								
	Nad>	10	0	0	12				
	Minimal>	1	0	0	0				
	Marked>	1	0	0	0				
	Total Incidence of Finding Observed:	2	0	0	0				
Thymus	Number examined:	0	0	0	0	0	0	0	0

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

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

Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

		-- A n i m a l s				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:									
Dosage group:		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s W i t h D i a g n o s e s									
No. in group:		12	12	12	12	11	12	12	8
Trachea	Number examined:	12	12	12	12	11	12	12	8
MONONUCLEAR CELL AGGREGATES									
	Nad>	11	10	9	11	8	11	11	8
	Minimal>	1	2	2	1	3	1	1	0
	Slight>	0	0	1	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	2	3	1	3	1	1	0
MUCOSA: GLANDULAR DILATATION									
	Nad>	12	8	8	6	9	10	9	6
	Minimal>	0	3	0	0	0	1	0	1
	Slight>	0	1	1	4	2	1	3	0
	Moderate>	0	0	3	2	0	0	0	1
.....Total Incidence of Finding Observed:		0	4	4	6	2	2	3	2
Uterus	Number examined:					11	0	0	8
STROMAL HYALINIZATION									
	Nad>					2	0	0	1
	Slight>					6	0	0	7
	Moderate>					3	0	0	0
.....Total Incidence of Finding Observed:						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
.....Total Incidence of Finding Observed:						5	0	0	0
LUMINAL DILATATION									
	Nad>					11	0	0	8
.....Total Incidence of Finding Observed:						0	0	0	0

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

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

Incidence Summary of Microscopic Findings with Severity Levels
 Terminal Sacrifice

		-- Animals				Affected --			
		-- Males --				-- Females --			
Tissues With Diagnoses	Animal sex: Dosage group: No. in group:	Ctls	2	3	4	Ctls	2	3	4
Controls from group(s): 1		12	12	12	12	11	12	12	8
Uterus	Number examined:					11	0	0	8
	LUMINAL CELLULAR DEBRIS								
	Nad>					11	0	0	8
	.....Total Incidence of Finding Observed:					0	0	0	0
Vagina	Number examined:					11	0	0	8
	ACUTE INFLAMMATORY CELL INFILTRATE								
	Nad>					1	0	0	0
	Minimal>					2	0	0	0
	Slight>					8	0	0	8
	.....Total Incidence of Finding Observed:					10	0	0	8
	LUMINAL INFLAMMATORY/CELLULAR DEBRIS								
	Nad>					3	0	0	1
	Minimal>					2	0	0	2
	Slight>					3	0	0	4
	Moderate>					3	0	0	1
	.....Total Incidence of Finding Observed:					8	0	0	7
	MONONUCLEAR CELL AGGREGATES								
	Nad>					9	0	0	8
	Minimal>					1	0	0	0
	Slight>					1	0	0	0
	.....Total Incidence of Finding Observed:					2	0	0	0
	SUPERFICIAL CELLULAR BALLOONING DEGENERATION								
	Nad>					11	0	0	6
	Minimal>					0	0	0	1
	Slight>					0	0	0	1
	.....Total Incidence of Finding Observed:					0	0	0	2

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

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

Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals				A f f e c t e d --			
		-- M a l e s --				-- F e m a l e s --			
Controls from group(s): 1	Animal sex:	Ctls	2	3	4	Ctls	2	3	4
T i s s u e s W i t h D i a g n o s e s	Dosage group:								
	No. in group:	0	0	0	0	1	0	0	4
Ear(s)	Number examined:	0	0	0	0	0	0	0	1
Epididymides	Number examined:	0	0	0	0				
ASPERMIA/LUMINAL CELLULAR DEBRIS									
.....	Total Incidence of Finding Observed:	0	0	0	0				
SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE									
.....	Total Incidence of Finding Observed:	0	0	0	0				
MONONUCLEAR CELL AGGREGATES									
.....	Total Incidence of Finding Observed:	0	0	0	0				
Kidneys	Number examined:	0	0	0	0	0	0	0	0
PELVIS: DILATED									
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
MONONONUCLEAR CELL AGGREGATES									
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Larynx: V-DVTC	Number examined:	0	0	0	0	0	0	0	4
MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID									
-AGGREGATES									
.....	Nad>	0	0	0	0	0	0	0	2
.....	Minimal>	0	0	0	0	0	0	0	2
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	2
SUBMUCOSAL GLAND: LUMINAL ACUTE INFLAMMATION									
.....	Nad>	0	0	0	0	0	0	0	4
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0

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

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

Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals --				Affected --			
		-- Males --				-- Females --			
Controls from group(s): 1	Animal sex:	Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	Dosage group:								
	No. in group:	0	0	0	0	1	0	0	4
Larynx: V-DVTC	Number examined:	0	0	0	0	0	0	0	4
GLANDULAR DILATATION									
	Nad>	0	0	0	0	0	0	0	4
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Larynx: V-SM-G	Number examined:	0	0	0	0	0	0	0	4
MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID									
-METAPLASIA									
	Nad>	0	0	0	0	0	0	0	3
	Minimal>	0	0	0	0	0	0	0	1
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	1
MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID									
-AGGREGATES									
	Minimal>	0	0	0	0	0	0	0	4
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	4
CHONDROMALACIA									
	Nad>	0	0	0	0	0	0	0	4
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
GLANDULAR DILATATION									
	Nad>	0	0	0	0	0	0	0	4
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Lungs	Number examined:	0	0	0	0	1	0	0	4
PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT)									
	Nad>	0	0	0	0	1	0	0	0
	Slight>	0	0	0	0	0	0	0	1
	Moderate>	0	0	0	0	0	0	0	3
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	4

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

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

Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

Controls from group(s): 1		-- Animals --				Affected --			
		-- Males --				-- Females --			
		Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	Animal sex: Dosage group: No. in group: Number examined:	0	0	0	0	1	0	0	4
Lungs	BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK -PIGMENT DEPOSITS	0	0	0	0	1	0	0	4
	Nad>	0	0	0	0	1	0	0	1
	Slight>	0	0	0	0	0	0	0	1
	Moderate>	0	0	0	0	0	0	0	1
	Marked>	0	0	0	0	0	0	0	1
	.....Total Incidence of Finding Observed:	0	0	0	0	0	0	0	3
	ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT								
	Nad>	0	0	0	0	1	0	0	0
	Moderate>	0	0	0	0	0	0	0	1
	Marked>	0	0	0	0	0	0	0	3
	.....Total Incidence of Finding Observed:	0	0	0	0	0	0	0	4
	BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY								
	Nad>	0	0	0	0	1	0	0	0
	Slight>	0	0	0	0	0	0	0	3
	Moderate>	0	0	0	0	0	0	0	1
	.....Total Incidence of Finding Observed:	0	0	0	0	0	0	0	4
	BRONCHIAL EPITHELIAL HYPERPLASIA								
	Nad>	0	0	0	0	1	0	0	4
	.....Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
	SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION								
	Minimal>	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
	.....Total Incidence of Finding Observed:	0	0	0	0	1	0	0	4

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

Petroleum Coke:
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Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals --				Affected --			
		-- Males --				-- Females --			
Controls from group(s): 1	Animal sex:	Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	Dosage group:								
	No. in group:	0	0	0	0	1	0	0	4
Lungs	Number examined:	0	0	0	0	1	0	0	4
HEMORRHAGE(S)									
	Nad>	0	0	0	0	1	0	0	4
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Mediastinal LN	Number examined:	0	0	0	0	1	0	0	4
PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE									
-CELLULARITY									
	Nad>	0	0	0	0	1	0	0	0
	Marked>	0	0	0	0	0	0	0	1
	Severe>	0	0	0	0	0	0	0	3
	Total Incidence of Finding Observed:	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
	Total Incidence of Finding Observed:	0	0	0	0	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	0	0	0	1
	Total Incidence of Finding Observed:	0	0	0	0	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
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	2

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

Petroleum Coke:
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 Study in Rats via Nose-Only Inhalation Exposures

Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals --				Affected --			
		-- Males --				-- Females --			
Controls from group(s): 1	Animal sex:	Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	Dosage group:								
	No. in group:	0	0	0	0	1	0	0	4
Mediastinal LN	Number examined:	0	0	0	0	1	0	0	4
PROMINENT PLASMA CELLS									
	Nad>	0	0	0	0	0	0	0	3
	Minimal>	0	0	0	0	0	0	0	1
	Slight>	0	0	0	0	1	0	0	0
	Total Incidence of Finding Observed:	0	0	0	0	1	0	0	1
YELLOW-BROWN PIGMENT									
	Nad>	0	0	0	0	1	0	0	4
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Nose/Turb Sec 1	Number examined:	0	0	0	0	1	0	0	4
NASAL MUCOSA (VESTIBULAR): EPITHELIAL-EROSION(S)									
	Nad>	0	0	0	0	1	0	0	4
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
NASAL MUCOSA (VESTIBULAR EPITHELIUM): MIXED INFLAMMATORY -CELLS WITH OR WITHOUT LYMPHOID AGGREGATES									
	Nad>	0	0	0	0	1	0	0	4
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET CELL -HYPERTROPHY/HYPERPLASIA									
	Nad>	0	0	0	0	1	0	0	1
	Minimal>	0	0	0	0	0	0	0	3
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	3
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT									
	Nad>	0	0	0	0	1	0	0	4
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0

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

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Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals				Affected --				
Controls from group(s): 1		-- Males --				-- Females --				
Tissues With Diagnoses	Animal sex: Dosage group: No. in group:	Ctls	2	3	4	Ctls	2	3	4	
Nose/Turb Sec 1	Number examined:	0	0	0	0	1	0	0	4	
NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITH OR -WITHOUT LYMPHOID AGGREGATES										
	Nad>	0	0	0	0	1	0	0	3	
	Minimal>	0	0	0	0	0	0	0	1	
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1	
PERIODONTAL TISSUE (AMELOBLAST EPITHELIUM): CELLULAR -DISORGANIZATION/DEGENERATION										
	Nad>	0	0	0	0	1	0	0	4	
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0	
Nose/Turb Sec 2	Number examined:	0	0	0	0	1	0	0	4	
NASAL MUCOSA (RESPIRATORY/OLFACTORY JUNCTION): SUBMUCOSAL -GLANDULAR EOSINOPHILIC SECRETORY MATERIAL										
	Nad>	0	0	0	0	1	0	0	3	
	Moderate>	0	0	0	0	0	0	0	1	
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1	
NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED -INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES										
	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	
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	4	
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT										
	Nad>	0	0	0	0	1	0	0	4	
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0	

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

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Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals				Affected --			
		-- Males --				-- Females --			
		Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	No. in group:	0	0	0	0	1	0	0	4
Controls from group(s): 1									
Animal sex:									
Dosage group:									
Nose/Turb Sec 2		0	0	0	0	1	0	0	4
Number examined:		0	0	0	0	1	0	0	4
NASAL SINUS: BROWN-BLACK PIGMENT									
Nad>		0	0	0	0	1	0	0	4
Total Incidence of Finding Observed:		0	0	0	0	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	0	0	0	1
Slight>		0	0	0	0	1	0	0	2
Total Incidence of Finding Observed:		0	0	0	0	1	0	0	3
ODONTOPATHY									
Nad>		0	0	0	0	1	0	0	4
Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Nose/Turb Sec 3		0	0	0	0	1	0	0	4
Number examined:		0	0	0	0	1	0	0	4
NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT									
Nad>		0	0	0	0	1	0	0	3
Minimal>		0	0	0	0	0	0	0	1
Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
NASAL-PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT									
Nad>		0	0	0	0	1	0	0	4
Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MAXILLARY GLANDULAR DILATATION									
Nad>		0	0	0	0	1	0	0	4
Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PALATE: ECTOPIC SEBACEOUS GLAND									
Nad>		0	0	0	0	1	0	0	4
Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

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

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Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals				Affected --			
		-- Males --				-- Females --			
		Ctls	2	3	4	Ctls	2	3	4
Controls from group(s): 1	Animal sex:								
	Dosage group:								
Tissues With Diagnoses	No. in group:	0	0	0	0	1	0	0	4
Nose/Turb Sec 3	Number examined:	0	0	0	0	1	0	0	4
PERIODONTAL DISEASE									
	Nad>	0	0	0	0	1	0	0	4
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Nose/Turb Sec 4	Number examined:	0	0	0	0	1	0	0	4
NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT									
	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
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	4
NASAL PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT									
	Nad>	0	0	0	0	1	0	0	4
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PERIODONTAL DISEASE									
	Nad>	0	0	0	0	1	0	0	4
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Ovaries	Number examined:					1	0	0	4
PROMINENT ATRETIC FOLLICLES									
	Nad>					1	0	0	3
	Minimal>					0	0	0	1
.....Total Incidence of Finding Observed:						0	0	0	1
FOLLICULAR CYST(S)									
	Nad>					1	0	0	3
	Slight>					0	0	0	1
.....Total Incidence of Finding Observed:						0	0	0	1

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

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Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals				Affected --			
		-- Males --				-- Females --			
		Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	No. in group:	0	0	0	0	1	0	0	4
Controls from group(s): 1	Animal sex:								
	Dosage group:								
Ovaries	Number examined:					1	0	0	4
INTERSTITIAL HEMORRHAGE									
	Nad>					1	0	0	4
	Total Incidence of Finding Observed:					0	0	0	0
Oviducts/Fallop	Number examined:					1	0	0	4
Prostate	Number examined:	0	0	0	0				
MONONUCLEAR CELL AGGREGATES									
	Total Incidence of Finding Observed:	0	0	0	0				
	ATROPHY								
	Total Incidence of Finding Observed:	0	0	0	0				
Seminal vesicles	Number examined:	0	0	0	0				
Testes	Number examined:	0	0	0	0				
GERM CELL LOSS/DEPLETION									
	Total Incidence of Finding Observed:	0	0	0	0				
Thymus	Number examined:	0	0	0	0	0	0	0	0
Trachea	Number examined:	0	0	0	0	1	0	0	4
MONONUCLEAR CELL AGGREGATES									
	Nad>	0	0	0	0	0	0	0	4
	Minimal>	0	0	0	0	1	0	0	0
	Total Incidence of Finding Observed:	0	0	0	0	1	0	0	0
	MUCOSA: GLANDULAR DILATATION								
	Nad>	0	0	0	0	1	0	0	3
	Slight>	0	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	1

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

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

Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- Animals				Affected --			
		-- Males --				-- Females --			
Controls from group(s): 1	Animal sex:	Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	Dosage group:								
	No. in group:	0	0	0	0	1	0	0	4
Uterus	Number examined:					1	0	0	4
STROMAL HYALINIZATION									
	Nad>					1	0	0	4
.....	Total Incidence of Finding Observed:					0	0	0	0
HEMORRHAGE									
	Nad>					1	0	0	4
.....	Total Incidence of Finding Observed:					0	0	0	0
LUMINAL DILATATION									
	Nad>					1	0	0	3
	Moderate>					0	0	0	1
.....	Total Incidence of Finding Observed:					0	0	0	1
LUMINAL CELLULAR DEBRIS									
	Nad>					1	0	0	3
	Slight>					0	0	0	1
.....	Total Incidence of Finding Observed:					0	0	0	1
Vagina	Number examined:					1	0	0	4
ACUTE INFLAMMATORY CELL INFILTRATE									
	Nad>					1	0	0	4
.....	Total Incidence of Finding Observed:					0	0	0	0
LUMINAL INFLAMMATORY/CELLULAR DEBRIS									
	Nad>					0	0	0	2
	Slight>					1	0	0	1
	Moderate>					0	0	0	1
.....	Total Incidence of Finding Observed:					1	0	0	2

