Study Title

Naphtha, Petroleum, Heavy Straight-Run:
Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test in Rats (OECD 422)

Volume 1 of 3

TEST GUIDELINES: Organisation for Economic Cooperation and Development (OECD), Section 4, (Part 422): Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test, *Guidelines for the Testing of Chemicals* (1996).

U. S. EPA *Health Effects Test Guidelines* OPPTS 870.3650 Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test (2000).

AUTHOR: [redacted]

STUDY COMPLETED ON: September 19, 2008

PERFORMING LABORATORIES: E.I. du Pont de Nemours and Company
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LABORATORY PROJECT ID: DuPont-18331

WORK REQUEST NUMBER: 16123

SERVICE CODE NUMBER: 1422

SPONSOR: Petroleum HPV Testing Group
American Petroleum Institute (API)
1220 L Street, NW
Washington, D.C. 20005
U.S.A.

GOOD LABORATORY PRACTICE COMPLIANCE STATEMENT

This study was conducted in compliance with U.S. EPA TSCA (40 CFR part 792) Good Laboratory Practice Standards, which are compatible with current OECD and MAFF (Japan) Good Laboratory Practices, except for the items documented below. The items listed do not impact the validity of the study.

- A sample of the test substance and the original containers will not be retained by the performing laboratory due to the flammability of the test substance and potential explosive hazards. Samples from the same lot in similar containers are retained by the sponsor at another location.
- The test substance was characterized by the sponsor prior to the initiation of this study. Although the characterization was not performed under Good Laboratory Practice Standards, the accuracy of the data is considered sufficient for the purposes of the study.

Applicant / Sponsor: Petroleum HPV Testing Group
American Petroleum Institute (API)
1220 L Street, NW
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Study Director: [redacted] 19-Sept-2008
Date

Applicant / Sponsor: [redacted] 9/10/2008
Date

QUALITY ASSURANCE STATEMENT

Work Request Number: 16123
Study Code Number: 1422

Phase Audited	***Audit Dates***	***Date Reported to Study Director***	***Date Reported to Management***
Protocol:	May 09, 2006	May 09, 2006	May 09, 2006
Conduct:	May 10, 2006	May 10, 2006	May 10, 2006
	June 08, 2006	June 08, 2006	June 08, 2006
	June 22, 2006	June 22, 2006	June 22, 2006
Report/Records:	August 28-30, 2006	August 30, 2006	November 17, 2006
	August 30-31, 2006	August 31, 2006	November 17, 2006
	September 20-21, 25, 2006	September 25, 2006	November 30, 2006
	October 20, 24-26, 30-31, 2006	October 31, 2006	December 18, 2006
	November 01, 2006	November 01, 2006	December 18, 2006
	February 16, 19, 2007	February 19, 2007	March 16, 2007
	February 19-20, 2007	February 21, 2007	February 28, 2007
	February 27, 2007	February 27, 2007	February 27, 2007
	April 10, 2008	April 10, 2008	April 10, 2008

Reported by: [redacted] 12 Sep 2008
Date

CERTIFICATION

We, the undersigned, declare that this report provides an accurate evaluation of data obtained from this study.

Analytical Evaluation by:	[redacted]	19-Sept-2008 Date
Neurobehavioral Evaluations by:		19-Sept-2008 Date
Clinical Pathology Evaluations by:		17 Sept 2008 Date
Anatomic Pathology Evaluations by:		17 Sept 2008 Date
Anatomic Pathology Evaluations Peer Review by:		19-Sept-2008 Date
Approved by:		18 Sept 2008 Date
Reviewed by:		18-Sept-2008 Date
Issued by Study Director:		19-Sept-2008 Date

CERTIFICATION (continued)

This report was accepted by the Sponsor.

Accepted by: [redacted] 9/10/2008
Date

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STUDY INFORMATION

Substance Tested:
- Naphtha Petroleum, Heavy Straight-Run
- 64741-41-9 (CAS Number)

Synonyms:
- High Naphthenic Naphtha
- Sweet Naphtha
- Heavy Hydrocrackate

Haskell Number: 27199

Composition: The test substance contains approximately 225 volatile hydrocarbons, of which 28 are unidentified.

Purity: The purity of the mixture is 100% (as reported by the manufacturer)

Physical Characteristics: Colorless liquid

Stability: The test substance appeared to be stable under the conditions of the study; no evidence of instability was observed.

Study Initiated/Completed: May 8, 2006 / (see report cover page)

Experimental Start/Termination: May 9, 2006 / (see report cover page)

SUMMARY

Naphtha, petroleum, heavy straight run is a complex mixture of approximately 225 volatile, organic components. The purpose of this study was to evaluate the potential subchronic and reproductive toxicity from repeated inhalation exposure of male and female rats exposed to 0, 100, 500, or 3000 ppm of the test substance.

Concentrations of the test substance vapor were generated by flash evaporation of the test material, and an air control chamber group was also evaluated using a similar generation apparatus, however no test material was supplied to the vapor generator. Vapor concentrations of the test substance were measured by gas chromatography (GC) using the area sum function and integrating all of the eluted peaks. Additional air samples were collected weekly and analyzed for 12 of the larger, most representative components of the test substance using a cryogenic GC method supplied by the sponsor. Measuring these components indicates that all fractions of the test material were adequately vaporized. Temperature, humidity, and airflow were also recorded periodically during each exposure day. Exposures were conducted for 6 hours per day, 7 days per week.

Groups of 12 young, adult, male or nulliparous, non pregnant female Crl:CD(SD) rats were exposed to atmosphere containing 0, 100, 500, or 3000 ppm of the test substance for approximately 28 days. Since pregnancy status could influence the outcome of neurobehavioral, clinical pathology, and organ weight endpoints, separate, satellite groups of 12 young, nulliparous, nonpregnant female rats were exposed to 0, 100, 500, or 3000 ppm during a premating period of approximately 2 weeks, a cohabitation period of approximately 2 weeks, and a gestation period of approximately 3 weeks. The animals were not exposed after gestation day 19, or during the 4 day lactation period. Animals without evidence of mating continued to be exposed for 19 days after the end of the cohabitation period. Body weights, clinical signs, and food consumption were recorded throughout the study. After approximately 28 days, blood samples were collected from all male rats and all subchronic female rats for measurement of hematology and clinical chemistry parameters. An abbreviated neurobehavioral evaluation was conducted on all males, subchronic females, and satellite females prior to test substance administration in order to obtain baseline measurements. This neurobehavioral evaluation was conducted again following approximately 4 weeks of test substance administration for males and subchronic females. Males and subchronic females were sacrificed after approximately 28 days of exposure, selected organs were weighed, and selected tissues were evaluated microscopically.

Following the 2-week premating period, each satellite female was paired with a male of the same respective dosage group during an approximately 2 week cohabitation period. Measurements of body weight, food consumption, and clinical signs of toxicity in females were conducted throughout premating, cohabitation, gestation, and lactation. On postpartum day 4, blood samples were collected from lactating females for hematology and clinical chemistry parameters. In addition, the neurobehavioral evaluation was conducted on lactating females on postpartum day 4, and subsequently, lactating females and offspring were sacrificed, selected organs were weighed, and selected tissues were evaluated microscopically. Offspring were evaluated for external abnormalities.

The mean concentrations, (± standard error of the mean) representing the total area for the approximately 225 components contained in the test substance, were 100 ± 0.8, 500 ± 2.0, and 3000 ± 8.3 ppm in chambers targeted at 100, 500, and 3000 ppm, respectively. Results from the cryogenic GC analysis indicated that the components were present in the chamber atmosphere within expected concentrations.

Mortality did not occur during the study. Test substance-related increases in the incidence of stained and wet fur in males, subchronic females, and satellite females were observed; however, they did not adversely impact the health of the animals.

Adverse, test substance-related, decreases in body weight, weight gain, and/or food efficiency occurred in 3000 ppm subchronic females and satellite females. Slightly decreased body weight and/or weight gain occurred in 3000 ppm males; however, the magnitude of the effect was not considered to be adverse.

There were no adverse or test substance-related effects on reproductive function, neurobehavioral parameters, hematology and clinical pathology parameters, and no effects on offspring body weight, clinical observations, or survival.

Liver weight parameters were increased in 3000 ppm males and females, which correlated with hepatocellular hypertrophy. Kidney weight parameters were increased in 500 ppm and above males and 3000 ppm females. In males, the increased absolute/relative kidney weights correlated with hyaline droplet accumulation which was observed at 100 ppm and above males. In 3000 ppm females, the increased kidney weight parameters were not associated with any functional or microscopic change, and therefore were considered secondary to non-adverse enzyme induction.

Minimal centrilobular hepatocellular hypertrophy was observed in males and females exposed to 3000 ppm, possibly secondary to enzyme induction. Minimal hypertrophy of thyroid follicular epithelium occurred in 3000 ppm males and females, possibly secondary to the liver enzyme induction. In the kidney, the incidences of hyaline droplets, tubular granular casts, and chronic progressive nephropathy were increased in 100 ppm and above males.

Under the conditions of this study, the no-observed-adverse-effect level (NOAEL) for systemic toxicity in males was not achieved based on an increased incidence of male-specific hyaline droplet accumulation at 100 ppm and above. However, these findings are generally accepted by U.S. EPA (1991) as a hydrocarbon – induced, male rat nephropathy, and not relevant to human risk assessment. NOAEL for male rats exclusive of the nephropathy is 500 ppm based on hypertrophy of the thyroid follicular epithelium observed in 3000 ppm males. The NOAEL for systemic toxicity in females was 500 ppm based on decreased body weight, weight gain, and food efficiency, and on hypertrophy of the thyroid follicular epithelium observed in 3000 ppm females. The NOAEL for reproductive and neurobehavioral toxicology was 3000 ppm, the highest concentration tested.

INTRODUCTION AND OBJECTIVE

The objective of this study was to evaluate the potential subchronic and reproductive toxicity of the test substance when administered via inhalation to male and female rats. Clinical pathology, neurobehavioral function, gross pathology, histopathology, and reproductive function were evaluated.

SPONSOR

Sponsor: Petroleum HPV Testing Group
American Petroleum Institute (API)
1220 L. Street, NW
Washington, DC 20005
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Attention: [redacted]

EXPERIMENTAL DESIGN

A. Treatment Groups and Exposure Concentrations

Study Groups		Identification[a]				
Subchronic[b] and Satellite (Female)[c]	Number/ Sex Group	Subchronic Male	Subchronic Female	Satellite Female	Targeted Atmospheric Concentration (ppm)[d]	
1	12	101-112	113-124	125-136	0	Control
2	12	201-212	213-224	225-236	100	Low
3	12	301-312	313-324	325-336	500	Intermediate
4	12	401-412	413-424	425-436	3000	High

a The Identification Number was included on the cage label. The pretest number assigned to each animal was tattooed on the tail during the pretest period and included on the cage label.
b Subchronic rats (repeated-treatment, general toxicity, neurotoxicity, clinical pathology, and pathology endpoints).
c Satellite females (reproductive and developmental toxicity, neurotoxicity, clinical pathology, and pathology endpoints).
d The test substance, administered by whole-body inhalation.

B. Treatment Schedule

All exposures were conducted for 6 hours/day, 7 days/week. Lactating dams were not exposed.

Animals	**Exposure Duration**
Subchronic Males	30 Days
Subchronic Females	31 Days
Satellite Females	Premating: 14 Days Mating: Maximum 14 Days Gestation: 0-19 Days Lactation: Not exposed
Females with no evidence of copulation	54 Days

C. Study Parameters

Clinical Observations	
Daily Animal Health Observations	Daily (a.m., pre-exposure)
Careful Clinical Observations	Daily (p.m., postexposure)
Detailed Clinical Observations	Once before first exposure and at least once per week thereafter
Clinical Observations During Inhalation Exposures	Daily, at least 3 times during exposure
Body Weights	
Quarantine/Pretest	At least twice/Weekly
During Study	Weekly
Gestation	Days 0, 7, 14, 21G
Lactation	Days 0, 4L
Food Consumption and Food Efficiency	
During Study	Weekly
Cohabitation/ Postcohabitation	
(Subchronic Males and Satellite Females)	None
Gestation – Satellite Females	Days 0, 7, 14, 21G
Lactation – Satellite Females	Days 0, 4L
Neurobehavioral Evaluations	
Pretest	All animals
Subchronic Males and Females	Test day 28 (approximate)
Satellite Dams with Litters	Day 4L
Clinical Pathology Evaluations	
Coagulation	All animals at terminal sacrifice
Hematology and Clinical Chemistry	
Subchronic Males and Females	Test day 28 (approximate)
Satellite Dams with Litters	Day 4L
Necropsy	
Sacrifice Schedule	
Subchronic Males and Females	After approximately 28 days of exposure
Satellite nonpregnant Dams	After approximately 26 days postcohabitation
Satellite Dams with Litters	Day 4L
Gross Pathology	All animals Offspring – Day 4L Pups – External examination
Organ Weights	All animals (excluding offspring)
Histopathology	
Subchronic Males and Females	Control and high-dose groups (target organs and gross lesions in intermediate-dose groups, if necessary)
Satellite Females	Reproductive organs for rats with reproductive failure

D. Selection of Exposure Concentrations

In a previous range-finding study,[(1)] male and pregnant female rats were exposed to 0, 250, 1000, or 4000 ppm for 6 hours per day for 14 days (males) or gestation days 6-20 (females). Test substance-related decreases in body weight, weight gain, and food consumption occurred in 4000 ppm males and females. A slightly decreased body weight, food consumption and/or food efficiency were also observed in 250 and 1000 ppm males. Relative liver and kidney weights

were significantly increased in 1000 and 4000 ppm males and in 4000 ppm females; relative testes weights were increased in 1000 and 4000 ppm males. There were no significant differences in absolute kidney, liver, or lung weights in males or females, or testes weights in males. There were no test substance-related effects on clinical signs of toxicity, in adults, number of litters, number of fetuses, number of live fetuses, number of implantations, resorptions, or external fetal observations. At 4000 ppm, fetal weights were slightly lower compared to control values.

Based on these data, exposure concentrations of 0, 100, 500, and 3000 ppm were selected for this study.

E. Route of Administration

The test substance was administered by inhalation as it is a potential route of human exposure.

MATERIALS AND METHODS

A. Regulatory Compliance

The study design complies with the following test guidelines:

- U. S. EPA, OPPTS 870.3650: Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test, *Health Effects Test Guidelines* (2000).
- OECD Section 4, (Part 422): Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test, *Guidelines for the Testing of Chemicals* (1996).

B. Analytical

1. Test Substance

Chemical Name:	Naphtha Petroleum Heavy Straight-Run
Other Names Used in this Study:	Sweet Naphtha, High Naphthenic Naphtha, Heavy Hydrocrackate
CAS Number:	64741-41-9 (Appendix A)
Haskell Sample Number:	H-27199
Purity:	The test substance is a mixture which also contains numerous volatile hydrocarbons. The purity of the mixture is 100% (as reported by manufacturer)
Color:	Colorless
Form:	Liquid
Supplier:	EPL Archives, Inc., Sample #1203-005
Vehicle:	Nitrogen (purity > 99.9%) and filtered air.

2. Sample Characterization and Stability

The sponsor provided the purity information, composition of the test substance, physical characteristics of the test substance, and the analytical conditions which were used for the

12 component analysis (see section D.3 below). The weekly 12 component analysis was used to verify that all the components were being delivered to the exposure chambers, and that the test substance composition remained stable over the duration of the study.

C. Inhalation Exposure System

1. Exposure Chambers

Exposures to the test substance were conducted in NYU type 1.4-m^3 chambers. The exposure chambers to be used for this study were constructed of stainless steel and glass, and were cubical with square-pyramidal chamber inlets and outlets with a tangential feed at the chamber inlet which promotes uniform chamber distribution of the test substance. The chamber volume was chosen so that the total body volume of the test animals did not exceed 5% of the chamber volume.

2. Atmosphere Generation

(Figure 1)

Chamber atmospheres were generated by flash evaporation of the test substance in nitrogen. The liquid test substance was metered into round-bottom, flash evaporation flasks. A Harvard Apparatus model 22 Syringe Infusion Pump supplied the liquid test material for the 100 ppm chamber, and Cole-Parmer Masterflex model 7521-40 pumps supplied the liquid to the 500 and 3000 ppm chamber evaporation flasks. The flasks were placed in Unimantle heaters that were heated to 185ºC for the 0 and 100 ppm chambers, 210ºC for the 500 ppm chamber, and 250ºC for the 3000 ppm chamber. Brooks model 0154E mass flow controllers supplied approximately 10 L/min of high purity nitrogen (>99.9%) to the evaporation flasks. The resulting vapors were swept into the chambers' HEPA-filtered, conditioned air supply lines. Chamber concentrations of the test substance were controlled by varying the test substance feed rates to the evaporation flasks. The Harvard Apparatus infusion pump, Cole-Parmer Masterflex pumps, Brooks mass flow controllers, and the Unimantle heaters were controlled and monitored by a customized Camile Inhalation Toxicology Automated Data System (CITADS).

The chambers were exhausted by setting the exhaust airflow slightly higher than the incoming chamber air supply so that the exposure chambers would be under slight negative pressure with respect to the surrounding room. Each chamber air supply was set to be at least 240 L/min to achieve a minimum of 10 air changes per hour.

3. Chamber Distribution of the Test Substance

Uniform distribution of the main component of the test substance was determined during the method development study.[(2)]

4. Exposure Mode

Animals were individually placed in stainless steel wire mesh modules (one/module except during mating) and exposed, whole-body, inside the exposure chamber. The animals were

rotated to a different level within the chamber weekly when there was more than one level of cages, except during cohabitation.

D. Characterization of Chamber Atmosphere

1. Test Substance Sampling and Analysis

Test substance vapor in each of the test chambers was monitored approximately once an hour by drawing a sample of the chamber atmosphere through stainless steel tubing leading to a Hewlett Packard model 6890 GC equipped with a pneumatically operated gas sample valve and a flame-ionization detector (denoted subsequently as the main GC). Samples were automatically injected onto a 30-meter J & W Scientific DB-5 fused silica glass column and were chromatographed using an oven temperature ramp rate of 10ºC/min from 40 to 125ºC. The atmospheric concentration of the test substance was determined from a standard curve derived from vapor standards that were prepared daily. Gas standards were prepared by injecting 3 known volumes of liquid test substance into Tedlar® gas standard bags containing either 5 or 12 liters of air.

Throughout the 6-hour period, GC sample results were automatically transferred to a CITADS unit. Upon completion of the run, a Camile Inhalation Automated Reporting and Analysis System (CIRAS) collated the results of the vapor samples.

Nominal concentrations were calculated daily based on the daily total airflow in a given test chamber, the molecular weight and density of the test substance, and the volume of liquid test substance pumped into the vaporization flask according to the following equation:

$$\frac{\text{Total volume of TS (mL) x TS density (g/mL)}}{\text{mean airflow (L/min) x 360 (min)}} = \text{g/L x } \frac{24.450}{\text{MW (g/mole)}} = \text{ppm}$$

TS = test substance
MW = molecular weight (111.25 [derived from DuPont-18332])
24.450 = conversion factor
TS density = test substance density, 0.749 g/mL

2. Environmental Monitoring

Chamber temperature was targeted at 19-25°C and chamber relative humidity was targeted at 50 ± 20%. The temperature and humidity were monitored continually with VWR Dial Hygrometer Thermometer Humidity meters and recorded 3 times during each exposure. The airflow was monitored continually with Omega model number FMA-604-V thermoanemometers, and recorded 3 times during each exposure. Chamber oxygen concentration was targeted to be at least 19%. The oxygen concentrations were measured with a Biosystems model 3100R oxygen analyzer and recorded one time during each exposure for each chamber.

3. Twelve Component Analysis

Since the test substance is a mixture of approximately 225 components (Appendix C), 12 components were selected for further analysis in order to verify that all the components in the test substance were being delivered to the chamber. The 12 components were selected from a

cross sample of the components' peak retention times. The analyses were conducted on samples collected from the test chambers approximately weekly.