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

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

Incidence Summary of Microscopic Findings with Severity Levels
 Unscheduled Deaths

		-- Animals				Affected			
		-- Males --				-- Females --			
Controls from group(s): 1	Animal sex:	Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	Dosage group:								
	No. in group:	0	0	0	0	1	0	0	4
Vagina	Number examined:					1	0	0	4
MONONUCLEAR CELL AGGREGATES									
	Nad>					1	0	0	2
	Minimal>					0	0	0	1
	Slight>					0	0	0	1
.....Total Incidence of Finding Observed:						0	0	0	2
SUPERFICIAL CELLULAR BALLOONING DEGENERATION									
	Nad>					1	0	0	4
.....Total Incidence of Finding Observed:						0	0	0	0

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

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TABLE 22

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

SUMMARY OF PUP NECROPSY OBSERVATIONS

DOSE GROUP:		1	2	3	4
DOSE LEVEL (MG/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	0	1
Pup Incidence	N	1	0	0	1
AUTOLYSIS					
Pup Incidence	N	1	0	0	1
	%	0.7	0.0	0.0	1.0
Litter Incidence	N	1	0	0	1
	%	9.1	0.0	0.0	12.5
LUNGS					
Litter Incidence	N	1	4	3	4
Pup Incidence	N	1	6	5	5
FLOTATION TEST-STILLBORN					
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
FLOTATION TEST- FOUND DEAD					
Pup Incidence	N	0	1	0	0
	%	0.0	0.6	0.0	0.0
Litter Incidence	N	0	1	0	0
	%	0.0	8.3	0.0	0.0

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TABLE 22

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

SUMMARY OF PUP NECROPSY OBSERVATIONS

DOSE GROUP:		1	2	3	4
DOSE LEVEL (MG/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
STOMACH					
Litter Incidence	N	1	4	4	4
Pup Incidence	N	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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PETROLEUM COKE; REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL ANIMAL TERMINATION HISTORY

MALES GROUP 1 0 MG/M3

ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY 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

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SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL ANIMAL TERMINATION HISTORY

MALES GROUP 2 30 MG/M3

ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY DAY
2001	TERMINAL SACRIFICE	25-JUN-04	31
2002	TERMINAL SACRIFICE	25-JUN-04	31
2003	TERMINAL SACRIFICE	25-JUN-04	31
2004	TERMINAL SACRIFICE	25-JUN-04	31
2005	TERMINAL SACRIFICE	25-JUN-04	31
2006	TERMINAL SACRIFICE	25-JUN-04	31
2007	TERMINAL SACRIFICE	25-JUN-04	31
2008	TERMINAL SACRIFICE	25-JUN-04	31
2009	TERMINAL SACRIFICE	25-JUN-04	31
2010	TERMINAL SACRIFICE	25-JUN-04	31
2011	TERMINAL SACRIFICE	25-JUN-04	31
2012	TERMINAL SACRIFICE	25-JUN-04	31

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SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL ANIMAL TERMINATION HISTORY

MALES GROUP 3 100 MG/M3

ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY 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

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SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL ANIMAL TERMINATION HISTORY

MALES GROUP 4 300 MG/M3

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

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INDIVIDUAL ANIMAL TERMINATION HISTORY

FEMALES GROUP 1 0 MG/M3

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	P
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

NP-NOT PREGNANT, P-PREGNANT

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INDIVIDUAL ANIMAL TERMINATION HISTORY

FEMALES GROUP 2 30 MG/M3

ANIMAL#	TYPE OF DEATH	DATE OF DEATH	STUDY DAY	PREGNANCY 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

NP-NOT PREGNANT, P-PREGNANT

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SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL ANIMAL TERMINATION HISTORY

FEMALES GROUP 3 100 MG/M3

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

NP-NOT PREGNANT, P-PREGNANT

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INDIVIDUAL ANIMAL TERMINATION HISTORY

FEMALES GROUP 4 300 MG/M3

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	P
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

NP-NOT PREGNANT, P-PREGNANT

	Individual Weekly Clinical Observations Preface	Appendix B
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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).

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 SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 1 0 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY							
			-	1	2	2	3		
			7	0	8	5	2	9	1
1001	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P
1002	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P
1003	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P
1004	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P
1005	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P
1006	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	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	P
1010	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P

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

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 SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 1 0 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY	-	1	2	2	3
			7	0	8	5	2 9 1
1011	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P P
1012	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P P P

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

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SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 2 30 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY							
			-	1	2	2	3		
			7	0	8	5	2	9	1
2001	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P
2002	WITHIN NORMAL LIMITS TERMINAL SACRIFICE CHROMODACRYORRHEA - UNILATERAL		P	P	P	P	P	P	P
2003	WITHIN NORMAL LIMITS TERMINAL SACRIFICE TEST MATERIAL ON FUR (BLACK) FACIAL		P	P	P		P		P
2004	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	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			1	1
2008	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P

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

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 SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 2 30 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY	-	1	2	2	3
			7	0	8	5	2 9 1
2009	WITHIN NORMAL LIMITS		P	P	P		
	TERMINAL SACRIFICE						P
	TEST MATERIAL ON FUR (BLACK)			1	1	1	
	FACIAL						
2010	WITHIN NORMAL LIMITS		P	P	P		
	TERMINAL SACRIFICE						P
	TEST MATERIAL ON FUR (BLACK)			1	1	1	
	FACIAL						
2011	WITHIN NORMAL LIMITS		P	P	P	P	P
	TERMINAL SACRIFICE						P
2012	WITHIN NORMAL LIMITS		P	P	P	P	P
	TERMINAL SACRIFICE						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 WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 3 100 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY							
			-	1	2	2	3		
			7	0	8	5	2	9	1
3001	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK) DORSAL CERVICAL			1					
	TEST MATERIAL ON FUR (BLACK) FACIAL				1	1	1		
3002	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK) FACIAL			2	2	2	2		
3003	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK) FACIAL			1	2	2	2		
	TEST MATERIAL ON FUR (BLACK) DORSAL CERVICAL				2	2	2		
3004	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK) FACIAL			1	2	2	2		
3005	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK) FACIAL			1	2	2	2		
	TEST MATERIAL ON FUR (BLACK) DORSAL CERVICAL							1	
	CHROMODACRYORRHEA - UNILATERAL								P

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

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SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 3 100 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY							
			-	1	2	2	3		
			7	0	8	5	2	9	1
3006	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)			1	1	1	1		
	FACIAL								
3007	WITHIN NORMAL LIMITS		P	P					
	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		P	P					
	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								

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

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SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURES

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 3 100 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF								
		STUDY		-	1	2	2	3		
				7	0	8	5	2	9	1
3011	WITHIN NORMAL LIMITS			P	P					
	TERMINAL SACRIFICE									P
	TEST MATERIAL ON FUR (BLACK)				1	1	1	1		
	FACIAL									
	TEST MATERIAL ON FUR (BLACK)				2	2	2	3		
	DORSAL CERVICAL									
3012	WITHIN NORMAL LIMITS			P	P					
	TERMINAL SACRIFICE									P
	TEST MATERIAL ON FUR (BLACK)				3	3	3	3		
	DORSAL CERVICAL									

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

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INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 4 300 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY							
			-	1	2	2	3		
			7	0	8	5	2	9	1
4001	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)			2	2	2	2		
	FACIAL								
4002	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)			2	2	2	3		
	FACIAL								
4003	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)			2	2	2	2		
	FACIAL								
4004	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)			3	3	3	3		
	FACIAL								
4005	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)			2	2	2	2		
	FACIAL								
4006	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)			2	2	2	3		
	FACIAL								

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

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APPENDIX B

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

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

MALES GROUP 4 300 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY							
			-	1	2	2	3		
			7	0	8	5	2	9	1
4007	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)				2	3	3	2	
	FACIAL								
4008	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)				3	3	3	3	
	FACIAL								
4009	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)				2	3	3	3	
	FACIAL								
4010	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)				2	2	3	2	
	FACIAL								
4011	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)				2	2	3	3	
	FACIAL								
4012	WITHIN NORMAL LIMITS		P	P					
	TERMINAL SACRIFICE								P
	TEST MATERIAL ON FUR (BLACK)				2	2	2	2	
	FACIAL								
	TEST MATERIAL ON FUR (BLACK)								2
	DORSAL								

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

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APPENDIX B

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

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

FEMALES GROUP 1 0 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY	-	1	2	2	3	3	4	5	5
			7	0	8	5	2	9	1	6	3	0	2
1501	WITHIN NORMAL LIMITS		P	P	P	P					
1502	WITHIN NORMAL LIMITS		P	P	P	P					
1503	WITHIN NORMAL LIMITS		P	P	P	P					
1504	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P	P	P	P	P	P	P	P
1505	WITHIN NORMAL LIMITS CHROMODACRYORRHEA - UNILATERAL		P	P	P						P
1506	WITHIN NORMAL LIMITS		P	P	P	P					
1507	WITHIN NORMAL LIMITS CHROMODACRYORRHEA - BILATERAL		P	P							P
1508	WITHIN NORMAL LIMITS		P	P	P	P					
1509	WITHIN NORMAL LIMITS		P	P	P	P					
1510	WITHIN NORMAL LIMITS		P	P	P	P					
1511	WITHIN NORMAL LIMITS		P	P	P	P					
1512	WITHIN NORMAL LIMITS		P	P	P	P					

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

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APPENDIX B

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

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

FEMALES GROUP 2 30 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY	-	1	2	2	3	3	4	5	5
			7	0	8	5	2	9	1	6	3	0	2
2501	WITHIN NORMAL LIMITS		P	P	P	P					
2502	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P			1	1			
2503	WITHIN NORMAL LIMITS		P	P	P	P					
2504	WITHIN NORMAL LIMITS		P	P	P	P					
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				1		P	
2507	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P	P			1			
2508	WITHIN NORMAL LIMITS		P	P	P						
2509	WITHIN NORMAL LIMITS		P	P	P	P					
2510	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL CHROMODACRYORRHEA - BILATERAL		P	P			1	1			
										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 WEEKLY CLINICAL OBSERVATIONS

FEMALES GROUP 2 30 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF	-	1	2	2	3	3	4	5	5	
		STUDY	7	0	8	5	2	9	1	6	3	0
2511	WITHIN NORMAL LIMITS		P	P	P	P						
2512	WITHIN NORMAL LIMITS		P	P		P						
	TEST MATERIAL ON FUR (BLACK)											1
	FACIAL											

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

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APPENDIX B

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

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

FEMALES GROUP 3 100 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY											
			-	1	2	2	3	3	4	5	5		
			7	0	8	5	2	9	1	6	3	0	2
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

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

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APPENDIX B

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

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

FEMALES GROUP 4 300 MG/M3

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 (BLACK) FACIAL		P	P										
4502	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P										
4503	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P										
4504	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P										
4505	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P										
4506	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P										
4507	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P										
4508	WITHIN NORMAL LIMITS TEST MATERIAL ON FUR (BLACK) FACIAL		P	P										
	CHROMODACRYORRHEA - BILATERAL													

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

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APPENDIX B

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

INDIVIDUAL WEEKLY CLINICAL OBSERVATIONS

FEMALES GROUP 4 300 MG/M3

ANIMAL#	OBSERVATIONS	DAY OF STUDY	-	1	2	2	3	3	4	5	5
			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		P	P							
	TEST MATERIAL ON FUR (BLACK)				2	2					
	FACIAL										
4511	WITHIN NORMAL LIMITS		P	P							
	TEST MATERIAL ON FUR (BLACK)				2	3					
	FACIAL										
4512	WITHIN NORMAL LIMITS		P	P							
	TEST MATERIAL ON FUR (BLACK)				1	1					
	FACIAL										

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

	Individual Clinical Observations During Gestation Preface	Appendix C
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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.

	Individual Maternal Clinical Observations During Lactation Preface	Appendix D
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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	1	2	3	4
1501	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P	
1502	WITHIN NORMAL LIMITS TERMINAL SACRIFICE			P	P		P
1503	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P	P
1505	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P	P
1506	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P	P
1507	TERMINAL SACRIFICE ALOPECIA - EXTREMITIES/SNOUT		3	3			3
1508	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P	P
1509	WITHIN NORMAL LIMITS TERMINAL SACRIFICE ALOPECIA - EXTREMITIES/SNOUT		P	P			2
1510	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P	P
1511	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P	P

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

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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	1	2	3	4	
1512	WITHIN NORMAL LIMITS			P	P			
	TERMINAL SACRIFICE							P
	ALOPECIA - EXTREMITIES/SNOUT							3

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

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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 2 30 MG/M3

FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3 4			
2501	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P
2502	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P
2503	WITHIN NORMAL LIMITS TERMINAL SACRIFICE RED/BROWN STAINS - AG AREA			P		P
2504	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P
2505	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P
2506	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P
2507	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P
2508	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P
2509	WITHIN NORMAL LIMITS TERMINAL SACRIFICE		P	P		P
2510	WITHIN NORMAL LIMITS TERMINAL SACRIFICE RED/BROWN STAINS - AG AREA			P		P

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

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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 2 30 MG/M3

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

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

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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 3 100 MG/M3

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

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

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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 3 100 MG/M3

FEMALE#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3 4				
3510	WITHIN NORMAL LIMITS		P	P		P	
	TERMINAL SACRIFICE					P	
3511	WITHIN NORMAL LIMITS		P	P		P	
	TERMINAL SACRIFICE					P	
3512	WITHIN NORMAL LIMITS		P	P		P	
	TERMINAL SACRIFICE					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/M3

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

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

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APPENDIX E

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

MALES GROUP 1 0 MG/M3

INDIVIDUAL BODY WEIGHTS (GRAMS)

ANIMAL#	DAY OF STUDY						
	-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

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APPENDIX E

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

MALES		GROUP 2		30 MG/M3		INDIVIDUAL BODY WEIGHTS (GRAMS)						
ANIMAL#	DAY OF STUDY											
	-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					

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

INDIVIDUAL BODY WEIGHTS (GRAMS)							
MALES	GROUP 3	100 MG/M3					
ANIMAL#	DAY OF STUDY						
	-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

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APPENDIX E

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

MALES		GROUP 4		300 MG/M3		INDIVIDUAL BODY WEIGHTS (GRAMS)						
ANIMAL#	DAY OF STUDY											
	-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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APPENDIX E

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

FEMALES GROUP 1		0 MG/M3									
		INDIVIDUAL BODY WEIGHTS (GRAMS)									