For this analysis, samples from the 100, 500, and 3000 ppm chambers were collected in Tedlar® gas standard bags and were injected into a separate Hewlett Packard model 6890 *Plus* GC also equipped with a pneumatically operated gas sample valve and a flame-ionization detector (denoted subsequently as the cryogenic GC). Samples were injected onto a 100-meter Sep Sys SD-009 column and were chromatographed using a cryogenic oven with 3 different oven temperature ramp rates starting from 0ºC and ending with a final oven temperature of 262ºC. The total run time for one chromatographic analysis was 138 minutes.

Gas standards were prepared by injecting known volumes of the test substance into Tedlar® gas standard bags containing known volumes of air. The 12 components' concentrations were calculated by multiplying the percent volume values supplied by the sponsor by the standard concentration. The cryogenic GC was then calibrated for each of the 12 peaks using the individual component concentrations. The standard curve was entered, and an external standard option using a linear curve was selected. The GC Hewlett Packard Chemstation software calculated the concentration of the 12 components in the test substance in parts per million (ppm).

E. Duration of Exposure

Animals were exposed as described in the study design. The starting time of each exposure was defined as the time when the generation system is turned on, and the ending time of each exposure was defined as the time when the generation system was turned off. After each exposure, rats were returned to their home cages.

F. Test Species

Species:	Rat
Strain:	Crl:CD(SD)
Sex:	Male and female, nonsiblings, nulliparous
Source:	Charles River Laboratories, Inc Raleigh, North Carolina
Number of Rats Requested/Received:	53 males; 105 females
Age at Arrival:	46 days
Age at Experimental Initiation (First day of Exposure):	60 days
Weight on Day after Arrival:	Approximately 146.5-185.4 grams (males); Approximately 136.8-177.2 grams (females) The weight range at the time of arrival was not a factor for the purposes of this study since animals were randomly distributed by weight at the time of assignment to groups. Therefore, deviations outside of this range were expected not to have any impact on the study.

Identification:	Number assigned to each animal which was tattooed on the tail during pretest period and included on cage label.
Selection Criteria:	Consistently acceptable health status and extensive experience with this strain at Haskell Laboratory.

G. Animal Husbandry

Housing - Male	
All Phases:	Individually (except during cohabitation of mating pairs) in stainless steel, wire-mesh cages suspended above cage boards; sexes on separate racks.
Housing – Subchronic Study Females	
All Phases:	Individually in stainless steel, wire-mesh cages suspended above cage boards; sexes on separate racks.
Housing – Satellite Females	
Quarantine/Premating:	Individually in stainless steel, wire-mesh cages suspended above cage boards; sexes on separate racks.
Cohabitation:	Mating pairs (females placed in males' cages) on a 1:1 basis in stainless steel, wire-mesh cages suspended above cage boards
Days 0–19 of gestation:	Individually in stainless steel, wire-mesh cages suspended above cage boards; sexes on separate racks.
Day 19 of gestation - Day 4 of lactation:	After the last exposure on day 19 of gestation, females assumed pregnant were housed individually in polycarbonate pans with bedding material. Females presumed nonpregnant were housed in the same manner as pregnant females 7 days after the mating pairs were separated.
Climate:	Temperature was maintained at 18-26ºC Relative humidity was maintained at 30%-70%
Illumination:	Artificial (fluorescent light) on an approximate 12-hour light/dark cycle.
Water:	Tap water from United Water Delaware *ad libitum* provided by an automatic watering system except during exposure.
Feed:	PMI® Nutrition International, LLC Certified Rodent LabDiet® 5002 (pelleted) *ad libitum* except during exposure and when fasted.

H. Animal Health and Environmental Monitoring Program

(Appendix TT)

As specified in the Haskell Laboratory animal health and environmental monitoring program, the following procedures are performed periodically to ensure that contaminant levels are below those that would be expected to impact the scientific integrity of the study:

Water Screening Tests:	Total bacterial counts, and the presence of coliforms, lead, and other contaminants
Cage and Cage Rack Screening Tests:	Analyzed for sentinel bacteria to ensure adequate sanitation by the cagewashers
Feed:	Certified animal feed is used, guaranteed by the manufacturer to meet specified nutritional requirements and not to exceed stated maximum concentrations of key contaminants, including specified heavy metals, aflatoxin, chlorinated hydrocarbons, and organophosphates.
Program Administration:	Laboratory animal veterinarian
Data:	Maintained separately from study records

I. Quarantine and Pretest Periods

Pretest Period:	14 days
Quarantine:	6 days (during the pretest period)
Quarantine Release:	Test Day -8; performed by the laboratory animal veterinarian or designee on the basis of adequate body weight gain and absence of clinical signs of disease or injury.

J. Assignment to Groups

Selection Criteria:	Animals without adequate body weight gain and/or with clinical signs of disease or injury were eliminated from consideration for use in the study; weight variation of individual rats did not exceed ± 20% of the mean weight for each sex.
Randomization:	Computerized, stratified randomization so that no statistically significant group mean body weight differences occur within a sex.
Disposition of Remaining Animals:	Sacrificed by carbon dioxide asphyxiation.

K. In-life Observations of Females

1. Daily Animal Health Observations

Frequency: All animals – At least once daily during quarantine and pretest, and once daily thereafter. On exposure days, the observations were conducted at the time animals were placed in the exposure modules.
Scope: Cage-site examination to detect moribund or dead animals.

2. Careful Clinical Observations

Frequency: All animals – once daily after initiation of exposures. On exposure days, the observations were conducted at the time the animals were returned to their home cages. On non-exposure days, observations were conducted in the afternoon.
Scope: Acute/systemic toxicity, including but not limited to nervous system function.

3. Detailed Clinical Observations

Frequency: All animals - Once during pretest (baseline), and weekly thereafter
Scope: Animals individually handled and examined for abnormal behavior and appearance in a standardized arena; observations included (but were not limited to) evaluation of fur, skin, eyes, mucous membranes, occurrence of secretions and excretions, autonomic nervous system activity (lacrimation, piloerection, and unusual respiratory pattern), changes in gait, posture, response to handling, presence of clonic, tonic, stereotypical, or bizarre behavior.

4. Clinical Observations During Inhalation Exposures

Frequency: All animals visible to the observer through the glass window of the chamber were observed collectively as a group at least 3 times during each exposure.
Scope: Observations through the window of the chamber for abnormal behavior or appearance.

5. Body Weight

Quarantine/Pretest:	Four weights were collected.
Subchronic Males and Females:	Weekly
Satellite Females:	Premating – Weekly. Cohabitation – Weekly. Gestation – Days 0, 7, 14, 21G. Lactation – Days 0, 4L.
Satellite Females without evidence of copulation:[a]	Post-cohabitation – Weekly
Neurobehavioral Evaluations:	All animals evaluated were weighed on the day of the functional observational battery (FOB) assessment.
Body Weight Collected at Terminal Sacrifice	All animals.

a Evidence of copulation = intravaginal copulation plug or sperm in the lavage sample.

6. Food Consumption and Food Efficiency

Subchronic Males:	Premating – weekly. Cohabitation and postcohabitation – none.
Subchronic Females:	Weekly
Satellite Females:	Premating – Weekly. Cohabitation – None. Gestation – Days 0, 7, 14, 21G. Lactation – Days 0, 4L.
Satellite Females without evidence of copulation:	Postcohabitation – None.
Calculation of Food Consumption:	Feeders were weighed at the beginning and end of the interval. The final weight and amount of spillage from the feeder were subtracted from initial weight.
Calculation of Mean Daily Food Efficiency:	From food consumption and body weight data.

L. Reproductive/Developmental Assessment

Subchronic Male Rats and Satellite Female Rats

1. Cohabitation[a]/Pairing

Frequency:	Once after approximately 2 weeks of exposure to the test substance.
Scope:	Each satellite female was continually housed on a 1:1 basis with a randomly selected, nonsibling subchronic male of the same concentration level.
Duration:	Until evidence of copulation was observed or the cohabitation period ended (Day 14 of cohabitation), at which time the mating pairs were separated.
Evidence of Copulation:[b]	Daily examination of each female for an intravaginal copulation plug or sperm in the vaginal lavage sample.

a First day of cohousing = Day 0 of cohabitation; End of cohousing = Day 14 of cohabitation
b Evidence of copulation = Day 0 of gestation

M. Gestation

After being transferred into polycarbonate pans (on day 19 of gestation for mated females, or 7 days after the mating pairs have been separated for females without evidence of copulation), female rats were observed at least twice daily for signs of delivery and offspring.

N. Lactation

On lactation days 0 and 4, offspring were individually handled and examined for abnormal behavior and appearance; any dead or abnormal pups were recorded.

Day 0:[a]	Live and dead pups in each litter were counted by sex. Live pups were individually weighed as soon as possible after delivery was completed. Dead pups were sent to pathology. The lungs were removed from the pups and placed in saline to determine if they floated.
Day 4:[b]	Pups in each litter were counted by sex and live pups were individually weighed and a gross external examination was performed.

a Day of delivery = Day 0 of lactation
b Litter Sacrifice

Individual pups that died prior to Day 4 of lactation were examined to the extent possible and discarded.

O. Neurobehavioral Evaluation

Pretest: All animals, including spares

During Study: Subchronic Males and Females – Week 4 (test days 26-29), in the morning, prior to the daily exposure.
Satellite Dams with Litters – Day 4L.

Scope: Neurobehavioral test battery consisting of an abbreviated functional observational battery assessment (FOB) and motor activity (MA).

Animal Identification: Experimenter was unaware of treatment group of the subchronic animals. The testing lots were evenly distributed across groups and days for both the pretest and week 4 assessments.

Acclimation: At least 10 minutes in the FOB laboratory prior to initiation of assessment.

Order of FOB and MA Assessments: The parameters were evaluated in the order shown in the table below.

1. Parameters

Body weights were collected on the day of neurobehavioral assessments.

Phase	Order	Procedure	Parameters or Methods	
FOB	1	Manipulations in Open Field	approach and touch response auditory response	tail pinch response
FOB	2	Fore- and hindlimb grip strength Strain gauge (Chatillion®)	forelimb grip strength	hindlimb grip strength
MA	3	Motor Activity	Duration of movement and number of movements were evaluated in 6 consecutive blocks of 10 minutes each as well as for the total 60-minute session.	
MA	4	Assessments in MA monitor	diarrhea	polyuria
FOB	5	Pupillary Constriction or Response[a]	Light beam directed to each eye in the darkened MA room	

a Conducted at the conclusion of motor activity while the animals were still in the motor activity monitor

2. Test Facility Positive Control Data

Procedures and data describing the effects of acrylamide, carbaryl, d-amphetamine, and trimethyltin are presented in 5 separate reports.[3,4,5,6,7] These positive control studies are the basis of training certification for the personnel making judgments in the neurobehavioral and neuropathology tests. The data also document that the equipment and procedures are capable of detecting effects that may be seen in studies of this type.

P. Clinical Pathology Evaluation

A clinical pathology evaluation was conducted on all subchronic animals on test days 31 (males) and 32 (females), and on lactating females on test days 42-45. The day before collection of samples for the clinical pathology evaluation for the subchronic part of the study, the animals were allowed to eat for 2 hours after the exposure period, and then were fasted after 3 p.m. for at least 15 hours. Lactating females were not fasted prior to blood collection. Blood samples for hematology and clinical chemistry measurements were collected from the orbital sinus of each animal while the animal was under carbon dioxide anesthesia. Blood samples for coagulation parameters were collected at sacrifice from the abdominal *vena cava* of each animal while the animal was under carbon dioxide anesthesia. Additional blood collected from the *vena cava* was placed in a serum tube, processed to serum, and frozen at approximately -80°C. Serum will be discarded without analysis because further tests were not required to support experimental findings. Bone marrow smears were prepared at sacrifice from all surviving animals. Bone marrow smears were stained with Wright-Giemsa stain, but analysis was not necessary to support experimental findings. All blood samples were evaluated for quality by visual examination. Results were maintained in the study records and reported only if the sample was analyzed.

1. Hematology and Coagulation

Complete blood counts, including reticulocytes, were determined on a Bayer® Advia 120 hematology analyzer or determined from microscopic evaluation of the blood smear. Wright-Giemsa-stained blood smears from all animals were examined microscopically for confirmation of automated results and evaluation of cellular morphology. Coagulation times were determined on a Sysmex® CA-1000 Coagulation Analyzer.

The following parameters were determined:

red blood cell count
hemoglobin
hematocrit
mean corpuscular (cell) volume
mean corpuscular (cell) hemoglobin
mean corpuscular (cell) hemoglobin concentration
red cell distribution width
absolute reticulocyte count
platelet count
white blood cell count
differential white blood cell count
microscopic blood smear examination

prothrombin time
activated partial thromboplastin time

2. Clinical Chemistry

Serum clinical chemistry parameters were determined on an Olympus® AU640 clinical chemistry analyzer.

The following parameters were determined:

aspartate aminotransferase	glucose
alanine aminotransferase	total protein
sorbitol dehydrogenase	albumin
alkaline phosphatase	globulin
gamma glutamyl transferase	calcium
total bilirubin	inorganic phosphorus
urea nitrogen	sodium
creatinine	potassium
cholesterol	chloride
triglycerides	albumin/globulin ratio

Q. Anatomic Pathology Evaluation

1. Quarantine/Pretest

No animals were found dead or sacrificed *in extremis* during the quarantine/pretest period.

2. Subchronic Males and Females

After 31 (males) or 32 (females) days on study, rats designated for the subchronic toxicity evaluation (12/sex/group) were sacrificed and necropsied. The order of sacrifice for scheduled deaths was stratified across all treatment groups within a sex. Rats were euthanized by carbon dioxide anesthesia and exsanguination. A gross examination was performed on all rats. Final body weights and organ weights were recorded.

All rats designated for subchronic toxicity evaluation survived until the scheduled terminal sacrifice. The following tissues were collected from all rats.

Digestive System
- liver
- stomach
- duodenum
- jejunum
- ileum
- cecum
- colon
- rectum

Urinary System
- kidneys
- urinary bladder

Respiratory System
- lungs
- trachea

Cardiovascular System
- heart

Hematopoietic System
- spleen
- thymus
- mandibular lymph node
- mesenteric lymph node
- bone marrow[a]
- Peyer's patch[b]

Endocrine System
- thyroid gland
- adrenal glands

Nervous System
- brain (three sections)[c]
- spinal cord (three levels)[d]
- sciatic nerve

Musculoskeletal System
- femur/knee joint

Reproductive System
- Male
  - testes
  - epididymides
  - prostate
  - seminal vesicles
  - coagulating glands
- Female
  - ovaries
  - oviducts
  - uterus
  - cervix
  - vagina

Miscellaneous
- Gross observation[e]

a Bone marrow was collected with the femur.
b Peyer's patches were collected with the intestines.
c Brain included cerebrum, midbrain, cerebellum, and medullar/pons.
d Spinal cord included cervical, mid-thoracic, and lumbar sections.
e Gross observations made at necropsy for which histopathology was not appropriate (e.g., fluid, ruffled fur, and missing anatomic parts) were generally not collected.

The following tissues were weighed from all rats at necropsy: liver, kidneys, lungs, adrenal glands, thymus, brain, spleen, heart, testes, epididymides, prostate, ovaries (with oviducts), and uterus (with cervix). Group mean absolute organ weight values and organ weight ratios (% body weight and % brain weight) were calculated.

Testes and epididymides were fixed in modified Davidson's solution. All other tissues were fixed in 10% neutral buffered formalin. Processed tissues were embedded in paraffin, sectioned approximately 5-6 microns thick, and stained with hematoxylin and eosin (H&E).

All collected tissues from rats in the control and 3000 ppm exposure groups were processed to slides and evaluated microscopically. Gross lesions, target organs–kidneys (males only), liver, and thyroid gland–were evaluated microscopically from all rats designated for subchronic toxicity evaluation.

3. Satellite Females and Offspring

Procedures for euthanasia, necropsy, gross examination and tissue collection/fixation for satellite females were the same as for subchronic animals. In addition, all satellite females were examined for the presence and number of uterine implantation sites and ovarian *corpora lutea*. Only one mating pair (male 406/female 430 in the 3000 ppm group) failed to produce a litter. Reproductive organs from the animals were processed and evaluated microscopically.

The following tissues were weighed from satellite females at necropsy: liver, kidneys, lungs, ovaries (with oviducts), and uterus (with cervix). Group mean absolute organ weight values and organ weight ratios (% body weight) were calculated.

All offspring surviving to postnatal day 4 were evaluated for external alterations and euthanized by intraperitoneal (i.p.) injection of sodium pentobarbital. Pups found dead or sacrificed in extremis were examined grossly and discarded.

STATISTICAL ANALYSES

A. Reproductive Function Calculations

The following table lists the indices of reproductive function that were calculated for the parental animals.

Reproductive Function Calculations

$$\text{Mating index (\%)} = \frac{\text{number mated}^{a}}{\text{number paired}} \times 100$$

$$\text{Fertility index (\%)} = \frac{\text{number pregnant}^{b}}{\text{number mated}^{a}} \times 100$$

$$\text{Post-Implantation Loss (\%)}^{c} = \frac{\text{number of implantation sites - number of pups born}}{\text{number of implantation sites}} \times 100$$

$$\text{Live Born Index (\%)}^{c} = \frac{\text{number of pups born alive}}{\text{number of pups born}} \times 100$$

$$\text{Viability index (\%)}^{c,d} = \frac{\text{number of pups alive Postnatal Day (PND) 4}}{\text{number of pups born alive}} \times 100$$

a Mated = intravaginal copulatory plug, sperm in vaginal lavage, uterine implantation sites, or delivery of a litter.
b Including those found dead pregnant during gestation.
c Determined for each litter.
d Excluding litters sacrificed due to death of dam during lactation.

B. Statistical Methods

		Method of Statistical Analysis (see Appendix A for references)	
Parameter	Preliminary Test	If preliminary test is not significant	If preliminary test is significant
Body Weight Body Weight Gain Food Consumption Food Efficiency Precoital Interval Gestation Length *Corpora Lutea* Implantation Sites Post-Implantation Loss Number of Pups Per Litter Live Born Index Viability Index Clinical Pathology Parameters[a] Organ Weight Parameters	Levene's test for homogeneity[8] and Shapiro-Wilk test[9] for normality[b]	One-way analysis of variance[10] and Dunnett's test[11,12,13]	Kruskal-Wallis test[14] and Dunn's test[15]
FOB Descriptive Parameters Mating Index Fertility Index	None	Sequential application of Cochran-Armitage test for trend[10][c]	
Sex Ratio (Covariate: litter size) Pup Weights (Covariates: litter size, sex ratio)	Levene's test for homogeneity[8] and Shapiro-Wilk test[9] for normality[d]	Analysis of covariance[10] and Dunnett-Hsu[16]	Non-parametric analysis of covariance[17]
Motor Activity[e] Grip Strength	Levene's test for homogeneity[8] and Shapiro-Wilk test[9] for normality[d]	Repeated measures analysis of variance[18] followed by Linear contrasts[19]	Sequential application[20] of the Jonckheere-Terpstra trend test[21]

a When an individual observation was recorded as being less than a certain value, calculations were performed on half the recorded value. For example, if bilirubin was reported as < 0.1, 0.05 was used for any calculations performed with that bilirubin data. When an individual observation was recorded as being greater than a certain value, calculations were performed on the recorded value. For example, if specific gravity was reported as > 1.083, 1.083 was used for any calculations performed with that data.

b If the Shapiro-Wilk test was not significant but Levene's test was significant, a robust version of Dunnett's test was used. If the Shapiro-Wilk test was significant, Kruskal-Wallis test was followed with Dunn's test.

c If the incidence was not significant, but a significant lack of fit occurred, then Fisher's Exact test[22] with a Bonferroni correction was used.

d A normalizing, variance stabilizing transformation was used as needed.

e Test day and 10-minute interval were used as repeated-measure factors.

Male and female data were evaluated separately. For litter parameters, the proportion of affected pups per litter or the litter mean were used as the experimental unit for statistical evaluation.[23] The level of significance selected was $p < 0.05$.