ANIMAL#	DAY OF STUDY										
	-7	0	7	14	21	28	35	42	49	52	

1501	183	218	229	244							
1502	176	208	201	225							
1503	184	211	220	221							
1504	187	220	230	231	263	275	271	278	294	290	
1505	171	215	219	233							
1506	175	210	219	227							
1507	174	208	228	246							
1508	180	218	229	240							
1509	185	214	226	235							
1510	171	203	217	241							
1511	178	215	229	239							
1512	177	229	239	252							
MEAN	178	214	224	236	263	275	271	278	294	290	
S.D.	5.5	6.8	9.5	9.3	0.0	0.0	0.0	0.0	0.0	0.0	
N	12	12	12	12	1	1	1	1	1	1	

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APPENDIX E

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

INDIVIDUAL BODY WEIGHTS (GRAMS)

FEMALES GROUP 2 30 MG/M3

ANIMAL#	DAY OF STUDY			
	-7	0	7	14
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
MEAN	179	217	231	245
S.D.	5.6	9.5	11.5	13.6
N	12	12	12	12

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APPENDIX E

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

FEMALES GROUP 3		100 MG/M3									
ANIMAL#	INDIVIDUAL BODY WEIGHTS (GRAMS)										
	DAY OF STUDY	-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							
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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APPENDIX E

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

FEMALES GROUP 4 300 MG/M3										
ANIMAL#	INDIVIDUAL BODY WEIGHTS (GRAMS)									
	DAY OF STUDY -7	0	7	14	21	28	35	42	49	52
4501	177	208	223	232						
4502	182	226	240	250						
4503	185	222	250	254						
4504	174	210	230	237						
4505	188	225	236	245						
4506	179	227	237	247						
4507	180	213	230	244						
4508	171	211	218	232						
4509	184	227	234	239	264	292	285	286	293	297
4510	172	199	215	226						
4511	175	217	231	242						
4512	177	222	233	250						
MEAN	179	217	231	241	264	292	285	286	293	297
S.D.	5.4	9.1	9.5	8.4	0.0	0.0	0.0	0.0	0.0	0.0
N	12	12	12	12	1	1	1	1	1	1

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APPENDIX F

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

MALES	GROUP 1	INDIVIDUAL BODY WEIGHT GAIN (GRAMS)						
		0 MG/M3						
ANIMAL#	DAY OF STUDY							
	-7-0	0-7	7-14	14-21	21-28	28-31	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	

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APPENDIX F

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

INDIVIDUAL BODY WEIGHT GAIN (GRAMS)							
MALES	GROUP 2	30 MG/M3					
ANIMAL#	DAY OF STUDY						
	-7-0	0-7	7-14	14-21	21-28	28-31	0-31
2001	64	31	23	28	29	5	116
2002	57	33	24	21	27	7	111
2003	60	32	33	26	25	6	121
2004	77	39	42	37	31	13	162
2005	51	10	19	20	28	10	87
2006	66	28	28	28	20	8	112
2007	63	33	32	25	39	1	130
2008	60	31	23	28	29	11	122
2009	61	33	28	37	37	17	152
2010	65	33	29	28	14	10	114
2011	69	37	36	27	28	7	136
2012	60	35	22	25	28	7	118
MEAN	63	31	28	28	28	8	123
S.D.	6.3	7.1	6.7	5.1	6.6	4.2	19.7
N	12	12	12	12	12	12	12

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APPENDIX F

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

INDIVIDUAL BODY WEIGHT GAIN (GRAMS)

MALES GROUP 3 100 MG/M3

ANIMAL#	DAY OF STUDY						
	-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

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APPENDIX F

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

INDIVIDUAL BODY WEIGHT GAIN (GRAMS)							
MALES	GROUP 4	300 MG/M3					
ANIMAL#	DAY OF STUDY						
	-7-0	0-7	7-14	14-21	21-28	28-31	0-31
4001	66	42	38	23	27	23	154
4002	72	25	46	37	28	17	153
4003	65	35	32	24	24	22	137
4004	52	25	12	18	22	12	89
4005	66	24	28	33	30	14	129
4006	69	37	28	25	24	13	127
4007	61	27	17	22	13	5	85
4008	60	34	27	28	32	12	132
4009	59	11	17	2	24	1	55
4010	62	43	33	34	27	10	147
4011	52	17	24	21	21	-3	80
4012	67	22	28	28	28	7	113
MEAN	63	29	27	24	25	11	117
S.D.	6.1	9.8	9.5	9.1	5.0	7.9	32.3
N	12	12	12	12	12	12	12

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APPENDIX F

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

INDIVIDUAL BODY WEIGHT GAIN (GRAMS)										
FEMALES	GROUP 1	0 MG/M3								
ANIMAL#	DAY OF STUDY									
	-7-0	0-7	7-14	14-21	21-28	28-35	35-42	42-49	49-52	0-14
1501	34	11	15							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

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APPENDIX F

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

INDIVIDUAL BODY WEIGHT GAIN (GRAMS)

FEMALES GROUP 2 30 MG/M3

ANIMAL#	DAY OF STUDY									
	-7-0	0-7	7-14	14-21	21-28	28-35	35-42	42-49	49-52	0-14
2501	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

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APPENDIX F

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

INDIVIDUAL BODY WEIGHT GAIN (GRAMS)

FEMALES GROUP 3 100 MG/M3

ANIMAL#	DAY OF STUDY									
	-7-0	0-7	7-14	14-21	21-28	28-35	35-42	42-49	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

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APPENDIX F

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

INDIVIDUAL BODY WEIGHT GAIN (GRAMS)

FEMALES GROUP 4 300 MG/M3

ANIMAL#	DAY OF STUDY									
	-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
S.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	1	1	1	1	12

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APPENDIX G

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

INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

GROUP 1 0 MG/M3

ANIMAL#	DAY OF GESTATION			
	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

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APPENDIX G

PETROLEUM COKE: REPRODUCTION / DEVELOPMENTAL TOXICITY
SCREENING STUDY IN RATS VIA NOSE-ONLY INHALATION EXPOSURESGROUP 2 30 MG/M3
INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

ANIMAL#	DAY OF GESTATION			
	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

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APPENDIX G

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

INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

GROUP 3 100 MG/M3

ANIMAL#	DAY OF GESTATION			
	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

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APPENDIX G

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

INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

GROUP 4 300 MG/M3

ANIMAL#	DAY OF GESTATION			
	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
MEAN	241	275	308	365
S.D.	7.1	6.4	12.8	44.2
N	9	9	9	9

NP=NOT PREGNANT x=EXCLUDED FROM MEAN

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APPENDIX H

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

GROUP 1 0 MG/M3 INDIVIDUAL GESTATION BODY WEIGHT GAIN (GRAMS)

ANIMAL#	DAY OF GESTATION			
	0 - 7	7 - 14	14 - 20	0 - 20
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

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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
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

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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#	DAY OF GESTATION			
	0 - 7	7 - 14	14 - 20	0 - 20
3501	24	23	22	69
3502	43	45	71	160
3503	46	35	68	150
3504	33	32	78	143
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

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APPENDIX H

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

INDIVIDUAL GESTATION BODY WEIGHT GAIN (GRAMS)

GROUP 4 300 MG/M3

ANIMAL#	DAY OF GESTATION			
	0 - 7	7 - 14	14 - 20	0 - 20
4501	33	33	63	129
4502	28	33	93	154
4503x NP	41	10	1	53
4504	37	13	-18	32
4505	35	31	63	128
4506	33	43	67	143
4507	34	27	32	93
4508	39	36	65	140
4509x NP				
4510x NP	36	12	-8	39
4511	29	42	80	150
4512	38	32	73	143
MEAN	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

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APPENDIX I

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

INDIVIDUAL MATERNAL LACTATION BODY WEIGHTS (GRAMS)

GROUP 1 0 MG/M3

Animal No.	DAY OF LACTATION	
	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

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APPENDIX I

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

INDIVIDUAL MATERNAL LACTATION BODY WEIGHTS (GRAMS)

GROUP 2 30 MG/M3

Animal No.	DAY OF LACTATION	
	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

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APPENDIX I

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

INDIVIDUAL MATERNAL LACTATION BODY WEIGHTS (GRAMS)

GROUP 3 100 MG/M3

Animal No.	DAY OF LACTATION	
	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

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APPENDIX I

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

INDIVIDUAL MATERNAL LACTATION BODY WEIGHTS (GRAMS)

GROUP 4 300 MG/M3

Animal No.	DAY OF LACTATION	
	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

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APPENDIX J

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

INDIVIDUAL MATERNAL LACTATION BODY WEIGHT GAIN (GRAMS)

GROUP 1 0 MG/M3

FEMALE#	DAY OF LACTATION	
	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	
N	11	

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APPENDIX J

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

INDIVIDUAL MATERNAL LACTATION BODY WEIGHT GAIN (GRAMS)

GROUP 2 30 MG/M3

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

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APPENDIX J

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

INDIVIDUAL MATERNAL LACTATION BODY WEIGHT GAIN (GRAMS)

GROUP 3 100 MG/M3

FEMALE#	DAY OF LACTATION

	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

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APPENDIX J

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

INDIVIDUAL MATERNAL LACTATION BODY WEIGHT GAIN (GRAMS)

GROUP 4 300 MG/M3

FEMALE#	DAY OF LACTATION
	1 - 4
4501	20
4502	25
4505	16
4506	36
4507	12
4508	27
4511	38
4512	22
MEAN	25
S.D.	9.1
N	8

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APPENDIX K

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

MALES	GROUP 1	INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)		
		0 MG/M3		
ANIMAL#	DAY OF STUDY			
	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	

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APPENDIX K

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

INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

MALES	GROUP 2	30 MG/M3		
		DAY OF STUDY		
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
MEAN		109	91	81
S.D.		3.3	4.2	2.6
N		12	12	12

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APPENDIX K

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

MALES	GROUP 3	100 MG/M3		
		INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)		
ANIMAL#	DAY OF STUDY			
	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	
3008	108	88	73	
3009	111	91	79	
3010	100	89	79	
3011	110	92	75	
3012	114	98	82	
MEAN	109	91	79	
S.D.	4.1	3.3	3.8	
N	12	12	12	

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APPENDIX K

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

MALES	GROUP 4	300 MG/M3	INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)		
			DAY OF STUDY		
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		

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APPENDIX K

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

FEMALES GROUP 1 0 MG/M3
 INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

ANIMAL#	DAY OF STUDY			35	42	49	52
	0	7	14				
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

CF=Contaminated Feeder

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APPENDIX K

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

INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)

FEMALES GROUP 2 30 MG/M3

ANIMAL#	DAY OF STUDY			35	42	49	52
	0	7	14				
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				

CF=Contaminated Feeder

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APPENDIX K

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

FEMALES GROUP 3		100 MG/M3						
ANIMAL#	INDIVIDUAL FEED CONSUMPTION (GRAMS/KG/DAY)							
	DAY OF STUDY	0	7	14	35	42	49	52
3501	95	83	73					
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					
MEAN	98	84	78	80				
S.D.	4.0	5.3	6.3	0.0				
N	9	9	9	1				

CF=Contaminated Feeder

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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 MG/M3

ANIMAL#	DAY OF STUDY						
	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

CF=Contaminated Feeder

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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

ANIMAL#	DAY OF GESTATION			
	0 - 7	7 - 14	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

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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

ANIMAL#	DAY OF GESTATION			
	0 - 7	7 - 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	77
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=Contaminated Feeder

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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#	DAY OF GESTATION			
	0 - 7	7 - 14	14 - 20	0 - 20
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	74
MEAN	85	81	72	78
S.D.	4.9	3.5	5.2	5.6
N	9	10	11	11

CF=Contaminated Feeder

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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

ANIMAL#	DAY OF GESTATION			
	0 - 7	7 - 14	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

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APPENDIX M

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

INDIVIDUAL MATERNAL LACTATION FEED CONSUMPTION -- (GRAMS/KG/DAY)

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

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APPENDIX M

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

INDIVIDUAL MATERNAL LACTATION FEED CONSUMPTION -- (GRAMS/KG/DAY)

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

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APPENDIX M

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

INDIVIDUAL MATERNAL LACTATION FEED CONSUMPTION -- (GRAMS/KG/DAY)

GROUP 3 100 MG/M3

ANIMAL#	DAY OF LACTATION
	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

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APPENDIX M

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

INDIVIDUAL MATERNAL LACTATION FEED CONSUMPTION -- (GRAMS/KG/DAY)

GROUP 4 300 MG/M3

ANIMAL#	DAY OF LACTATION
	1 - 4
4501	113
4502	123
4505	120
4506	117
4507	80
4508	169
4511	148
4512	123
MEAN	124
S.D.	26.0
N	8

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APPENDIX N - MATING PERIOD

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

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

D=DIBESTRUS M=METESTRUS P=PROESTRUS E=ESTRUS S=SPERM C=COPULATORY PLUG, --NO EVIDENCE OF COPULATION

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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

FEMALE#	DAY OF ESTROUS EVALUATION													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2501	D	C												
2502	D	D	C											
2503	E	C												
2504	D	D	D	C										
2505	M	D	D	C										
2506	D	D	C											
2507	D	D	C											
2508	C													
2509	D	S												
2510	D	D	C											
2511	D	P	C											
2512	D	C												

D=DIESTRUS M=METESTRUS P=PROESTRUS E=ESTRUS S=SPERM C=COPULATORY PLUG, -=NO EVIDENCE OF COPULATION

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APPENDIX N - MATING PERIOD

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

ESTROUS STAGES

GROUP 3 100 MG/M3

FEMALE#	DAY OF ESTROUS EVALUATION													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
3501	D	D	D	C										
3502	D	D	C											
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	D	D	S										
3508	D	C												
3509	C													
3510	D	P	C											
3511	M	D	D	C										
3512	D	C												

D=DIESTRUS M=METESTRUS P=PROESTRUS E=ESTRUS S=SPERM C=COPULATORY PLUG, -=NO EVIDENCE OF COPULATION

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APPENDIX N - MATING PERIOD

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

ESTROUS STAGES

GROUP 4 300 MG/M3

FEMALE#	DAY OF ESTROUS EVALUATION													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
4501	E	E	M	D	D	P	C							
4502	D	D	C											
4503	C													
4504	E	S												
4505	D	S												
4506	D	S												
4507	C													
4508	D	D	C											
4509	D	D	D	D	D	D	D	D	D	D	D	D	D	D
4510	D	C												
4511	D	P	C											
4512	P	S												

D=DIESTRUS M=METESTRUS P=PROESTRUS E=ESTRUS S=SPERM C=COPULATORY PLUG, --NO EVIDENCE OF COPULATION

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APPENDIX O

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

INDIVIDUAL MATING ASSIGNMENTS

GROUP 1 0 MG/M3

Female 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	+	P	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	+	P	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

+ = Sperm/Plug Positive - = Sperm/Plug Negative N = Not Mated

NP=NOT PREGNANT P=PREGNANT

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APPENDIX O

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

INDIVIDUAL MATING ASSIGNMENTS

GROUP 2 30 MG/M3

Female 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	+	P	8-JUN-04	11-JUN-04	4-JUL-04
2512	2012	+	P	8-JUN-04	10-JUN-04	2-JUL-04

+ = Sperm/Plug Positive - = Sperm/Plug Negative N = Not Mated

P=PREGNANT

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APPENDIX O

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

INDIVIDUAL MATING ASSIGNMENTS

GROUP 3 100 MG/M3

Female 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		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

+ = Sperm/Plug Positive - = Sperm/Plug Negative N = Not Mated

P=PREGNANT

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APPENDIX O

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

INDIVIDUAL MATING ASSIGNMENTS

GROUP 4 300 MG/M3

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	
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-JUL-04
4507	4007	+	P	8-JUN-04	9-JUN-04	1-JUL-04
4508	4008	+	P	8-JUN-04	11-JUN-04	3-JUL-04
4509	4009	-	NP	8-JUN-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

+ = Sperm/Plug Positive - = Sperm/Plug Negative N = Not Mated

NP=NOT PREGNANT P=PREGNANT

Huntingdon Life Sciences 03-4246

APPENDIX P

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

INDIVIDUAL DELIVERY AND LITTER DATA

GROUP 1 0 MG/M3

FEMALE#	LITTER DELIVERED			NUMBER OF LIVE PUPS				DURATION OF GESTATION (DAYS)	TOTAL CORPORA LUTEA	TOTAL IMPLAN- TATIONS	PRE- IMPLAN- TATION LOSS	POST- IMPLAN- TATION LOSS		
	LIVE N	DEAD N	TOTAL N	0		1							4	
				M	F	M	F						M	F
1501	13	0	13	9	4	9	4	9	4	22	14	14	0	1
1502	13	0	13	6	7	6	7	6	7	21	14	14	0	1
1503	11	0	11	5	6	5	6	5	6	22	12	12	0	1
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	4	9	4	9	21	17	13	4	0
1507	14	0	14	13	1	13	1	13	1	22	17	16	1	2
1508	15	0	15	10	5	10	5	10	5	22	19	15	4	0
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	0	13	7	6	7	6	7	6	23	14	14	0	1
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	11

NP=Not Pregnant

Huntingdon Life Sciences 03-4246

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

FEMALE#	LITTER DELIVERED			NUMBER OF LIVE PUPS						DURATION OF GESTATION (DAYS)	TOTAL CORPORA LUTEA N	TOTAL IMPLAN- TATIONS N	PRE- IMPLAN- TATION LOSS N	POST- IMPLAN- TATION LOSS N
	LIVE N	DEAD N	TOTAL N	0		1		4						
				M	F	M	F	M	F					
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	0	1
3504	11	3	14	6	5	6	5	6	5	22	15	14	1	0
3505	12	0	12	9	3	9	3	9	3	22	14	14	0	2
3506	12	0	12	5	7	5	7	5	7	22	14	14	0	2
3507	14	0	14	8	6	8	6	8	6	22	15	14	1	0
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	0
3511	10	1	11	6	4	6	4	6	4	22	13	13	0	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	4.8	6.3	4.8	6.3	4.7	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

FEMALE#	LITTER DELIVERED			NUMBER OF LIVE PUPS				DURATION OF GESTATION (DAYS)	TOTAL CORPORA LUTEA	TOTAL IMPLAN- TATIONS	PRE- IMPLAN- TATION LOSS	POST- IMPLAN- TATION LOSS		
	LIVE	DEAD	TOTAL	0		1							4	
	N	N	N	M	F	M	F						M	F
4501	11	1	12	6	5	6	5	6	4	22	15	14	1	2
4502	17	0	17	9	8	9	8	9	8	21	17	17	0	0
4503 NP										-	0	0	-	-
4504 NVF										-	2	2	0	2
4505	10	1	11	5	5	5	5	5	5	22	14	11	3	0
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	14	7	6	7	6	7	6	22	16	15	1	1
4509 NP										-	0	0	-	-
4510 NP										-	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	5.6	6.6	5.6	6.6	5.5	21.9	15.1	14.0	1.1	1.1
S.D.	4.1	0.7	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

Huntingdon Life Sciences 03-4246

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

FEMALE#	PUP #																						
	1	2	3	4	5	6	7	8	9	10	11	12	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	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	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4			
1506	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 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	MK 4	MK 4	MK 4	MK 4	MK 4	MK 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	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
1509	MS	MK 4	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	FK 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	MK 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	FK 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

Huntingdon Life Sciences 03-4246

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

FEMALE#	PUP #																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2501	MS	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2502	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2503	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2504	FD 0	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	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2505	MK 4	MK 4	MM 3	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2506	MK 4	MK 4	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	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2507	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2508	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	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2509	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	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2510	MS	MS	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2511	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	
2512	MS	FS	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 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 D-DIED M-MISSING K-SCHEDULED SACRIFICE

Huntingdon Life Sciences 03-4246

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

FEMALE#	PUP #																						
	1	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	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4
3503	MK 4	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	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4
3504	MS	FS	FS	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4
3505	MK 4	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									
3506	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4									
3507	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	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4
3508	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4
3509	FS	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4
3510	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4															
3511	FS	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4
3512	MK 4	MK 4	FK 4	FK 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 D-DIED K-SCHEDULED SACRIFICE

Huntingdon Life Sciences 03-4246

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

FEMALE#	PUP #																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
4501	FS	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FD 2	FK 4	FK 4	FK 4										
4502	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	FK 4	FK 4	FK 4	FK 4						
4505	FS	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4												
4506	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4											
4507	MK 4	MK 4	FK 4	FK 4																			
4508	FS	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	MK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4									
4511	FS	FS	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	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4	FK 4
4512	MK 4	MK 4	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	FK 4	FK 4	FK 4	FK 4	FK 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 D-DIED K-SCHEDULED SACRIFICE

	Individual Pup Clinical Observations During Lactation Preface	Appendix R
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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.

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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	DAY OF					
			0	1	2	3	4	
1501	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		
1502	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		
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		

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

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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	DAY OF LACTATION					
			0	1	2	3	4	
1503	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	
1505	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	
	PUP# 14 WITHIN NORMAL LIMITS			P			P	
1506	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	

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

Huntingdon Life Sciences 03-4246

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
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 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
	PUP# 14 WITHIN NORMAL LIMITS		P			P
1508	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
	PUP# 14 WITHIN NORMAL LIMITS		P			P
	PUP# 15 WITHIN NORMAL LIMITS		P			P

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

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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	DAY OF LACTATION			
			0	1	2	3 4
1509	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
1510	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
1511	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

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

Huntingdon Life Sciences 03-4246

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	DAY OF LACTATION			
			0	1	2	3 4
1511	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
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

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

Huntingdon Life Sciences 03-4246

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#	OBSERVATIONS	DAY OF LACTATION				
		0	1	2	3	4
2501	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
	PUP# 14 WITHIN NORMAL LIMITS	P				P
2502	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
2503	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

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

Huntingdon Life Sciences 03-4246

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#	OBSERVATIONS	DAY OF LACTATION	DAY OF LACTATION			
			0	1	2	3 4
2503	PUP# 7	WITHIN NORMAL LIMITS				
	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
2504	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
	PUP# 14	WITHIN NORMAL LIMITS	P			P
2505	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

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

Huntingdon Life Sciences 03-4246

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#	OBSERVATIONS	DAY OF LACTATION				
		0	1	2	3	4
2505	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
2506	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
	PUP# 14 WITHIN NORMAL LIMITS	P				P
2507	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

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

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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#	OBSERVATIONS	DAY OF LACTATION				
		0	1	2	3	4
2508	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
2509	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
	PUP# 14	WITHIN	NORMAL	LIMITS	P	P
2510	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

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

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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#	OBSERVATIONS	DAY OF 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		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
	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

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

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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#	OBSERVATIONS	DAY OF						
		LACTATION	0	1	2	3	4	
2512	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	

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

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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#	OBSERVATIONS	DAY OF LACTATION					
			0	1	2	3	4
3501	PUP# 1	WITHIN NORMAL LIMITS	P				P
	PUP# 2	WITHIN NORMAL LIMITS	P				P
	PUP# 3	WITHIN NORMAL 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	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
	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	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

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

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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#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3 4			
3503	PUP# 14 WITHIN NORMAL LIMITS		P		1	
3504	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
	PUP# 14 WITHIN NORMAL LIMITS		P			P
3505	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
3506	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

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

¹Died on Lactation Day 3.

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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#	OBSERVATIONS	DAY OF LACTATION				
		0	1	2	3	4
3506	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
3507	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
	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

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

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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#	OBSERVATIONS	DAY OF LACTATION	0 1 2 3 4			
3508	PUP# 12	WITHIN NORMAL LIMITS	P			P
	PUP# 13	WITHIN NORMAL LIMITS	P			P
	PUP# 14	WITHIN NORMAL LIMITS	P			P
3509	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
	PUP# 14	WITHIN NORMAL LIMITS	P			P
	PUP# 15	WITHIN NORMAL LIMITS	P			P
3510	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
3511	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

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

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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#	OBSERVATIONS	DAY OF LACTATION						
			0	1	2	3	4	
3511	PUP# 7	WITHIN NORMAL LIMITS						
	PUP# 8	WITHIN NORMAL LIMITS						
	PUP# 9	WITHIN NORMAL LIMITS						
	PUP# 10	WITHIN NORMAL LIMITS						
	PUP# 11	WITHIN NORMAL LIMITS						
3512	PUP# 1	WITHIN NORMAL LIMITS						
	PUP# 2	WITHIN NORMAL LIMITS						
	PUP# 3	WITHIN NORMAL LIMITS						
	PUP# 4	WITHIN NORMAL LIMITS						
	PUP# 5	WITHIN NORMAL LIMITS						
	PUP# 6	WITHIN NORMAL LIMITS						

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

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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 WITHIN NORMAL LIMITS	P				1
	PUP# 10 WITHIN NORMAL LIMITS	P				P
	PUP# 11 WITHIN NORMAL LIMITS	P				P
	PUP# 12 WITHIN NORMAL LIMITS	P				P
4502	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
	PUP# 14 WITHIN NORMAL LIMITS	P				P
	PUP# 15 WITHIN NORMAL LIMITS	P				P
	PUP# 16 WITHIN NORMAL LIMITS	P				P
	PUP# 17 WITHIN NORMAL LIMITS	P				P

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

¹Died on Lactation Day 2.

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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			
4505	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
4506	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
4507	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
4508	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

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

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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	DAY OF LACTATION			
			0	1	2	3 4
4508	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
4511	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
	PUP# 14	WITHIN NORMAL LIMITS	P			P
	PUP# 15	WITHIN NORMAL LIMITS	P			P
	PUP# 16	WITHIN NORMAL LIMITS	P			P
	PUP# 17	WITHIN NORMAL LIMITS	P			P
	PUP# 18	WITHIN NORMAL LIMITS	P			P
4512	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

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

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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
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
PUP# 15	WITHIN NORMAL LIMITS			P		P

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

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APPENDIX S

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

GROUP 1	0 MG/M3	INDIVIDUAL PUP BODY WEIGHTS (GRAMS)																	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
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

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APPENDIX S

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

GROUP 2	30 MG/M3	INDIVIDUAL PUP BODY WEIGHTS (GRAMS)																	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
		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

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APPENDIX S

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

GROUP 3	100 MG/M3	INDIVIDUAL PUP BODY WEIGHTS (GRAMS)														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	7.6					
3504	7.4	S	S	S	7.5	8.2	7.7	8.2	8.0	7.4	6.7	6.9	6.5	7.3	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	7.1	6.6					
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											
3511	7.9	S	8.0	8.0	8.4	8.3	7.9	8.2	8.0	8.2	7.2	7.1								
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

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APPENDIX S

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

GROUP 4	300 MG/M3	INDIVIDUAL PUP BODY WEIGHTS (GRAMS)																	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
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	5.9	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					
4503	NP																						
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	7.1	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								
4509	NP																						
4510	NP																						
4511	6.6	S	S	6.8	6.0	7.4	7.2	7.4	6.3	6.6	6.5	7.3	6.8	6.6	5.6	6.6	6.7	6.3	5.6				
4512	6.6	6.7	6.6	7.2	7.2	5.6	7.0	7.0	6.5	6.4	7.1	5.9	6.6	6.8	6.4	5.7							
MEAN	7.0																						
S.D.	0.57																						
N	8																						

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

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APPENDIX S

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

GROUP 1	0 MG/M3	INDIVIDUAL PUP BODY WEIGHTS (GRAMS)														LACTATION DAY 4					
		FEMALE#	MEAN	PUP#											12	13	14	15	16	17	18
		1	2	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

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APPENDIX S

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

GROUP 2		30 MG/M3		INDIVIDUAL PUP BODY WEIGHTS (GRAMS)														LACTATION DAY 4				
FEMALE#	MEAN	PUP#																				
		1	2	3	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	11.6	10.7	10.7	11.1	10.5	11.5	10.6									
2503	11.5	11.9	12.2	11.8	11.8	11.7	11.0	11.3	10.6	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	10.9	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	10.6							
2506	12.1	12.4	12.7	12.4	12.8	12.4	12.3	12.9	8.6	11.8	12.4	11.4	12.3	12.6	12.2							
2507	12.0	11.7	13.0	11.0	12.7	12.3	11.4	11.7	11.6	12.3	12.2	11.9										
2508	11.6	12.3	12.0	11.4	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	12.3	13.3	11.9	13.0	12.5	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

Huntingdon Life Sciences 03-4246

APPENDIX S

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

GROUP 3	100 MG/M3	INDIVIDUAL PUP BODY WEIGHTS (GRAMS)																	LACTATION 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	S	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

Huntingdon Life Sciences 03-4246

APPENDIX S

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

GROUP 4	300 MG/M3	INDIVIDUAL PUP BODY WEIGHTS (GRAMS)																	LACTATION DAY 4	
		FEMALE#	MEAN	PUP#																
		1	2	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	11.6	11.8	11.7	11.7	11.8	D	11.1	10.6	11.5							
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	S	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																			
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	9.3	9.7	8.6	10.3	9.8	9.0	8.5	
4512	9.8	10.0	9.8	10.6	10.8	8.9	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																			

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

	Individual Organ Weights Preface	Appendix T
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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/m ³
Group 2	-	30 mg/m ³
Group 3	-	100 mg/m ³
Group 4	-	300 mg/m ³

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.