RESULTS

ANALYTICAL

A. Test Substance Concentration

(Table 1, Figure 2, Appendices D-E)

The mean concentrations, (± standard error of the mean) representing the total area for the approximately 225 components contained in the test substance, were 100 ± 0.8, 500 ± 2.0, and 3000 ± 8.3 ppm in chambers targeted at 100, 500, and 3000 ppm, respectively (note: whenever possible, 2 significant figures were used. Overall daily mean concentrations ranged from 90-110 ppm for the 100 ppm chamber, from 480-560 ppm for the 500 ppm chamber, and from 2800-3100 ppm for the 3000 ppm chamber. The calculated nominal concentrations were generally similar to the actual measured concentrations, with a mean calculation concentration of 101, 584, and 3410 ppm for the 100, 500, and 3000 ppm chambers, respectively (Appendix E). These data demonstrate that the exposure system and analyses were operating as expected.

B. Chamber Environmental Conditions

(Table 2, Appendix F)

The temperatures in the 0, 100, 500, and 3000 ppm chambers ranged from 19-25ºC. The chamber temperatures were lower than the targeted range of 21-25ºC, however, this difference did not adversely impact the study based on the clinical appearance of the animals.

The relative humidity in the 0, 100, 500, and 3000 ppm chambers was 41%-59%.

The chamber airflows in the 0, 100, 500, and 3000 ppm chambers ranged from 250-400 L/min which was adequate to achieve at least 10 air changes per hour.

The oxygen concentration in the 0, 100, 500, and 3000 ppm chambers was 20%.

C. Twelve Component Analysis

(Table 3, Appendix G)

The concentrations of the 12 selected components indicated small differences between the expected theoretical value and the analytically determined values. However, these differences were most likely due to the low concentration of the components which approached the lower limit for accurate quantification for a flame ionization detector. Therefore, the 12 components evaluated were present in the exposure chamber within the acceptable range of variation from the theoretical values and indicate that the vapor generation method performed as expected.

IN-LIFE TOXICOLOGY

A. Clinical Observations and Mortality

Mortality did not occur during the study. Test substance-related increases in the incidence of stained and wet fur in males, subchronic females, and satellite females were observed. However, they did not adversely impact the health of the animals.

1. During Exposure – All Rats

(Table 4)

Wet fur was observed during exposure in the 3000 ppm animals beginning at the 18th exposure. This observation was consistent with the stained and wet fur observed post-exposure.

2. Subchronic Male Rats

(Tables 5-6, Appendices H-I)

Test substance-related, statistically significant increases in the incidences of red stained facial fur and wet fur were observed in rats following exposure to 3000 ppm. All other post exposure clinical observations and detailed clinical observations had similar incidences across all exposure groups.

3. Subchronic Female Rats

(Tables 7-8, Appendices J-K)

Test substance-related, statistically significant increases in the incidences of red stained facial fur and wet fur were observed in rats following exposure to 3000 ppm, and stained fur was also significantly increased in 500 ppm females. In addition, the incidence of stained fur was significantly increased in 3000 ppm females during detailed observations conducted prior to the daily exposure session. All other post exposure clinical observations and detailed clinical observations had similar incidences across all exposure groups.

4. Satellite Female Rats

(Tables 9-12, Appendices L-O)

Premating: Test substance-related, statistically significant increases in the incidences of red stained facial fur and wet fur were observed in rats following exposure to 3000 ppm, and stained fur was also significantly increased in 500 ppm females. All other post-exposure clinical observations had similar incidences across all exposure groups.

Gestation: Test substance-related, statistically significant increases in the incidences of red stained facial fur and wet fur were observed in rats following exposure to 3000 ppm, and stained fur was also significantly increased in 500 ppm females. All other post-exposure clinical observations had similar incidences across all exposure groups.

Lactation: A test substance-related, statistically significant increase in the incidence of red stained facial fur was observed in rats previously exposed to 3000 ppm.

The incidence of stained fur in satellite females was also evident in 500 and 3000 ppm satellite females during detailed observations conducted prior to the daily exposure session. All other detailed clinical observations had similar incidences across all exposure groups.

B. Body Weights and Body Weight Changes

1. Subchronic Male Rats

(Tables 13-14, Appendices P-Q)

No adverse or statistically significant effects on body weight or weight gain were observed in males for any exposure concentration. On test day 29 (last body weight prior to fasting), body weight of 3000 ppm males was slightly (5%) lower compared to the control mean; and weight gain for the interval of test days 1-29 was 15% lower for 3000 ppm males compared to controls. Since mean body weight on test day 29 was only 5% lower than the control value, it was not considered to be an adverse effect. There were no test substance-related effects or statistically significant differences on weight or weight gain in 100 or 500 ppm males.

2. Subchronic Female Rats

(Tables 15-16, Appendices R-S)

Test substance-related, statistically significant decreases in body weight gain occurred in 3000 ppm females. Body weights and body weight gain values for 3000 ppm females were significantly lower (7% and 70%, respectively) compared to the control group on test day 8 and over test days 1-8, respectively. Body weight for 3000 ppm females was 8% lower compared to the control value on test day 29 (final body weight prior to fasting); and weight gain was 35% lower compared to the control value on test days 1-29. These decreases were considered to be test substance related and adverse. There were no test substance-related effects or statistically significant differences on weight or weight gain in 100 or 500 ppm females.

3. Satellite Female Rats

(Tables 17-22, Appendices T-Y)

Premating: No adverse or statistically significant effects on body weight or weight gain were observed in females for any exposure concentration during the 2-week premating period. On test day 15, body weight of 3000 ppm females was slightly (4%) lower compared to the control mean; and weight gain for the interval of test days 1-15 was 29% lower for 3000 ppm females compared to controls. As was observed in subchronic females, body weight gain was decreased during the first week of exposure at 3000 ppm. However, the magnitude of the change (26% lower than controls) was not sufficient to be statistically significant. Since mean body weight on test day 15 was only 4% lower than the control value, it was not considered to be an adverse effect. There were no test substance-related effects or statistically significant differences on weight or weight gain during the premating period in 100 or 500 ppm females.

Gestation: Test substance-related effects on body weight and weight gain were observed in 3000 ppm females during the 3-week gestation period. On GD21, body weight of 3000 ppm females was slightly (7%) lower compared to the control mean; and weight gain for the interval of GD 0-21 was 14% lower for 3000 ppm females compared to controls. The lower body weight on GD 21 correlates with the lower weight on LD 0 and was considered to be an adverse effect. There were no test substance-related effects or statistically significant differences on weight or weight gain during the gestation period in 100 or 500 ppm females.

Lactation: Test substance-related, statistically significant decreases in body weight occurred in 3000 ppm females. Body weight for 3000 ppm females was 7% lower compared to the control value on Lactation Day (LD) 0; however, weight gain for the interval of LD 0-4 was similar to the control value. The significantly lower body weight on LD 0 for 3000 ppm females suggests an effect on the maternal body weight gain during gestation, and correlates with the lower weight on GD 21 and lower weight gain over the interval of GDs 0-21. There were no test substance-related effects or statistically significant differences on weight or weight gain in 100 or 500 ppm satellite females.

C. Food Consumption and Food Efficiency

1. Subchronic Male Rats

(Tables 23-24, Appendix Z)

Test substance-related, statistically significant decreases in food consumption occurred in males exposed to 3000 ppm of the test substance. Food consumption for 3000 ppm males was significantly lower on test days 1-8, and 1-15, and was 11% lower compared to the control value for test days 1-15. The slightly lower food consumption correlates with the slightly lower body weight and weight gain for 3000 ppm males, however, it was not considered to be adverse due to the small magnitude of the effect on body weight. There were no test substance-related effects or statistically significant differences on food consumption or food efficiency in 100 or 500 ppm males, or on food efficiency in 3000 ppm males.

2. Subchronic Female Rats

(Tables 25-26, Appendix AA)

A test substance-related decrease in food efficiency occurred in 3000 ppm females. During test days 1-8, food efficiency was decreased 72% compared to the control value, was decreased 42% during test days 22-29, and was decreased 33% for the interval of test days 1-29. There were no test substance-related effects or statistically significant differences on food consumption in females for any exposure concentration, or on food efficiency for the 100 and 500 ppm groups.

The decreased food efficiency in 3000 ppm females correlates with the decreased body weight, and was considered to be adverse.

3. Satellite Female Rats

(Tables 27-32, Appendices BB-DD)

Premating: There were no statistically significant differences on food consumption or food efficiency in females for any exposure concentration. However, food efficiency was slightly decreased (21%) in 3000 ppm satellite females during test days 1-8, decreased 32% during test days 8-15, and decreased 25% for the interval of test days 1-15.

Gestation: Food consumption was slightly decreased (8-10%) in 3000 ppm satellite females during GD 0-7, 7-14, 14-21, and 0-21.

Lactation: There were no statistically significant differences on food consumption or food efficiency in females for any exposure concentration.

REPRODUCTIVE/DEVELOPMENTAL ASSESSMENT

A. Reproductive Indices in Satellite Female Rats

(Table 33, Appendices EE-FF)

There were no test substance-related or statistically significant differences in mean number of pregnant animals, number of animals delivering, mating index, fertility index, precoital interval, gestation length, number of corpora lutea, number of implantation sites, or percent of post-implantation loss for any exposure concentration. The mating date for Dam #434 could not be determined from the vaginal smears, and as a result, she delivered during exposure.

B. Litter Parameters

1. Litter Size, Sex Ratio, Pup Survival, Clinical Observations, Pup Weights

(Tables 34-36, Appendices GG-II)

There were no test substance-related or statistically significant differences in number of fetuses born or born alive, live born index, viability index, sex ratio, incidence of clinical observations, or mean pup body weight on postnatal days 0 or 4. Mean litter weight on PND 0 and PND 4, and mean litter survival on PND 4 were slightly lower for the 3000 ppm group compared to the control value due to one litter (Dam #434) which delivered during exposure and lost 5/12 pups between lactation days 0-4. The mating date for this dam could not be determined. All other 3000 ppm litters had 100% survival on PND 4. PND 0-4 viability index for Dam #434 was omitted from the mean, and the offspring body weights were re-analyzed omitting Dam #434, yielding 3000 ppm group means that were comparable to control.

NEUROBEHAVIORAL EVALUATION

A. Abbreviated Functional Observational Battery

1. Forelimb Grip Strength

(Tables 37-39, Appendices JJ-KK)

There were no test substance-related effects or statistically significant differences on forelimb grip strength in subchronic males, subchronic females or satellite females exposed to any concentration of the test substance.

2. Hindlimb Grip Strength

(Tables 37-39, Appendices JJ-KK)

There were no test substance-related effects or statistically significant differences on hindlimb grip strength in subchronic males, subchronic females, or satellite females exposed to any concentration of the test substance.

3. Open Field Observations

(Tables 40-42, Appendices LL-MM)

There were no test substance-related effects or statistically significant effects for any behavioral parameter evaluated in subchronic males, subchronic females, or satellite females exposed to any concentration of the test substance. At the week 4 evaluation, females exposed to 3000 ppm had a significantly higher incidence of stained facial fur, which is consistent with the post-exposure observations and detailed clinical observations. However, the stained facial fur was not present in the satellite females evaluated on LD 4, since their exposure to the test substance had been discontinued after test day 19. Although the stained facial fur was considered to be test substance-related, and was present at the time of the neurobehavioral evaluation, it is not indicative of an effect on the function of the nervous system.

B. Motor Activity

(Tables 43-48, Appendices NN-QQ)

There were no test substance-related effects on duration of movement or number of movements in subchronic males, subchronic females, or satellite females exposed to any concentration of the test substance. During the baseline and week 4 evaluations, subchronic males in the 3000 ppm group had significantly lower total duration and number of movements compared to the control mean. In addition, duration and number of movements were significantly lower for 3000 ppm males during the 4th and 5th 10-minute interval of the baseline evaluation, and during the 6th 10-minute interval of the week 4 evaluation. Number of movements was also significantly lower for 3000 ppm males during the second 10-minute interval. However, since total duration and number of movements were significantly lower compared to control during both the baseline and week 4 evaluation, and the relative magnitude of the difference was similar for both the baseline and week 4 evaluations, these statistical differences were not considered to be test substance related.

CLINICAL PATHOLOGY EVALUATION

A. Hematology

(Tables 49-50, Appendix RR)

There were no adverse changes in hematology parameters in male or female rats. The following statistically significant changes in mean hematology parameters were not adverse or not related to exposure to the test substance:

- Reticulocytes were statistically but mildly decreased at test days 42-45 in the satellite female rats exposed to 3000 ppm (mean was 77% of the control group mean). The decrease in reticulocyte count was of uncertain relationship to treatment. In this study, there was no effect of the test substance on red cell mass parameters (red blood cell, hemoglobin and hematocrit). Minimally lower reticulocyte counts without any changes in red cell mass parameters have no biological significance. Therefore, this change was considered to be non-adverse.

- Neutrophils were mildly decreased at test days 42-45 in the satellite female rats exposed to 3000 ppm (mean was 73% of the control group mean). The lower limit of individual values was generally similar across all 3 treatment groups, despite the 300-fold difference in concentration, while the upper limit of individual values was higher in rats exposed to 0-500 ppm of the test substance. This change was of uncertain relationship to treatment. However, due to the similar lower range in both control and treated groups, this change was considered to be non-adverse.

B. Coagulation

(Tables 51-52, Appendix RR)

There were no treatment-related changes in coagulation parameters in male or female rats. Statistically significant prolonged activated partial thromboplastin time at test day 31 in male rats exposed to 500 ppm was considered to be unrelated to treatment and non-adverse because it did not occur in a dose-related pattern.

C. Clinical Chemistry

(Tables 53-54, Appendix RR)

There were no adverse changes in clinical chemistry parameters in male or female rats. The following statistically significant changes in mean clinical chemistry parameters were not adverse:

- Glucose was minimally decreased at test days 31/32 in males and females exposed to 3000 ppm (means were 84% and 92% of the respective control group means for males and females). In males, the decrease in glucose was primarily due to one control male (animal 112) with a moderately high glucose concentration. With the exception of 2 rats with high glucose concentrations (animal 112 and 212 at 100 ppm), all groups of males had similar glucose concentrations; this change was considered to be unrelated to treatment. For

females, there was less variability in glucose concentrations among individual animals, compared to males, and therefore the decrease in glucose may have been related to treatment. However, the degree of change in glucose was very small for both males and females and had no adverse consequences; therefore the decreases in glucose were considered to be non-adverse.

- Cholesterol and triglycerides were mildly increased at test day 32 in females exposed to 3000 ppm (means were 132% and 129% of the respective control group means). Six females exposed to 3000 ppm had cholesterol concentrations that were higher than most individual values for other females on this study; this change was likely related to treatment. For triglycerides, the range of concentrations for individual females was similar in all groups, including controls. The statistical difference in triglyceride concentration was unlikely to be related to treatment. Regardless, the changes in triglycerides and cholesterol were minimal and were considered to be non-adverse due to the small magnitude of the changes.

The following statistically significant changes in mean clinical chemistry parameters were considered to be unrelated to treatment and non-adverse because they did not occur in a dose-related pattern:

- Transiently increased sorbitol dehydrogenase activity at test day 32 in female rats exposed to 100 ppm

- Increased glucose at test days 42-45 in female rats exposed to 500 ppm.

ANATOMIC PATHOLOGY EVALUATION

A. Subchronic Male and Female Rats

1. Cause of Death

There were no test substance-related deaths. All rats survived until the scheduled terminal sacrifice.

2. Organ Weights

(Tables 55-56, Appendix SS)

Exposure-related organ weight effects were present in the liver and kidney of male and female rats, and are summarized below.

Mean Liver and Kidney Weights (Relative to Body Weight) in Male and Female Rats[a]

	Male			Female		
Concentration (ppm):	100	500	3000	100	500	3000
Liver wt/body wt	97%	105%	128%*	100%	104%	128%*
Kidney/body wt	107%	115%*	125%*	99%	104%	114%*

a values are given as percent of control group mean.
* Statistically significant (alpha = 0.05) by Dunnett/Tamhane-Dunnett pair-wise test (parametric) or by Dunn's pair-wise test (nonparametric).
Underlined values were interpreted to be test substance-related weight effects

Liver

Liver weight parameters were increased in male and female rats exposed to 3000 ppm of the test substance. The magnitude of the liver weight increase was similar between males and females. For example, liver weight/body weight ratio was 128% of the control group mean for both males and females at 3000 ppm. In some animals, increased liver weight was associated with microscopic hepatocellular hypertrophy. Liver weight changes were consistent with the non-adverse pharmacological induction of hepatic enzymes.[24]

Kidneys

Kidney weights were increased in male rats at 500 and 3000 ppm and in female rats at 3000 ppm. In males only, increased kidney weights correlated with the dose-related hyaline droplet accumulation (and associated secondary changes) observed microscopically at all dose levels.

In the 3000 ppm females, there were no gross or microscopic anatomic correlates, and no clinical chemistry changes associated with the increased kidney weight parameters. The kidney weight effects in females were therefore interpreted to be the result of non-adverse enzyme induction.[25] Although microscopic hypertrophy of renal tubular epithelium may occur in enzyme induction, small increases in kidney weight are often not associated with a morphological change.

Other

Statistically significant increases in testes weight relative to body weight in 3000 ppm males, and in adrenal weight relative to body weight in 3000 ppm females, were not associated with changes in other weight parameters or with microscopic changes in the respective organs. These weight changes were secondary to the slight decreases in final body weight at this exposure level and thus were not considered to be primary effects of the test substance.

All other individual and mean organ weight differences were considered to be spurious and unrelated to exposure to the test substance.

3. Gross Observations

(Tables 58-59)

There were no test substance-related gross observations.

4. Microscopic Findings

(Tables 61-62, Appendices TT-UU)

Test substance-related microscopic findings were present in the liver (centrilobular hypertrophy) and thyroid gland (follicular cell hypertrophy) of males and females and the kidneys (hyaline droplet accumulation, granular casts, and increased chronic progressive nephropathy) of males.

Incidences and Severity of Test Substance-Related Microscopic Findings in Male and Female Rats

	Male				Female			
Concentration (ppm):	0	100	500	3000	0	100	500	3000
Number of Rats:	12	12	12	12	12	12	12	12
Liver								
Hypertrophy, centrilobular								
Minimal	0	0	0	2	0	0	0	9
Tot al	0	0	0	2	0	0	0	9
Thyroid gland								
Hypertrophy, follicular cell								
Minimal	0	0	0	2	0	0	0	2
Tot al	0	0	0	2	0	0	0	2
Kidney								
Hyaline droplets, increased								
Minimal	1	10	4	0	0	0	0	0
Mild	0	0	8	12	0	0	0	0
Total	1	10	12	12	0	0	0	0
Granular casts, tubular,								
Minimal	0	2	5	2	0	0	0	0
Mild	0	1	2	0	0	0	0	0
Total	0	3	7	2	0	0	0	0
Chronic progressive nephropathy								
Minimal	7	9	9	11	0	0	0	2
Mild	0	1	3	1	0	0	0	0
Total	7	10	12	12	0	0	0	2

Underlined values for total incidences were interpreted to be test-substance related increases in microscopic observations.

Liver

Centrilobular hepatocellular hypertrophy was observed in male and female rats exposed to 3000 ppm of the test substance and occurred in greater incidences in females compared to males.

The hepatocellular hypertrophy in all animals was minimal and was characterized by an increase in the size of centrilobular hepatocytes due to an increase in nuclear and cytoplasmic area.

Hepatocellular hypertrophy is a common microscopic finding associated with the non-adverse xenobiotic induction of hepatocellular enzymes.[24] Such was also the case in this study as increased liver weights, and microscopic hepatocellular hypertrophy were not associated with microscopic or clinical pathology changes indicative of liver toxicity.

Thyroid

Low incidences (2/12 in both males and females) of minimal hypertrophy of thyroid follicular epithelium were present in male and female rats in the 3000 ppm exposure groups.

Thyroid hypertrophy is a common finding in rats in association with induction of hepatic microsomal enzymes, and in this study was seen only at doses that also produced liver hypertrophy consistent with enzyme induction. Increased activity of the enzyme UDP-glucuronyltransferase, as part of a spectrum of induced cytochrome P450 isoenzymes, leads to increased biliary excretion of the thyroid hormone, T_4. This results in elevation of thyroid stimulating hormone (TSH) which produces hypertrophy of follicular cells. Due to the species-specific short half life for T_4 in rodents, rats are uniquely sensitive to thyroid hormone perturbation in association with induction of liver enzymes.[26] Thyroid follicular cell hypertrophy in the current study was considered potentially adverse in the species tested. However, this response is likely not relevant to nonrodent species.[26]

Kidneys

An increase in hyaline droplet accumulation within the epithelium of the proximal convoluted tubule (PCT) of the kidneys was observed in male rats at all exposure concentrations.