Appendix T

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Adrenal Glands	Brain	Epididymis Left	Epididymis Right	Lungs	Pituitary gland

				M a l e	A n i m a l s			
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	0.0137
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	0.0118
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	0.0124
1011/M	1/1	382.3	0.0569	1.9728	0.3368	0.6057	1.7704	0.0129
1012/M	1/1	335.1	0.0739	1.8978	0.5244	0.5274	1.7038	0.0123
Number of observ. :		(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 observ. :		(12)	(12)	(12)	(12)	(12)	(12)	(12)
3001/M	3/1	350.5	0.0426	1.9825	0.5492	0.5045	2.4645	0.0085
3002/M	3/1	429.1	0.0876	2.1395	0.5818	0.5689	2.4892	0.0144
3003/M	3/1	343.8	0.0427	2.1122	0.5370	0.5813	2.1257	0.0120
3004/M	3/1	445.8	0.0665	1.9954	0.5878	0.6327	2.5409	0.0145
3005/M	3/1	387.7	0.0595	1.9876	0.5449	0.5473	2.4374	0.0123
3006/M	3/1	356.0	0.0484	2.0993	0.5831	0.5752	2.0342	0.0116
3007/M	3/1	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	369.6	0.0513	1.9197	0.5043	0.4976	2.2929	0.0095
3010/M	3/1	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 observ. :		(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	0.0140
4003/M	4/1	398.6	0.0619	1.9776	0.5379	0.5777	2.5082	0.0114

Appendix T

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Prostate	Semis w/Coag Gl	Testis Left	Testis Right	Thymus

				M a l e	A n i m a l s		
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	0.5289
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 observ. :		(12)	(12)	(12)	(12)	(12)	(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 observ. :		(12)	(12)	(12)	(12)	(12)	(12)
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 observ. :		(12)	(12)	(12)	(12)	(12)	(12)
4001/M	4/1	423.6	0.8667	1.8012	1.5477	1.5236	0.5900
4002/M	4/1	424.8	0.8421	1.6492	1.7426	1.7535	0.5878
4003/M	4/1	398.6	0.9707	1.2304	1.7389	1.7482	0.4329

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

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

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Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Adrenal Glands	Brain	Lungs	Ovary Left	Ovary Right	Pituitary gland
				F e m a l e		A n i m a l s		
1501/F	1/1	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	0.0097
1506/F	1/1	287.4	0.0813	1.8357	1.4700	0.0667	0.0701	0.0152
1507/F	1/1	319.5	0.1020	1.9177	1.4117	0.1002	0.0642	0.0165
1508/F	1/1	312.6	0.0906	2.0339	1.8038	0.0770	0.0704	0.0219
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	0.0191
1511/F	1/1	299.8	0.0897	2.0144	1.6354	0.0723	0.0707	0.0165
1512/F	1/1	308.6	0.0923	1.9461	1.6421	0.0732	0.0623	0.0173
M e a n:		300.6	0.0916	1.9660	1.5069	0.0742	0.0682	0.0163
Standard deviation:		12.6	0.0121	0.1018	0.1875	0.0122	0.0069	0.0032
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	0.0157
2502/F	2/1	305.3	0.0870	1.9358	1.4617	0.0790	0.0789	0.0148
2503/F	2/1	309.1	0.0899	1.9090	1.5889	0.0941	0.0823	0.0203
2504/F	2/1	328.9	0.0885	1.9948	1.7263	0.0798	0.0738	0.0163
2505/F	2/1	329.8	0.0747	1.8631	1.6790	0.0810	0.0724	0.0181
2506/F	2/1	345.4	0.0843	1.9667	1.6469	0.0759	0.1015	0.0100
2507/F	2/1	307.8	0.0816	1.8118	1.7385	0.0886	0.0632	0.0217
2508/F	2/1	314.6	0.0951	2.0031	1.5835	0.0595	0.0641	0.0155
2509/F	2/1	287.9	0.0772	1.9411	1.5952	0.0617	0.0699	0.0160
2510/F	2/1	316.0	0.0893	1.9005	1.7155	0.0818	0.0718	0.0180
2511/F	2/1	327.1	0.0860	1.9893	1.8429	0.0672	0.0766	0.0142
2512/F	2/1	335.8	0.0843	1.9819	1.7788	0.0738	0.0825	0.0215
M e a n:		318.9	0.0848	1.9353	1.6648	0.0750	0.0756	0.0168
Standard deviation:		15.6	0.0058	0.0578	0.1033	0.0114	0.0102	0.0033
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	0.0187
3503/F	3/1	329.3	0.0926	2.0074	2.2934	0.0917	0.0872	0.0257
3504/F	3/1	306.7	0.0918	1.8347	1.8118	0.0791	0.0558	0.0187
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	0.0774	0.0730	0.0177
3507/F	3/1	286.5	0.0801	1.9048	2.1311	0.0637	0.0715	0.0211
3508/F	3/1	301.2	0.0720	1.8573	1.5744	0.0728	0.0653	0.0128
3509/F	3/1	308.5	0.0974	1.9540	1.9898	0.0860	0.0738	0.0214
3510/F	3/1	304.7	0.0792	2.0432	2.3182	0.0645	0.0766	0.0201
3511/F	3/1	346.2	0.0806	2.0373	2.1006	0.0840	0.0691	0.0089
3512/F	3/1	295.3	0.0654	1.9377	1.9683	0.0547	0.0768	0.0160
M e a n:		309.5	0.0841	1.9587	1.9869	0.0732	0.0737	0.0175
Standard deviation:		23.0	0.0108	0.0676	0.2050	0.0109	0.0100	0.0045

Appendix T (pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Thymus	Uterus w/vagina	
					F e m a l e A n i m a l s
1501/F	1/1	306.7	0.3009	1.0678	
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	0.2185	0.9918	
1511/F	1/1	299.8	0.2322	1.2256	
1512/F	1/1	308.6	0.3482	0.9358	
M e a n:		300.6	0.2921	0.9995	
Standard deviation:		12.6	0.0677	0.1196	
Number of observ. :		(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 e a n:		318.9	0.3138	0.9571	
Standard deviation:		15.6	0.0957	0.1038	
Number of observ. :		(12)	(12)	(12)	
3501/F	3/1	260.6	0.3154	0.8133	
3502/F	3/1	328.6	0.2683	1.0133	
3503/F	3/1	329.3	0.2135	1.0422	
3504/F	3/1	306.7	0.4179	0.8565	
3505/F	3/1	314.7	0.2788	0.9861	
3506/F	3/1	331.2	0.4796	0.9729	
3507/F	3/1	286.5	0.2291	1.1104	
3508/F	3/1	301.2	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	
M e a n:		309.5	0.3241	0.9757	
Standard deviation:		23.0	0.0851	0.1618	

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Appendix T (pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Uterus w/vagina		
			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	
M e a n:		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-pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Thymus	Uterus w/vagina	F e m a l e	A n i m a l s
1504/F	1/1	289.6	0.3777	0.8195		
	Mean:	289.6	0.3777	0.8195		
	Standard deviation:	0.0	0.0000	0.0000		
	Number of observ. :	(1)	(1)	(1)		
4503/F	4/1	306.1	0.5539	0.6822		
4504/F	4/1	269.4	0.4796	1.0413		
4509/F	4/1	296.8	0.3747	1.0459		
4510/F	4/1	270.7	0.4840	1.4326		
	Mean:	285.8	0.4731	1.0505		
	Standard deviation:	18.5	0.0739	0.3065		
	Number of observ. :	(4)	(4)	(4)		

Appendix T

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Adrenal Glands	Brain	Epididymis Left	Epididymis Right	Lungs	Pituitary gland

				M a l e	A n i m a l s			
1001/M	1/1	382.3	0.0183	0.5056	0.1422	0.1345	0.4891	0.0030
1002/M	1/1	383.2	0.0182	0.5557	0.1464	0.1556	0.4746	0.0025
1003/M	1/1	379.3	0.0195	0.5477	0.1607	0.1536	0.4211	0.0036
1004/M	1/1	408.1	0.0138	0.4937	0.1456	0.1277	0.4674	0.0026
1005/M	1/1	406.0	0.0165	0.4917	0.1337	0.1399	0.5410	0.0029
1006/M	1/1	395.5	0.0179	0.5120	0.1410	0.1445	0.5337	0.0032
1007/M	1/1	348.2	0.0177	0.5783	0.1635	0.1524	0.5038	0.0034
1008/M	1/1	356.4	0.0161	0.5130	0.1610	0.1810	0.4620	0.0020
1009/M	1/1	398.2	0.0151	0.5238	0.1381	0.1381	0.4945	0.0029
1010/M	1/1	398.8	0.0130	0.5228	0.1406	0.1475	0.5994	0.0031
1011/M	1/1	382.3	0.0149	0.5160	0.0881	0.1584	0.4631	0.0034
1012/M	1/1	335.1	0.0221	0.5663	0.1565	0.1574	0.5084	0.0037
Number of observ. :		(12)	(12)	(12)	(12)	(12)	(12)	(12)
2001/M	2/1	378.4	0.0163	0.5209	0.1535	0.1649	0.5240	0.0031
2002/M	2/1	364.1	0.0160	0.5483	0.1612	0.1700	0.5671	0.0041
2003/M	2/1	378.4	0.0179	0.5502	0.1475	0.1514	0.4897	0.0024
2004/M	2/1	442.4	0.0178	0.4572	0.1392	0.1420	0.5035	0.0030
2005/M	2/1	325.5	0.0225	0.6057	0.1705	0.1674	0.5846	0.0033
2006/M	2/1	376.9	0.0140	0.5296	0.1568	0.1628	0.5519	0.0035
2007/M	2/1	388.7	0.0148	0.5217	0.1307	0.1395	0.4884	0.0034
2008/M	2/1	367.8	0.0181	0.5275	0.1604	0.1651	0.5302	0.0023
2009/M	2/1	415.1	0.0146	0.4717	0.1391	0.1393	0.5687	0.0031
2010/M	2/1	373.1	0.0150	0.5161	0.1483	0.1689	0.6055	0.0025
2011/M	2/1	398.3	0.0147	0.5082	0.1469	0.1464	0.4972	0.0033
2012/M	2/1	366.0	0.0161	0.5360	0.1540	0.1552	0.5082	0.0025
Number of observ. :		(12)	(12)	(12)	(12)	(12)	(12)	(12)
3001/M	3/1	350.5	0.0122	0.5656	0.1567	0.1439	0.7031	0.0024
3002/M	3/1	429.1	0.0204	0.4986	0.1356	0.1326	0.5801	0.0034
3003/M	3/1	343.8	0.0124	0.6144	0.1562	0.1691	0.6183	0.0035
3004/M	3/1	445.8	0.0149	0.4476	0.1319	0.1419	0.5700	0.0033
3005/M	3/1	387.7	0.0153	0.5127	0.1405	0.1412	0.6287	0.0032
3006/M	3/1	356.0	0.0136	0.5897	0.1638	0.1616	0.5714	0.0033
3007/M	3/1	377.2	0.0155	0.5236	0.1666	0.1702	0.4605	0.0027
3008/M	3/1	374.4	0.0164	0.5257	0.1452	0.1561	0.5622	0.0029
3009/M	3/1	369.6	0.0139	0.5194	0.1364	0.1346	0.6204	0.0026
3010/M	3/1	397.9	0.0147	0.5397	0.1496	0.1501	0.6161	0.0031
3011/M	3/1	367.5	0.0167	0.5301	0.1703	0.1669	0.5328	0.0035
3012/M	3/1	361.1	0.0222	0.5387	0.1715	0.1867	0.6372	0.0034
Number of observ. :		(12)	(12)	(12)	(12)	(12)	(12)	(12)
4001/M	4/1	423.6	0.0147	0.4713	0.1213	0.1275	0.7048	0.0029
4002/M	4/1	424.8	0.0149	0.5130	0.1371	0.1356	0.6029	0.0033
4003/M	4/1	398.6	0.0155	0.4961	0.1349	0.1449	0.6293	0.0029

Appendix T

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Prostate	Semis w/Coag Gl	Testis Left	Testis Right	Thymus

M a l e A n i m a l s							
1001/M	1/1	382.3	0.2335	0.4201	0.3884	0.3947	0.1066
1002/M	1/1	383.2	0.1837	0.3528	0.4092	0.4227	0.1311
1003/M	1/1	379.3	0.2571	0.3262	0.4261	0.4218	0.1140
1004/M	1/1	408.1	0.1439	0.3653	0.3864	0.3886	0.1642
1005/M	1/1	406.0	0.2554	0.3965	0.4261	0.4194	0.1303
1006/M	1/1	395.5	0.2250	0.4748	0.3938	0.4041	0.1616
1007/M	1/1	348.2	0.2719	0.4503	0.4019	0.4165	0.1482
1008/M	1/1	356.4	0.1671	0.4181	0.4523	0.4514	0.1431
1009/M	1/1	398.2	0.2007	0.3854	0.4170	0.4226	0.1331
1010/M	1/1	398.8	0.1661	0.4360	0.4323	0.4217	0.1357
1011/M	1/1	382.3	0.3215	0.3197	0.2014	0.4174	0.1236
1012/M	1/1	335.1	0.1930	0.3481	0.5011	0.4965	0.1688
Number of observ. :		(12)	(12)	(12)	(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	0.4680	0.4786	0.0867
2003/M	2/1	378.4	0.2815	0.3231	0.4050	0.4260	0.0917
2004/M	2/1	442.4	0.2569	0.3404	0.3886	0.3869	0.1583
2005/M	2/1	325.5	0.3444	0.5296	0.4745	0.4813	0.1684
2006/M	2/1	376.9	0.1829	0.4765	0.4512	0.4491	0.0873
2007/M	2/1	388.7	0.2944	0.2784	0.3997	0.4027	0.0991
2008/M	2/1	367.8	0.1662	0.4473	0.4872	0.4954	0.1592
2009/M	2/1	415.1	0.2053	0.3411	0.4089	0.4012	0.1000
2010/M	2/1	373.1	0.1839	0.5037	0.4557	0.4642	0.1050
2011/M	2/1	398.3	0.2659	0.3467	0.3979	0.3860	0.0958
2012/M	2/1	366.0	0.2161	0.3988	0.4898	0.4594	0.1563
Number of observ. :		(12)	(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	429.1	0.2266	0.4085	0.3973	0.4065	0.1614
3003/M	3/1	343.8	0.1465	0.4200	0.4372	0.4622	0.1567
3004/M	3/1	445.8	0.1792	0.3525	0.3892	0.3865	0.1505
3005/M	3/1	387.7	0.2117	0.3537	0.3930	0.3960	0.1921
3006/M	3/1	356.0	0.2051	0.3492	0.4627	0.4576	0.1392
3007/M	3/1	377.2	0.2347	0.3040	0.4331	0.4368	0.1026
3008/M	3/1	374.4	0.2365	0.5278	0.4390	0.4413	0.1337
3009/M	3/1	369.6	0.2466	0.3358	0.4003	0.3954	0.1661
3010/M	3/1	397.9	0.1626	0.4027	0.4186	0.4334	0.1757
3011/M	3/1	367.5	0.2694	0.3348	0.4666	0.4708	0.1340
3012/M	3/1	361.1	0.2565	0.3712	0.4543	0.4602	0.1668
Number of observ. :		(12)	(12)	(12)	(12)	(12)	(12)
4001/M	4/1	423.6	0.2046	0.4252	0.3654	0.3597	0.1393
4002/M	4/1	424.8	0.1982	0.3882	0.4102	0.4128	0.1384
4003/M	4/1	398.6	0.2435	0.3087	0.4363	0.4386	0.1086

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Appendix T (pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Adrenal Glands	Brain	Lungs	Ovary Left	Ovary Right	Pituitary gland