Small quantities of hyaline droplets are a normal finding in the cytoplasm of the renal proximal convoluted tubular epithelium in male rats. They consist of phagolysosomes containing the poorly hydrolysable low molecular weight protein, $\alpha_{2\mu}$ globulin. Normally, approximately 50 mg of this globulin are produced daily in the male rat liver and passed into the glomerular filtrate. More than half of the globulin is reabsorbed by the lining cells of the PCT. Several xenobiotics have been reported to increase the accumulation of hyaline droplets in the PCT by binding to the $\alpha_{2\mu}$ globulin. Since female rats, and most other species including mice, dogs, monkeys and humans, do not produce significant quantities of the $\alpha_{2\mu}$ globulin, experimental findings related to hyaline droplet accumulation in male rats are not relevant to other species.[27]

Additional findings in the kidneys of all exposed male groups were the presence of granular casts in renal tubules and slight increases in the incidence and severity of chronic progressive nephropathy (CPN). These changes tended to occur in rats with more prominent accumulation of hyaline droplets, especially at the 500 and 3000 ppm exposure concentrations.

Granular casts were graded as minimal to mild, but did not occur in a clear dose-related manner with respect to either incidence or severity. Granular casts consisted of multiple focal accumulations of lightly eosinophilic granular material in the tubular lumen near the junction of

the inner and outer stripes of the renal outer medulla. The tubular epithelium of affected tubules was often attenuated. Tubular cast may be indicative of renal tubular damage. Urinalysis was not conducted in this study, so the presence or absence of casts in the urine correlative to the casts seen microscopically could not be assessed.

The incidence and severity of chronic progressive nephropathy (CPN) were slightly increased in male rats in all exposed groups compared to the control group. However, as with casts, there was no clear dose response for this observation. CPN is a common background lesion of laboratory rats and is characterized by multifocal tubular epithelial degeneration and regeneration with peritubular fibrosis. Minimal (grade 1) CPN is commonly seen in about half the male rats of this age and strain. The presence of a slight increase in incidence and severity of CPN in the exposed groups suggests that the increased hyaline droplet accumulation contributed to an increase in this naturally occurring degenerative condition in the kidneys and was not a primary effect of the test substance.

In individual animals from the exposed male groups, the presence of tubular casts and more severe CPN were usually associated with more severe accumulation of hyaline droplets, especially at the two higher concentrations. Furthermore, in female rats that did not have increased hyaline droplet accumulation, tubular casts were not observed and incidences and severity of nephropathy was similar to that commonly seen in female rats of this strain and age. Therefore, tubular casts and the increase in CPN noted in all male exposure groups were likely secondary to the increase in tubular hyaline droplets in these groups.

Other

All other microscopic observations in this study were consistent with normal background lesions in rats of this age and strain.

B. Satellite Female Rats

1. Organ Weights

(Table 57, Appendix SS)

There were no test substance-related or statistically significant changes in organ weights in exposed female satellite groups compared to controls. The absence of organ weight changes in 3000 ppm satellite females compared to the 3000 ppm subchronic females may be due to recovery since their last exposure occurred on GD 19.

2. Gross Observations

(Table 60, Appendix TT)

There were no test substance-related gross findings in exposed female satellite groups compared to controls.

3. Microscopic Findings

(Table 60, Appendix UU)

One mating pair (male 406/female 430 in the 3000 ppm group) failed to produce a litter. There were no microscopic changes in the reproductive organs of these animals.

ANATOMIC PATHOLOGY CONCLUSIONS

Following subchronic inhalation exposure of male and female rats to the test substance at concentrations of up to 3000 ppm, test substance-related effects were present in the kidneys, liver and thyroid gland.

In male rats, kidney weights were increased in the 500 and 3000 ppm groups, and increased hyaline droplet accumulation in renal tubules was present at all exposure concentrations. Additional microscopic changes in the kidneys of male rats were likely secondary to hyaline droplet accumulation. These included granular casts within renal tubules and slight increases in the incidence and severity of CPN. The kidney changes in male rats were considered adverse for the species tested. However, hyaline droplet accumulation, and thus the associated secondary effects, is species and sex specific and not predictive of effects in other species.

Kidney weights were also increased in females at 3000 ppm. However, in females the kidney weight changes were not associated with evidence of renal toxicity, based on the lack of correlative microscopic or clinical chemistry findings. Therefore, the kidney weight changes in females were considered non-adverse.

Other exposure-related findings were limited to the 3000 ppm male and female groups. These included increased liver weight and microscopic hepatocellular hypertrophy. These liver effects were considered non-adverse, adaptive responses to metabolism of a xenobiotic. Low incidences of minimal hypertrophy of thyroid follicular epithelium were also present in 3000 ppm males and females and were likely secondary to liver enzyme induction.

DISCUSSION AND CONCLUSIONS

Test substance-related increases in the incidence of stained and wet fur were observed at ≥ 500 ppm, however, they did not adversely impact the health of the animals.

Test substance-related decreases in body weight, weight gain, and food efficiency occurred in 3000 ppm subchronic and satellite females. Slightly decreased body weight and/or weight gain occurred in 3000 ppm males; however, the magnitude of the effect in males was not considered to be adverse. There were no adverse or test substance-related effects on reproductive function, and no effects on offspring body weight, clinical observations, or survival.

There were no adverse or test substance-related effects on neurobehavioral parameters in males, subchronic females, or in satellite females. The range of mean values for forelimb grip strength measurement in satellite females evaluated on lactation day 4 was slightly greater (0.70-0.83 kg) compared to the forelimb grip strength of subchronic females measured during week 4 (0.68-0.78 kg). This small difference likely reflects the slight difference s in range of mean values for body weight between the satellite females and subchronic females (306.9-331.5 g for satellite females and 251.9-269.4 for subchronic females). With respect to hindlimb grip strength, there was no difference between the range of mean values for satellite females compared to subchronic females. In addition, there were no differences in neurobehavioral endpoints evaluated in an open field arena or the motor activity monitor (responses to approach, touch, auditory stimulus, tail pinch; and pupillary response) between satellite females and subchronic females.). With respect to motor activity, there was no difference between the range of mean values for satellite females compared to subchronic females. Therefore, the neurobehavioral data for subchronic females were similar to the data for satellite females evaluated on lactation day 4, indicating that pregnancy status did not affect evaluation of these neurobehavioral parameters.

There were no adverse or test substance-related effects on hematology and clinical pathology parameters. As expected, clinical chemistry parameters were affected by pregnancy status, resulting in differences between subchronic females when compared to lactating females. There were no adverse or biologically significant differences in these parameters between the control and treated females within the subchronic or lactating females group. Thus, there were no unique, test substance-related effects in lactating females. Therefore, lactating females were not more sensitive to the test substance compared to subchronic females.

Liver weight parameters were increased in 3000 ppm males and females, which correlated with hepatocellular hypertrophy. Kidney weight parameters were increased in 500 ppm and above males and 3000 ppm females. In males, the increased absolute/relative kidney weights correlated with hyaline droplet accumulation which was observed at 100 ppm and above males. In 3000 ppm females, the increased kidney weight parameters were not associated with any functional or microscopic change, and therefore were considered secondary to non-adverse enzyme induction. Similar to the changes in clinical chemistry parameters, lactating females had increased liver weights compared to subchronic females. However, there were no unique, test substance-related effects on organ weight in lactating females.

Minimal centrilobular hepatocellular hypertrophy was observed in males and females exposed to 3000 ppm, possibly secondary to enzyme induction. Minimal hypertrophy of thyroid follicular epithelium occurred in 3000 ppm males and females, possibly secondary to the liver enzyme induction. In the kidney, the incidences of hyaline droplets, tubular granular casts, and chronic progressive nephropathy consistent with male and species specific hydrocarbon nephropathy were increased in 100 ppm and above males.

Under the conditions of this study, the no-observed-adverse-effect level (NOAEL) for systemic toxicity in males was not achieved based on an increased incidence of male-specific hyaline droplet accumulation at 100 ppm and above. However, these findings are generally accepted by US EPA[28] as a hydrocarbon-induced male rat nephropathy, and are not relevant to human risk assessment. The NOAEL for male rats exclusive of the nephropathy is 500 ppm based on hypertrophy of the thyroid follicular epithelium observed in 3000 ppm males. The NOAEL for systemic toxicity in females was 500 ppm based on decreased body weight, weight gain, and food efficiency; and on hypertrophy of the thyroid follicular epithelium observed in 3000 ppm females. The NOAEL for reproductive and neurobehavioral toxicology was 3000 ppm, the highest concentration tested.

RECORDS AND SAMPLE STORAGE

Specimens, all raw data, the protocol, amendments, and the final report will be retained in the archives of Haskell Laboratory for ten years following the issuance of the final report. After that period, arrangements will be made to either return all materials to the Sponsor or archive them longer at Haskell Laboratory.

Laboratory-specific raw data such as personnel files, instrument, equipment, refrigerator and/or freezer raw data will be retained at the facility where the work was done.