F e m a l e A n i m a l 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
M e a n:		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
M e a n:		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	0.0042
3509/F	3/1	308.5	0.0316	0.6334	0.6450	0.0279	0.0239	0.0069
3510/F	3/1	304.7	0.0260	0.6706	0.7608	0.0212	0.0251	0.0066
3511/F	3/1	346.2	0.0233	0.5885	0.6068	0.0243	0.0200	0.0026
3512/F	3/1	295.3	0.0221	0.6562	0.6665	0.0185	0.0260	0.0054
M e a n:		309.5	0.0272	0.6361	0.6445	0.0237	0.0238	0.0057
Standard deviation:		23.0	0.0029	0.0520	0.0744	0.0033	0.0029	0.0014

Appendix T (pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Thymus	Uterus w/vagina	
					F e m a l e A n i m a l s
1501/F	1/1	306.7	0.0981	0.3482	
1502/F	1/1	277.8	0.1041	0.3096	
1503/F	1/1	302.4	0.0827	0.3661	
1505/F	1/1	304.4	0.1385	0.3732	
1506/F	1/1	287.4	0.0781	0.3370	
1507/F	1/1	319.5	0.1027	0.2704	
1508/F	1/1	312.6	0.0744	0.3010	
1509/F	1/1	284.0	0.1295	0.3156	
1510/F	1/1	303.5	0.0720	0.3268	
1511/F	1/1	299.8	0.0775	0.4088	
1512/F	1/1	308.6	0.1128	0.3032	
	M e a n:	300.6	0.0973	0.3327	
	Standard deviation:	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	
	M e a n:	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	0.1210	0.3121	
3502/F	3/1	328.6	0.0816	0.3084	
3503/F	3/1	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	
	M e a n:	309.5	0.1047	0.3150	
	Standard deviation:	23.0	0.0254	0.0445	

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Appendix T (pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Thymus	Uterus w/vagina
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
M e a n:		313.7	0.0894	0.3215
Standard deviation:		10.5	0.0194	0.0424
Number of observ. :		(8)	(8)	(8)

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Appendix T (non-pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Thymus	Uterus w/vagina	F e m a l e	A n i m a l s
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)		

Appendix T

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Adrenal Glands	Epididymis Left	Epididymis Right	Lungs	Pituitary gland	Prostate

M a l e A n i m a l s								
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
1005/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	1/1	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	46.7708
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 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 observ. :		(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

Appendix T

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Semis w/Coag Gl	Testis Left	Testis Right	Thymus

				M a l e	A n i m a l s	
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	4/1	423.6	90.2269	77.5284	76.3212	29.5547
4002/M	4/1	424.8	75.6757	79.9615	80.4616	26.9720
4003/M	4/1	398.6	62.2168	87.9298	88.4001	21.8902

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Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Semis w/Coag Gl	Testis Left	Testis Right	Thymus
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 observ. :		(12)	(12)	(12)	(12)	(12)

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Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Adrenal Glands	Brain	Lungs	Ovary Left	Ovary Right	Pituitary gland
F e m a l e A n i m a l 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	0.7421
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	1.0767
1509/F	1/1	284.0	4.3576	100.0000	78.0260	3.3586	3.4891	0.8484
1510/F	1/1	303.5	4.5219	100.0000	62.6306	3.3430	3.3529	0.9502
1511/F	1/1	299.8	4.4529	100.0000	81.1855	3.5892	3.5097	0.8191
1512/F	1/1	308.6	4.7428	100.0000	84.3790	3.7614	3.2013	0.8890
M e a n:		300.6	4.6521	100.0000	76.6167	3.7846	3.4625	0.8277
Standard deviation:		12.6	0.5202	0.0000	8.1885	0.6646	0.2352	0.1510
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	0.8152
2502/F	2/1	305.3	4.4943	100.0000	75.5088	4.0810	4.0758	0.7645
2503/F	2/1	309.1	4.7093	100.0000	83.2321	4.9293	4.3112	1.0634
2504/F	2/1	328.9	4.4365	100.0000	86.5400	4.0004	3.6996	0.8171
2505/F	2/1	329.8	4.0094	100.0000	90.1186	4.3476	3.8860	0.9715
2506/F	2/1	345.4	4.2864	100.0000	83.7393	3.8593	5.1609	0.5085
2507/F	2/1	307.8	4.5038	100.0000	95.9543	4.8902	3.4882	1.1977
2508/F	2/1	314.6	4.7476	100.0000	79.0525	2.9704	3.2000	0.7738
2509/F	2/1	287.9	3.9771	100.0000	82.1802	3.1786	3.6011	0.8243
2510/F	2/1	316.0	4.6988	100.0000	90.2657	4.3041	3.7780	0.9471
2511/F	2/1	327.1	4.3231	100.0000	92.6406	3.3781	3.8506	0.7138
2512/F	2/1	335.8	4.2535	100.0000	89.7523	3.7237	4.1627	1.0848
M e a n:		318.9	4.3832	100.0000	86.0918	3.8899	3.9062	0.8735
Standard deviation:		15.6	0.2617	0.0000	5.8919	0.6685	0.4975	0.1884
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	0.7071
3502/F	3/1	328.6	4.8003	100.0000	99.7345	3.3858	4.4531	0.9550
3503/F	3/1	329.3	4.6129	100.0000	114.2473	4.5681	4.3439	1.2803
3504/F	3/1	306.7	5.0035	100.0000	98.7518	4.3113	3.0414	1.0192
3505/F	3/1	314.7	4.7736	100.0000	97.2056	3.3277	4.4352	0.7640
3506/F	3/1	331.2	4.6265	100.0000	95.9594	3.8754	3.6551	0.8862
3507/F	3/1	286.5	4.2052	100.0000	111.8805	3.3442	3.7537	1.1077
3508/F	3/1	301.2	3.8766	100.0000	84.7682	3.9197	3.5159	0.6892
3509/F	3/1	308.5	4.9846	100.0000	101.8321	4.4012	3.7769	1.0952
3510/F	3/1	304.7	3.8763	100.0000	113.4593	3.1568	3.7490	0.9838
3511/F	3/1	346.2	3.9562	100.0000	103.1071	4.1231	3.3917	0.4369
3512/F	3/1	295.3	3.3751	100.0000	101.5792	2.8229	3.9635	0.8257
M e a n:		309.5	4.2977	100.0000	101.3319	3.7392	3.7608	0.8958
Standard deviation:		23.0	0.5764	0.0000	8.6343	0.5470	0.4810	0.2277

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Appendix T (pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Thymus	Uterus w/vagina	
					F e m a l e A n i m a l s
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	
M e a n:		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	
M e a n:		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	
M e a n:		309.5	16.5627	49.8667	
Standard deviation:		23.0	4.3546	8.3380	

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Appendix T (pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Thymus	Uterus w/vagina
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
M e a n:		313.7	14.7045	52.8339
Standard deviation:		10.5	3.3928	7.8911
Number of observ. :		(8)	(8)	(8)

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Appendix T (non-pregnant animals)

Animal No/sex	Group/ Subgroup	Terminal Body wt. (g)	Thymus	Uterus w/vagina	F e m a l e A n i m a l s
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)	

	Individual Animal Gross and Microscopic Observations Preface	Appendix U
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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 Diverticulum and Thyroid Cartilage
V-SM-G	=	Ventral Seromucinous Gland

Corresponding exposure levels for each group were as follows:

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

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.

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

Tissue Gross Observations/Comments Microscopic Observations/Comments

Seminal vesicles Testes Trachea

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 1003
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 1

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, Multifocal, Slight.
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Focal, Moderate.
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, 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.	PALATE: ECTOPIC SEBACEOUS GLAND, Present.

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
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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
Trachea				

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 1004
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 1

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-GOBBLET 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

 STATUS: Final phase sacrifice SEX: Male ANIMAL: 1004
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

 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

Mediastinal LN No gross observations on tissue.

PARACORTICAL AREA: INCREASED
 [T-LYMPHOCYTE] SIZE CELLULARITY, Minimal.

 PROMINENT HISTIOCYTES, Minimal.

 FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS,
 Slight.

 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, Multifocal,
 Minimal.

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,
 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

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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 1006
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 1

Mediastinal LN	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Minimal. PROMINENT PLASMA CELLS, Slight. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.
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. GLANDULAR DILATATION, Minimal.
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-GOBBLET 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:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Mediastinal LN	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.
Larynx: V-DVTC	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. GLANDULAR DILATATION, 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-GOBBLET 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, Multifocal, Slight.

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

Tissue	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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 1009
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 1

Mediastinal LN	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal.
Lungs	Discolored, Right diaphragmatic lobe, Red, Focus, 0.2 - 0.5 cm, Slight	Examined; 1 correlation found: 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: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Mediastinal LN	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. PROMINENT PLASMA CELLS, Slight. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.
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: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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, 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: 1011  
PHASE DAY OF DEATH: 31                 PHASE: Dosing phase                     GROUP: 1  
-----  
Tissue      Gross Observations/Comments      Microscopic Observations/Comments  
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Testes . . . . . Small, Left, Moderate      Examined; 1 correlation found:  
                                         GERM CELL LOSS/DEPLETION, UNILATERAL,  
                                         Marked.
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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 3 Nose/Turb Sec 4 Prostate Seminal vesicles Trachea

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 1012
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 1

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-GOBBLET 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: 1012
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 1

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

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

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:
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: 2002
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2

Tissue	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, 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. 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 AND WITHOUT LYMPHOID AGGREGATES, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET CELL HYPERTROPHY/HYPERPLASIA, 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: Male ANIMAL: 2002
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 2

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Nose/Turb Sec 1		NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITH OR 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, Slight.
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal.
Trachea	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Minimal. 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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 2003
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 2

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, Slight	Examined; 2 correlations found: BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Slight. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Minimal. 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, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	Tissue is missing. - NO SLIDE.

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: 2004
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, 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:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 2005
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 2

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, Slight.
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. SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION, Multifocal, Minimal.
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.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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: 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.

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

Tissue	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, Slight. PROMINENT PLASMA CELLS, 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. 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, 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, 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: 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

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

Tissue	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 PLASMA CELLS, Minimal. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.
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 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, Minimal.
Larynx: V-SM-G	No gross observations on tissue.	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

STATUS: Final phase sacrifice SEX: Male ANIMAL: 2007
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-GOBBLET CELL
HYPERTROPHY/HYPERPLASIA, 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 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

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 2008
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.

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

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	
Mediastinal LN	Discolored, Black, Slight	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. PROMINENT HISTIOCYTES, 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, 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, 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: 2009
PHASE DAY OF DEATH: 31                        PHASE: Dosing phase            GROUP: 2
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Tissue           Gross Observations/Comments                Microscopic Observations/Comments
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Nose/Turb Sec 2 . . . . No gross observations on tissue.
                                                NASAL MUCOSA (RESPIRATORY/VESTIBULAR
                                                JUNCTION): MIXED INFLAMMATORY CELLS WITH
                                                OR WITHOUT LYMPHOID AGGREGATES, Minimal.
    
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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 Trachea

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

Tissue	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, Minimal. 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, Slight.
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.

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
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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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Mediastinal LN	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Minimal.
Lungs	No gross observations on tissue.	PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Minimal. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, 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, 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-GOBBLET 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, 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: 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:
 Reproduction/Developmental Toxicity Screening
 Study in Rats via Nose-Only Inhalation Exposures
 Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

	STATUS: Final phase sacrifice PHASE DAY OF DEATH: 31	SEX: Male PHASE: Dosing phase
		ANIMAL: 2012 GROUP: 2

	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	ANIMAL: 2012
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 2

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
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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 1 Nose/Turb Sec 2 Nose/Turb Sec 3

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: 3001
PHASE DAY OF DEATH: 31                 PHASE: Dosing phase         GROUP: 3
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Tissue           Gross Observations/Comments      Microscopic Observations/Comments
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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-GOBBLET 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.

Thymus . . . . . Discolored, Red, Slight
                                     No micropathology observations on tissue.
  
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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 3 Trachea

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 3002
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 3

Mediastinal LN	Discolored, Black, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. PROMINENT HISTIOCYTES, 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, 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-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

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 3002
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 3

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 3003
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 3

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	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 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

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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
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Nose/Turb Sec 1 No gross observations on tissue.

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

Nose/Turb Sec 2 No gross observations on tissue.

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 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

STATUS: Final phase sacrifice
PHASE DAY OF DEATH: 31

SEX: Male
PHASE: Dosing phase

ANIMAL: 3004
GROUP: 3

Tissue	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, Moderate. PROMINENT HISTIOCYTES, Minimal.
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 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: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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: 31

SEX: Male
PHASE: Dosing phase

ANIMAL: 3004
GROUP: 3

Tissue 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,
Multifocal, Minimal.

Trachea No gross observations on tissue.

MONONUCLEAR CELL AGGREGATES, Focal,
Minimal.

MUCOSA: GLANDULAR DILATATION, Moderate.

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

Tissue	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, Moderate. PROMINENT HISTIOCYTES, Minimal. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Slight. PROMINENT PLASMA CELLS, Minimal. YELLOW-BROWN PIGMENT, 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.

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

Tissue	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 (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-GOBBLET 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, Focal, 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.
Trachea	No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION, 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: 3005
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:
 Reproduction/Developmental Toxicity Screening
 Study in Rats via Nose-Only Inhalation Exposures
 Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

	STATUS: Final phase sacrifice	SEX: Male
	PHASE DAY OF DEATH: 31	PHASE: Dosing phase
		ANIMAL: 3006
		GROUP: 3

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 TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, 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 AND WITHOUT LYMPHOID AGGREGATES, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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.

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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 3007
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 3

Mediastinal LN	Discolored, Red, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight. - MARGINAL TISSUE PRESENT/EVALUATED. RECUR, NO IMPROVEMENT.
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, 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, Multifocal, 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

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 3008
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 3

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 3010
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 3

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.
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, 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.
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Multifocal, 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: 3011
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 3

Tissue	Gross Observations/Comments	Microscopic 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	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, 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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 3012
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 3

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	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 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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4001
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

Epididymides	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, UNILATERAL, Focal, Minimal.
Kidneys	Dilated Pelvis, Right, Moderate	Examined; 1 correlation found: PELVIS: DILATED, UNILATERAL, Moderate. MONONUCLEAR CELL AGGREGATES, Focal, Minimal.
Mediastinal LN	Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Moderate. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Multifocal, Minimal. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. PROMINENT PLASMA CELLS, Minimal.
Lungs	Discolored, All lobes, Black, Severe	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Moderate.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4001
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

Lungs	No gross observations on tissue.	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, Slight.
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, BILATERAL, 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, Minimal.
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, UNILATERAL, 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: 4001
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4
Tissue	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:
Nose/Turb Sec 1 Prostate Seminal vesicles Testes

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4002
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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.
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, Slight.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4002
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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-GOBBLET 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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

	STATUS: Final phase sacrifice	SEX: Male
	PHASE DAY OF DEATH: 31	PHASE: Dosing phase
		ANIMAL: 4003
		GROUP: 4

Epididymides	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, UNILATERAL, Focal, Minimal.
Kidneys	Dilated Pelvis, Right, Moderate	Examined; 1 correlation found: PELVIS: DILATED, UNILATERAL, Marked.
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. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, 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, Moderate. BRONCHIOLO-ALVEOLAR EPITHELIAL HYPERPLASIA/HYPERTROPHY, Multifocal, Slight.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice		SEX: Male
PHASE DAY OF DEATH: 31		PHASE: Dosing phase
		ANIMAL: 4003
		GROUP: 4

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 METAPLASIA, Focal, 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-GOBBLET 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, 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, 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: 4003
	PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

Tissue	Gross Observations/Comments	Microscopic Observations/Comments	

Prostate	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Multifocal, Moderate.	
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

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: 4004
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Epididymides	No gross observations on tissue.	SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE, UNILATERAL, Focal, Minimal.
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 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, 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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4005
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4005
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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-GOBBLET 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.
Nose/Turb Sec 3	No gross observations on tissue.	NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal. PALATE: ECTOPIC SEBACEOUS GLAND, Present.
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, BILATERAL, Multifocal, Slight.
Trachea	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

STATUS: Final phase sacrifice		SEX: Male	ANIMAL: 4005
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:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Tissue	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.
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-SM-G	No gross observations on tissue.	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

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4006
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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			

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4007
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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-GOBBLET 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.	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 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

Tissue	Gross Observations/Comments	Microscopic 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
Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice SEX: Male ANIMAL: 4009
PHASE DAY OF DEATH: 31 PHASE: Dosing phase GROUP: 4

Tissue Gross Observations/Comments Microscopic 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.

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: 4009
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, 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-GOBBLET 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

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: 4010
PHASE DAY OF DEATH: 31                PHASE: Dosing phase                GROUP: 4
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Tissue                Gross Observations/Comments                Microscopic Observations/Comments
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Mediastinal LN . . . . . Discolored, Black, Severe                Examined; 1 correlation found:
                                BROWN-BLACK PIGMENT DEPOSITS,
                                Multifocal, Slight.
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PARACORTICAL AREA: INCREASED
[T-LYMPHOCYTE] SIZE CELLULARITY, Marked.

PROMINENT HISTIOCYTES, Multifocal, Minimal.

PROMINENT PLASMA CELLS, Minimal.
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Lungs . . . . . Discolored, All lobes, Black, Severe                Examined; 1 correlation found:
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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.
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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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4010
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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-GOBBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.
Nose/Turb Sec 2	No gross observations on tissue.	NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, Multifocal, 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.
Prostate	No gross observations on tissue.	ATROPHY, Slight.
Trachea	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

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4010
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
 Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4011
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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.

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

Tissue	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-GOBBLET 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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4012
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Male	ANIMAL: 4012
PHASE DAY OF DEATH: 31	PHASE: Dosing phase	GROUP: 4

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, Slight.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.
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.	NASAL MUCOSAL-SURFACE/LUMEN: BROWN-BLACK PIGMENT, Minimal.
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Multifocal, Minimal. NASAL PHARYNGEAL LUMEN: BROWN-BLACK PIGMENT, Multifocal, Minimal.
Trachea	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

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
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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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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: 1501
GROUP: 1

Tissue 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.

- 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 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,
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, UNILATERAL,
Slight.

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

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, 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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 1502
PHASE DAY OF DEATH: 41	PHASE: Dosing phase	GROUP: 1
Mediastinal LN	No gross observations on tissue.	PROMINENT HISTIOCYTES, Minimal. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal. - POOR SECTION QUALITY: RECUT, NO IMPROVEMENT.
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: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLLET 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, 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
PHASE DAY OF DEATH: 41

SEX: Female
PHASE: Dosing phase

ANIMAL: 1502
GROUP: 1

Tissue Gross Observations/Comments

Ovaries No gross observations on tissue.

MICROSCOPIC OBSERVATIONS/COMMENTS

PROMINENT ATRETIC FOLLICLES, BILATERAL,
Slight.

FOLLICULAR CYST(S), UNILATERAL, slight.

INTERSTITIAL HEMORRHAGE, BILATERAL,
Multifocal, Moderate.

- NORMAL MORPHOLOGY FOR VARIOUS PHASES OF
THE ESTRUS CYCLE.

Uterus No gross observations on tissue.

MICROSCOPIC OBSERVATIONS/COMMENTS

STROMAL HYALINIZATION, UNILATERAL, Focal,
Moderate.

HEMORRHAGE, UNILATERAL, Focal, Moderate.

- NORMAL MORPHOLOGY FOR VARIOUS PHASES OF
THE ESTRUS CYCLE.

Vagina No gross observations on tissue.

MICROSCOPIC OBSERVATIONS/COMMENTS

ACUTE INFLAMMATORY CELL INFILTRATE,
Multifocal, Slight.

LUMINAL INFLAMMATORY/CELLULAR DEBRIS,
Moderate.

- 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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 1503
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 1

Mediastinal LN	No gross observations on tissue.	Tissue is inadequate and unreadable. - INSUFFICIENT TISSUE PRESENT: RECUT, NO IMPROVEMENT.
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 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.
Nose/Turb Sec 2	No gross observations on tissue.	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, Present.
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, UNILATERAL, Minimal. - 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

Tissue	Gross Observations/Comments	Microscopic 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

Petroleum Coke:
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Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Mediastinal LN	No gross observations on tissue.	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.	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	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 DEBRIS, 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: 1504
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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 1505
PHASE DAY OF DEATH: 43	PHASE: Dosing phase	GROUP: 1

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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
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, Multifocal, 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. 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:
Lungs Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice		SEX: Female
PHASE DAY OF DEATH: 43		PHASE: Dosing phase
		ANIMAL: 1506
		GROUP: 1

Mediastinal LN	No gross observations on tissue.	PROMINENT HISTIOCYTES, Slight. PROMINENT PLASMA CELLS, 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, Multifocal, Minimal. - TISSUE IS FRAGMENTED, BUT READABLE.
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, BILATERAL, Multifocal, Minimal.
Trachea	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Multifocal, Minimal.
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, Multifocal, Moderate.

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

Tissue	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

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

Tissue	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-GOBLLET 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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 1507
PHASE DAY OF DEATH: 41	PHASE: Dosing phase	GROUP: 1

Vagina		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:
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

Tissue	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, 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

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: 1508	
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 1	
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Tissue	Gross Observations/Comments	Microscopic Observations/Comments	
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		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:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 1509
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 1

Mediastinal LN	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Minimal.
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.
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILATERAL, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, Multifocal, Slight, Probably Incidental. - 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: 1509
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 1

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Vagina		LUMINAL INFLAMMATORY/CELLULAR DEBRIS, Minimal. MONONUCLEAR CELL AGGREGATES, Multifocal, 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 1 Nose/Turb Sec 2 Nose/Turb Sec 3 Nose/Turb Sec 4 Oviducts/Fallop
Trachea

Petroleum Coke:
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Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Tissue	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-GOBBLET 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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILATERAL, Slight. INTERSTITIAL HEMORRHAGE, UNILATERAL, Multifocal, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Trachea	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Multifocal, Minimal.
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, BILATERAL, Multifocal, Slight. 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, 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: 1510
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 1

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
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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 3 Nose/Turb Sec 4 Oviducts/Fallop

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: 1511
PHASE DAY OF DEATH: 44		PHASE: Dosing phase	GROUP: 1
Tissue	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.

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

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

Tissue	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. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.
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 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: 1512
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 1

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
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Vagina No gross observations on tissue.

ACUTE INFLAMMATORY CELL INFILTRATE,
Multifocal, 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 1 Nose/Turb Sec 3 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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2501
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 2

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2502
PHASE DAY OF DEATH: 43	PHASE: Dosing phase	GROUP: 2

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 QUALITY: 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.

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: 2502
PHASE DAY OF DEATH: 43 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-GOBBLET CELL
HYPERTROPHY/HYPERPLASIA, Minimal.

Nose/Turb Sec 3 No gross observations on tissue.

PALATE: ECTOPIC SEBACEOUS GLAND, Present.

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 2 Nose/Turb Sec 4

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2503
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 2

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
PHASE DAY OF DEATH: 42

SEX: Female
PHASE: Dosing phase

ANIMAL: 2503
GROUP: 2

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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2504
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 2

Mediastinal LN	No gross observations on tissue.	BROWN-BLACK PIGMENT DEPOSITS, Minimal. 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 TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Slight. ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Moderate. 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, Minimal.
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, 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: 2504
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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2505
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 2

Mediastinal LN	Discolored, Black, Slight	Examined; 1 correlation found: 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, 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, 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.

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: 2505  
PHASE DAY OF DEATH: 44           PHASE: Dosing phase           GROUP: 2  
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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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2506
PHASE DAY OF DEATH: 43	PHASE: Dosing phase	GROUP: 2

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 cm, Moderate	Examined; 2 correlations found: 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-GOBBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2508
PHASE DAY OF DEATH: 41	PHASE: Dosing phase	GROUP: 2

Mediastinal LN	No gross observations on tissue.	PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. BROWN-BLACK PIGMENT DEPOSITS, 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, 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-GOBBLET CELL HYPERTROPHY/HYPERPLASIA, Slight.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2509
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 2

Mediastinal LN	Discolored, Black, Moderate	Examined; 1 correlation found: 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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2511
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 2

Mediastinal LN	Discolored, Black, Slight	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Minimal. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. PROMINENT PLASMA CELLS, Minimal. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.
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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 2512
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 2

Mediastinal LN	Discolored, Black, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Moderate. PROMINENT PLASMA CELLS, Slight. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.
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, 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:
Reproduction/Developmental Toxicity Screening
Study in Rats via Nose-Only Inhalation Exposures
Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 3501
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 3

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	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 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

Tissue	Gross Observations/Comments	Microscopic 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

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: 3503
PHASE DAY OF DEATH: 45	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:
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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 3505
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 3

Mediastinal LN	Discolored, Black, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight.
	Enlarged, Slight	Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, 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, 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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 3506
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 3

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, 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 LYMPHOID 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 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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 3507
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 3

Mediastinal LN	Discolored, Black, Severe	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 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: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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: Female	ANIMAL: 3508
PHASE DAY OF DEATH: 41	PHASE: Dosing phase	GROUP: 3

Tissue	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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 3509
PHASE DAY OF DEATH: 41	PHASE: Dosing phase	GROUP: 3

Mediastinal LN	Discolored, Black, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Slight.
	Enlarged, Moderate	Examined; 1 correlation found: PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Marked. PROMINENT HISTIOCYTES, Minimal. PROMINENT PLASMA CELLS, Minimal. - PROCESSING ARTIFACTS/ACCORDION FOLDS PRESENT.
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, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID 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 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: 3509
PHASE DAY OF DEATH: 41	PHASE: Dosing phase	GROUP: 3

Tissue	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,
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-GOBLLET 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

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 3510
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 3

Mediastinal LN	Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Moderate.
	Enlarged, Slight	Examined; 1 correlation found: 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, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID 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 WITH AND WITHOUT LYMPHOID AGGREGATES, 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
PHASE DAY OF DEATH: 44

SEX: Female
PHASE: Dosing phase

ANIMAL: 3510
GROUP: 3

Tissue 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-GOBBLET 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
 Study in Rats via Nose-Only Inhalation Exposures
 Individual Animal Gross and Microscopic Observations

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 3511
PHASE DAY OF DEATH: 44	PHASE: Dosing phase	GROUP: 3

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

Mediastinal LN	Discolored, Black, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Moderate. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Slight. PROMINENT HISTIOCYTES, Slight. FREE ERYTHROCYTES/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

 STATUS: Final phase sacrifice SEX: Female ANIMAL: 3511
 PHASE DAY OF DEATH: 44 PHASE: Dosing phase GROUP: 3

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 3512
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 3

Mediastinal LN	Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Moderate.
	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 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 (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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 4501
PHASE DAY OF DEATH: 47	PHASE: Dosing phase	GROUP: 4

Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	PERIODONTAL TISSUE (AMELOBLAST EPITHELIUM): CELLULAR DISORGANIZATION/DEGENERATION, BILATERAL, Multifocal, 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 3	No gross observations on tissue.	PALATE: ECTOPIC SEBACEOUS GLAND, Present.
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.	PROMINENT ATRETIC FOLLICLES, UNILATERAL, Multifocal, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, Multifocal, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 4502
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 4

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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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, UNILATERAL, Focal, Minimal. NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES, BILATERAL, Multifocal, Slight.
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.	PROMINENT ATRETIC FOLLICLES, UNILATERAL, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, Focal, 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: 4502  
PHASE DAY OF DEATH: 42                PHASE: Dosing phase                GROUP: 4  
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Tissue                Gross Observations/Comments                Microscopic Observations/Comments  
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Uterus                .                - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF  
                        THE ESTRUS CYCLE.
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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.
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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 3 Oviducts/Fallop Trachea

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 4503
PHASE DAY OF DEATH: 43	PHASE: Dosing phase	GROUP: 4

Mediastinal LN	Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Moderate. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Severe. PROMINENT HISTIOCYTES, Multifocal, Minimal.
Lungs	Discolored, All lobes, Black, Foci, 0.2 - 0.5 cm, 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, Moderate.
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.

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 DAY OF DEATH: 43 PHASE: Dosing phase GROUP: 4

Tissue Gross Observations/Comments Microscopic Observations/Comments

Nose/Turb Sec 1 No gross observations on tissue.

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

NASAL LACRIMAL DUCT: MIXED INFLAMMATORY
CELLS WITH OR 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,
Multifocal, Minimal.

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

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 OF
THE ESTRUS CYCLE.

Uterus
Distended, Bilateral horns, elongated,
Severe/ (post-fixation observation)

Tissue is unremarkable (with comment).
Examined; no correlation found

- NORMAL MORPHOLOGY FOR VARIOUS 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
PHASE DAY OF DEATH: 43

SEX: Female
PHASE: Dosing phase

ANIMAL: 4503
GROUP: 4

Tissue Gross Observations/Comments

Microscopic Observations/Comments

Vagina No gross observations on tissue.

THE ESTRUS CYCLE.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
----- STATUS: Final phase sacrifice SEX: Female ANIMAL: 4504 PHASE DAY OF DEATH: 43 PHASE: Dosing phase GROUP: 4 -----		
Mediastinal LN	Discolored, Black, Moderate	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Moderate. PARACORTICAL AREA: INCREASED [T-LYMPHOCYTE] SIZE CELLULARITY, Severe. PROMINENT HISTIOCYTES, Multifocal, Minimal. FREE ERYTHROCYTS/ERYTHROPHAGOCYTOSIS, Minimal.
Lungs	Discolored, All lobes, Black, Foci, 0.2 - 0.5 cm, Moderate	Examined; 1 correlation found: ALVEOLAR MACROPHAGES: BROWN-BLACK PIGMENT, Multifocal, Marked. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Slight. 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 AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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: Female	ANIMAL: 4504
PHASE DAY OF DEATH: 43	PHASE: Dosing phase	GROUP: 4

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
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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.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY
 CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,
 BILATERAL, Multifocal, Slight.

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, UNILATERAL,
 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:

Larynx: V-DVTC	Oviducts/Fallop	Trachea	Uterus	Vagina
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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: 4505
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 4

Tissue	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, Multifocal,
Minimal.

Nose/Turb Sec 1 No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):
EPITHELIAL-GOBBLET 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, Slight.

NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY
CELLS WITH OR WITHOUT LYMPHOID AGGREGATES,
BILATERAL, Multifocal, Minimal.

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.

PROMINENT ATRETIC FOLLICLES, BILATERAL,
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

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STATUS: Final phase sacrifice                SEX: Female                ANIMAL: 4505
PHASE DAY OF DEATH: 42                     PHASE: Dosing phase        GROUP: 4
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Tissue          Gross Observations/Comments          Microscopic Observations/Comments
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Trachea . . . . . No gross observations on tissue.
                                           MUCOSA: GLANDULAR DILATATION, Minimal.
    
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Uterus . . . . . No gross observations on tissue.
                                           STROMAL HYALINIZATION, UNILATERAL,
                                           Multifocal, Slight.
                                           - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF
                                           THE ESTRUS CYCLE.
    
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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.
    
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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 Oviducts/Fallop

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 4506
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 4

Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal. - TISSUE IS FRAGMENTED, BUT READABLE.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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, BILATERAL, Multifocal, Slight.
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.	PROMINENT ATRETIC FOLLICLES, BILATERAL, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, 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: 4506
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 4
Tissue	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:
 Reproduction/Developmental Toxicity Screening
 Study in Rats via Nose-Only Inhalation Exposures
 Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 4507
PHASE DAY OF DEATH: 41	PHASE: Dosing phase	GROUP: 4

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.
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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice		SEX: Female
PHASE DAY OF DEATH: 41		PHASE: Dosing phase
		ANIMAL: 4507
		GROUP: 4

Larynx: V-SM-G	No gross observations on tissue.	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID METAPLASIA, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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. 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, Multifocal, Slight.
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILATERAL, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Trachea	No gross observations on tissue.	MUCOSA: GLANDULAR DILATATION, 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: Female	ANIMAL: 4508
PHASE DAY OF DEATH: 43	PHASE: Dosing phase	GROUP: 4

Tissue	Gross Observations/Comments	Microscopic 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, 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 INFLAMMATION, Multifocal, Marked.
Larynx: V-DVTC	No gross observations on tissue.	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

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 4508
PHASE DAY OF DEATH: 43	PHASE: Dosing phase	GROUP: 4

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
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Larynx: V-SM-G No gross observations on tissue.

MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.

Nose/Turb Sec 1 No gross observations on tissue.

NASAL MUCOSA (RESPIRATORY):
EPITHELIAL-GOBLLET CELL
HYPERTROPHY/HYPERPLASIA, Slight.

PERIODONTAL TISSUE (AMELOBLAST
EPITHELIUM): CELLULAR
DISORGANIZATION/DEGENERATION, UNILATERAL,
Focal, 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,
UNILATERAL, Focal, Moderate.

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, BILATERAL,
Slight.

- NORMAL MORPHOLOGY FOR VARIOUS 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: 4508
PHASE DAY OF DEATH: 43	PHASE: Dosing phase	GROUP: 4
Tissue	Gross Observations/Comments	Microscopic Observations/Comments

Vagina No gross observations on tissue.

THE ESTRUS CYCLE.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 4509
PHASE DAY OF DEATH: 52	PHASE: Dosing phase	GROUP: 4

Ear(s)	Discolored, Bilateral, Black, Moderate	Tissue is unremarkable. Examined; no correlation found
Mediastinal LN	Discolored, Black, Severe	Examined; 1 correlation found: BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Marked. 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, Moderate. PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT), Multifocal, Moderate. BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE (BALT): BROWN-BLACK PIGMENT DEPOSITS, Multifocal, Marked. 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:
 Reproduction/Developmental Toxicity Screening
 Study in Rats via Nose-Only Inhalation Exposures
 Individual Animal Gross and Microscopic Observations

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

	STATUS: Final phase sacrifice	SEX: Female
	PHASE DAY OF DEATH: 43	PHASE: Dosing phase
		ANIMAL: 4510
		GROUP: 4

Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET 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, 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:
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	GROUP: 4

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
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Uterus		- NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Vagina	No gross observations on tissue.	MONONUCLEAR CELL AGGREGATES, Multifocal, 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:
Larynx: V-DVTC Nose/Turb Sec 3 Oviducts/Fallop Ovaries

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice		SEX: Female
PHASE DAY OF DEATH: 43		PHASE: Dosing phase
		ANIMAL: 4511
		GROUP: 4

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 - 0.9 cm, Moderate	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, 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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments
Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBBLET CELL HYPERTROPHY/HYPERPLASIA, Minimal.
Nose/Turb Sec 4	No gross observations on tissue.	NASAL MUCOSA SURFACE/LUMEN: BROWN-BLACK PIGMENT, Multifocal, Minimal.
Ovaries	No gross observations on tissue.	PROMINENT ATRETIC FOLLICLES, BILATERAL, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, 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, Slight. SUPERFICIAL CELLULAR BALLOONING DEGENERATION, Multifocal, Minimal.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

	STATUS: Final phase sacrifice	SEX: Female
	PHASE DAY OF DEATH: 42	PHASE: Dosing phase
		ANIMAL: 4512
		GROUP: 4

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, 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.

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

Tissue	Gross Observations/Comments	Microscopic Observations/Comments

STATUS: Final phase sacrifice	SEX: Female	ANIMAL: 4512
PHASE DAY OF DEATH: 42	PHASE: Dosing phase	GROUP: 4

Larynx: V-SM-G	No gross observations on tissue.	MUCOSA: MIXED INFLAMMATORY CELLS WITH AND WITHOUT LYMPHOID AGGREGATES, Multifocal, Minimal.
Nose/Turb Sec 1	No gross observations on tissue.	NASAL MUCOSA (RESPIRATORY): EPITHELIAL-GOBLLET 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.
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.	PROMINENT ATRETIC FOLLICLES, UNILATERAL, Slight. - NORMAL MORPHOLOGY FOR VARIOUS PHASES OF THE ESTRUS CYCLE.
Uterus	No gross observations on tissue.	STROMAL HYALINIZATION, UNILATERAL, 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

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 EXPOSURESGROUP 1 0 MG/M3
INDIVIDUAL PUP NECROPSY OBSERVATIONS

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
1501	1M	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	K	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	K	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
	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
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
	5F	K	4		NO REMARKABLE OBSERVATIONS
	6F	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

GROUP 1 0 MG/M3 INDIVIDUAL PUP NECROPSY OBSERVATIONS

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION

1503	(CONTINUED)				
	7F	K	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	K	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	K	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
	6F	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

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 1 0 MG/M3

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION

1506	(CONTINUED)				
	13F	K	4		NO REMARKABLE OBSERVATIONS
1507	1M	K	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
	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	K	4		NO REMARKABLE OBSERVATIONS
	13M	K	4		NO REMARKABLE OBSERVATIONS
	14F	K	4		NO REMARKABLE OBSERVATIONS
1508	1M	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	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

GROUP 1 0 MG/M3 INDIVIDUAL PUP NECROPSY OBSERVATIONS

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
1509	1M	S		GROSS EXAM	AUTOLYSIS
	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	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
1510	1M	K	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
	9F	K	4		NO REMARKABLE OBSERVATIONS
	10F	K	4		NO REMARKABLE OBSERVATIONS
	11F	K	4		NO REMARKABLE OBSERVATIONS
	12F	K	4		NO REMARKABLE OBSERVATIONS
1511	1M	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	K	4		NO REMARKABLE OBSERVATIONS

SEX CODES: M=Male, F=Female, U=Undetermined
PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

Huntingdon Life Sciences 03-4246

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#	STATUS	DAY	ORGAN	OBSERVATION

1511	(CONTINUED)				
	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
1512	1M	K	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
	7M	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

SEX CODES: M-Male, F-Female, U=Undetermined
 PUP STATUS CODES: K-SCHEDULED SACRIFICE

Huntingdon Life Sciences 03-4246

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
2501	1M	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	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	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	
2502	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
	6F	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
2503	1M	K	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

SEX CODES: M=Male, F=Female, U=Undetermined

PUP STATUS CODES: S-STILLBORN K-SCHEDULED SACRIFICE

Huntingdon Life Sciences 03-4246

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
2503 (CONTINUED)					
	6F	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
	14F	K	4		NO REMARKABLE OBSERVATIONS
2504	1F	D	0	LUNGS STOMACH	FLOTATION TEST- FOUND DEAD MILK IN STOMACH
	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
	7M	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
	14F	K	4		NO REMARKABLE OBSERVATIONS
2505	1M	K	4		NO REMARKABLE OBSERVATIONS
	2M	K	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
	8F	K	4		NO REMARKABLE OBSERVATIONS
	9F	K	4		NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F-Female, U=Undetermined
PUP STATUS CODES: D-DIED K-SCHEDULED SACRIFICE

Huntingdon Life Sciences 03-4246

APPENDIX V

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

GROUP 2 30 MG/M3 INDIVIDUAL PUP NECROPSY OBSERVATIONS

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION

2505	(CONTINUED)				
	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	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	K	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
	14F	K	4		NO REMARKABLE OBSERVATIONS
2507	1M	K	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
	6F	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

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

GROUP 2 30 MG/M3 INDIVIDUAL PUP NECROPSY OBSERVATIONS

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
2508	1M	K	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
	9F	K	4		NO REMARKABLE OBSERVATIONS
	10F	K	4		NO REMARKABLE OBSERVATIONS
	11F	K	4		NO REMARKABLE OBSERVATIONS
	12F	K	4		NO REMARKABLE OBSERVATIONS
2509	1M	K	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
	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		NO REMARKABLE OBSERVATIONS
2510	1M	S		LUNGS STOMACH	FLOTATION TEST-STILLBORN NO MILK IN STOMACH
	2M	S		LUNGS STOMACH	FLOTATION TEST-STILLBORN 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
2510 (CONTINUED)					
	5M	K	4		NO REMARKABLE OBSERVATIONS
	6M	K	4		NO REMARKABLE OBSERVATIONS
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	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	K	4		NO REMARKABLE OBSERVATIONS
	15F	K	4		NO REMARKABLE OBSERVATIONS
	16F	K	4		NO REMARKABLE OBSERVATIONS
2511					
	1M	K	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
	6F	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
2512					
	1M	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	K	4		NO REMARKABLE OBSERVATIONS
	5M	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 EXPOSURESGROUP 2 30 MG/M3
INDIVIDUAL PUP NECROPSY OBSERVATIONS

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION

2512	(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
	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 3 100 MG/M3

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
3501	1M	K	4		NO REMARKABLE OBSERVATIONS
	2M	K	4		NO REMARKABLE OBSERVATIONS
	3F	K	4		NO REMARKABLE OBSERVATIONS
3502	1M	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	K	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
	14F	K	4		NO REMARKABLE OBSERVATIONS
	15F	K	4		NO REMARKABLE OBSERVATIONS
3503	1M	K	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
	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

Huntingdon Life Sciences 03-4246

APPENDIX V

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

GROUP 3		100 MG/M3		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
	3F	S		LUNGS	FLOTATION TEST-STILLBORN
				STOMACH	NO MILK IN STOMACH
	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	K	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	
14F	K	4		NO REMARKABLE OBSERVATIONS	
3505	1M	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	K	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
3506	1M	K	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

Huntingdon Life Sciences 03-4246

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

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION

3506	(CONTINUED)				
	4M	K	4		NO REMARKABLE OBSERVATIONS
	5M	K	4		NO REMARKABLE OBSERVATIONS
	6F	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
3507	1M	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	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	K	4		NO REMARKABLE OBSERVATIONS
3508	1M	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	K	4		NO REMARKABLE OBSERVATIONS
	9M	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

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
3508 (CONTINUED)					
	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
3509	1F	S		LUNGS STOMACH	FLOTATION TEST-STILLBORN NO MILK IN STOMACH
	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	K	4		NO REMARKABLE OBSERVATIONS
	9M	K	4		NO REMARKABLE OBSERVATIONS
	10F	K	4		NO REMARKABLE OBSERVATIONS
	11M	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
3510	1M	K	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
	6F	K	4		NO REMARKABLE OBSERVATIONS
	7F	K	4		NO REMARKABLE OBSERVATIONS
	8F	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 3 100 MG/M3

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
3511	1F	S		LUNGS STOMACH	FLOTATION TEST-STILLBORN NO MILK IN STOMACH
	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
	7M	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
3512	1M	K	4		NO REMARKABLE OBSERVATIONS
	2M	K	4		NO REMARKABLE OBSERVATIONS
	3F	K	4		NO REMARKABLE OBSERVATIONS
	4F	K	4		NO REMARKABLE OBSERVATIONS
	5F	K	4		NO REMARKABLE OBSERVATIONS
	6F	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 4 300 MG/M3

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
4501	1F	S		LUNGS STOMACH	FLOTATION TEST-STILLBORN NO MILK IN STOMACH
	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8F	K	4		NO REMARKABLE OBSERVATIONS
	9F	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		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
7M		K	4		NO REMARKABLE OBSERVATIONS
8M		K	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
14F		K	4		NO REMARKABLE OBSERVATIONS
15F		K	4		NO REMARKABLE OBSERVATIONS
16F		K	4		NO REMARKABLE OBSERVATIONS
17F		K	4		NO REMARKABLE OBSERVATIONS

SEX CODES: M-Male, F-Female, U=Undetermined

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

Huntingdon Life Sciences 03-4246

APPENDIX V

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

INDIVIDUAL PUP NECROPSY OBSERVATIONS

GROUP 4 300 MG/M3

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
4505	1F	S		LUNGS STOMACH	FLOTATION TEST-STILLBORN NO MILK IN STOMACH
	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
	9F	K	4		NO REMARKABLE OBSERVATIONS
	10F	K	4		NO REMARKABLE OBSERVATIONS
	11F	K	4		NO REMARKABLE OBSERVATIONS
4506	1M	K	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
	7M	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
4507	1M	K	4		NO REMARKABLE OBSERVATIONS
	2M	K	4		NO REMARKABLE OBSERVATIONS
	3F	K	4		NO REMARKABLE OBSERVATIONS
	4F	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

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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 4 300 MG/M3

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION

4508	(CONTINUED)				
	3M	K	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	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	K	4		NO REMARKABLE OBSERVATIONS
4511	1F	S		LUNGS STOMACH	FLOTATION TEST-STILLBORN NO MILK IN STOMACH
	2F	S		LUNGS STOMACH	FLOTATION TEST-STILLBORN NO MILK IN STOMACH
	3M	K	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	K	4		NO REMARKABLE OBSERVATIONS
	9M	K	4		NO REMARKABLE OBSERVATIONS
	10M	K	4		NO REMARKABLE OBSERVATIONS
	11M	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
	16F	K	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

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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 4 300 MG/M3

FEMALE#	PUP#	STATUS	DAY	ORGAN	OBSERVATION
4512	1M	K	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
	7M	K	4		NO REMARKABLE OBSERVATIONS
	8M	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	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