REFERENCES

1. DuPont Haskell Laboratory. (2005). Naphtha, Petroleum, Heavy Straight-Run: Pilot Inhalation Developmental Toxicity Study in Rats. Unpublished Report. DuPont Haskell Laboratory DuPont-18330, DuPont Haskell Laboratory Work Request (WR) 16123, Service Code 730.
2. DuPont Haskell Laboratory. (2005). Naphtha, Petroleum, Heavy Straight-Run: Inhalation Methods Development. Unpublished Report. DuPont Haskell Laboratory DuPont-18332, DuPont Haskell Laboratory Work Request (WR) 16123, Service Code 707.
3. DuPont Haskell Laboratory (1995). Neurotoxicity Evaluation of Trimethyltin in Rats (Positive Control Study). Unpublished data, HLR 266-95.
4. DuPont Haskell Laboratory (1997). Neurotoxicity Evaluation of Amphetamine in Rats (Positive Control Study). Unpublished data, HL-1997-00686.
5. DuPont Haskell Laboratory (1997). Neurotoxicity Evaluation of Carbaryl in Rats (Positive Control Study). Unpublished data, HL-1997-00361.
6. DuPont Haskell Laboratory (1996). Neurotoxicity Evaluation of Acrylamide in Rats (Positive Control Study). Unpublished data, HLR 293-95.
7. DuPont Haskell Laboratory (2000). Neurotoxicity Evaluation of Carbaryl in Rats (Positive Control Study). Unpublished data, DuPont-3468.
8. Levene, H. (1960). Robust test for equality of variances. *Contributions to Probability and Statistics* (J. Olkin, ed.), pp 278-292. Stanford University Press, Palo Alto.
9. Shapiro, S.S. and Wilk, M.B. (1965). An analysis of variance test for normality (complete samples). *Biometrika* 52, 591-611.
10. Snedecor, G.W. and Cochran, W.G. (1967). *Statistical Methods*, 6th edition, pp 246-248 and 349-352. The Iowa State University Press, Iowa.
11. Dunnett, C.W. (1964). New tables for multiple comparisons with a control. *Biometrics* 20, 482-491.
12. Dunnett, C.W. (1980). Pairwise multiple comparisons in the unequal variance case. *J. Amer. Statist. Assoc.* 75, 796-800.
13. Tamhane, A.C. (1979). A comparison of procedures for multiple comparison of means with unequal variances. *J. Amer. Statist. Assoc.* 74, 471-480.
14. Kruskal, W.H. and Wallis, W.A. (1952). Use of ranks in one-criterion analysis of variance. *J. Amer. Statist. Assoc.* 47, 583-621.
15. Dunn, O.J. (1964). Multiple contrasts using rank sums. *Technometrics* 6, 241-252.
16. Hsu, J.C. (1992). The Factor Analytic Approach to Simultaneous Inference in the General Linear Model. *Journal of Computational and Graphical Statistics* 1, 151-168.
17. Stephenson, W.R., Jacobson, D. (1988). A comparison of Nonparametric Analysis of Covariance Techniques. *Communications in Statistics – Simulations* 17. 17(2), 451-461.

18. Milliken, G.A. and Johnson, D.A. (1984). *Analysis of Messy Data, Volume 1.: Designed Experiments.* Lifetime Learning Publications, Belmont.

19. Hocking, R.A. (1985). The Analysis of Linear Models. Brooks/Cole, Monterey.

20. Selwyn, M.R. (1995). The use of trend tests to determine a no-observable-effect level in animal safety studies. Journal of the American College of Toxicology 14(2), 158-168.

21. Jonckheere, A.R. (1954). A distribution-free K-sample test against ordered alternatives. Biometrika 41, 133-145.

22. Fisher, R.A. (1985). *Statistical Methods for Research Workers* 13th edition. Haffner, New York.

23. Haseman, J.K. and Hogan, M.D. (1975). Selection of the experimental unit in teratology studies. *Teratology* 12, 165-171.

24. Cattley R.C. and Popp J.A. (2002). Liver. In: "Handbook of Toxicologic Pathology" (WM Haschek, CG Rousseaux, and MA Wallig, eds), 2nd Ed., pp. 202. Academic Press, New York.

25. Khan, K.N.M. and Alden, C.L. (2002a). Kidney. In: "Handbook of Toxicologic Pathology" (WM Haschek, CG Rousseaux, and MA Wallig, eds), 2nd Ed., pp. 269. Academic Press, New York.

26. Capen, CC (1997). Toxic responses of the thyroid gland. In: Comprehensive Toxicology, IG Sipes et al.., eds., Elsevier Science Inc., New York, pp 683-700.

27. Khan, K.N.M. and Alden, C.L. (2002b). Kidney. In: "Handbook of Toxicologic Pathology" (WM Haschek, CG Rousseaux, and MA Wallig, eds), 2nd Ed., pp. 294-298. Academic Press, New York.

28. U.S. EPA (1991). Alpha 2 Microglobulin: Association of Chemically Induced Renal Toxicity and Neoplasia in Male Rats. In Risk Assessment Forum, p. 85. U.S. Government Printing Office, Washington, D.C.

TABLES

TABLES

EXPLANATORY NOTES

Notes

Due to rounding differences, values in tables may be slightly different than appendices.

Abbreviations

BW =		Body weight
BWG	=	Body weight gain
FC =		Food consumption
FE =		Food efficiency
G =		Gestation
GD =		Gestation day
Kg =		Kilogram
L =		Lactation
LD =		Lactation day
Mg =		Milligram
N/n	=	Number in group/Number of values used in calculation of mean
PND =		Postnatal day
Ppm	=	parts per million
Wt =		Weight
-/---/./…/Blank space	=	No data/Data could not be calculated

INHALATION DATA

Chamber Concentrations of High Naphthenic Naphtha
Chamber Environmental Conditions

n - number of samples
ppm - parts per million
S.E.M. - standard error of the mean

Summary of Observations in Rats During Exposure

NAD - no abnormalities detected

NOTES:

Chamber Concentrations of High Naphthenic Naphtha
Chamber Environmental Conditions

Values are reported to 2 significant figures.
Calculations were performed prior to rounding values.

TABLES

EXPLANATORY NOTES (Continued)

CLINICAL PATHOLOGY DATA

ABBREVIATIONS:

Summary of Hematology Values

RBC	-	red blood cell count
HGB	-	hemoglobin
HCT	-	hematocrit
MCV	-	mean corpuscular (cell) volume
MCH	-	mean corpuscular (cell) hemoglobin
MCHC	-	mean corpuscular (cell) hemoglobin concentration
RDW	-	red cell distribution width
ARET	-	absolute reticulocyte count
PLT	-	platelet count
WBC	-	white blood cell count
ANEU	-	absolute neutrophil
ALYM	-	absolute lymphocyte
AMON	-	absolute monocyte
AEOS	-	absolute eosinophil
ABAS	-	absolute basophil
ALUC	-	absolute large unstained cell
ABAN	-	absolute neutrophil band
AHSN	-	absolute hypersegmented neutrophil
AAL	-	absolute atypical lymphocyte
-	-	no data
NC	-	not calculated or not calculable

Summary of Coagulation Values

PT	-	prothrombin time
APTT	-	activated partial thromboplastin time

TABLES

EXPLANATORY NOTES (Continued)

ABBREVIATIONS: (Continued)

Summary of Clinical Chemistry Values

AST	-	aspartate aminotransferase
ALT	-	alanine aminotransferase
SDH	-	sorbitol dehydrogenase
ALKP	-	alkaline phosphatase
GGT	-	gamma glutamyltransferase
BILI	-	total bilirubin
BUN	-	urea nitrogen
CREA	-	creatinine
CHOL	-	cholesterol
TRIG	-	triglycerides
GLUC	-	glucose
TP	-	total protein
ALB	-	albumin
GLOB	-	globulin
CALC	-	calcium
IPHS	-	inorganic phosphorous
NA	-	sodium
K	-	potassium
CL	-	chloride
A/G	-	albumin/globulin ratio

NOTES:

Summary of Hematology Values
Summary of Coagulation Values
Summary of Clinical Chemistry Values
Groups with identical values may vary in statistical significance, because tabulated statistics are rounded to fewer decimal places than the values used for statistical determination.

Table 1
Chamber Concentrations of Test Substance

DESIGN CONCENTRATION (ppm)	MEASURED CONCENTRATION (ppm)[a]			
	MEAN	S.E.M.	RANGE	n
0	0	0	0	38
100	100	0.77	90 - 110	38
500	500	2.0	480 - 560	38
3000	3000	8.3	2800 - 3100	48[b]

a Values represent the mean, standard error of the mean (S.E.M.), and range of the daily mean values obtained from n exposures.
b Two rats without evidence of copulation were exposed for 19 days post cohabitation.

Table 2
Chamber Environmental Conditions

DESIGN CONCENTRATION (ppm)	TEMPERATURE (°C)[a]			RELATIVE HUMIDITY (%)[a]			n
	MEAN	S.E.M.	RANGE	MEAN	S.E.M.	RANGE	
0	23	0.16	20 - 24	51	0.58	41 - 57	38
100	22	0.16	19 - 24	53	0.53	45 - 58	38
500	22	0.18	19 - 24	53	0.56	43 - 59	38
3000	22	0.19	20 - 25	54	0.46	43 - 59	48[b]

DESIGN CONCENTRATION (ppm)	AIRFLOW (L/min)[a]			OXYGEN (%)[a]			n
	MEAN	S.E.M.	RANGE	MEAN	S.E.M.	RANGE	
0	300	3.48	260 - 400	20	0.017	20	38
100	290	3.41	270 - 390	20	0.024	20	38
500	290	3.23	260 - 370	20	0.015	20	38
3000	280	3.22	250 - 390	20	0.015	20	48[b]

a Values represent the mean, standard error of the mean (S.E.M.), and range of the daily mean values obtained from n exposures.
b Two rats without evidence of copulation were exposed for 19 days post cohabitation.

Table 3
Mean Measured Concentration (ppm) of 12 Selected Components of
Naphtha, Petroleum, Heavy Straight-Run

Peak	Peak ID	100 ppm[a]	500 ppm[a]	3000 ppm[b]
1	2-MethylC6+C7-Olefin	4.7 (0.6)	22.2 (0.5)	128.3 (12.6)
2	3-Methylhexane	3.6 (0.4)	17.2 (0.4)	100.2 (9.7)
3	t-1,3-DimethylcyC5	1.5 (0.3)	7.1 (0.2)	41.4 (4.0)
4	t-1,2-DimethylcycloC5	1.7 (0.2)	7.9 (0.3)	45.9 (4.3)
5	n-Heptane	7.3 (0.9)	34.4 (0.8)	203.2 (18.4)
6	Methylcyclohexane	6.8 (0.8)	32.0 (0.8)	170.1 (17.4)
7	Toluene	3.5 (0.4)	15.9 (0.4)	95.9 (8.4)
8	2-Methylheptane	3.3 (0.4)	14.7 (0.6)	89.5 (7.9)
9	n-Octane	5.7 (0.7)	25.8 (1.1)	158.5 (14.0)
10	Ethylcyclohexane	2,0 (0.2)	8.7 (0.3)	53.2 (4.5)
11	m-Xylene	1.8 (0.2)	7.4 (0.3)	45.7 (4.1)
12	n-Nonane	4.5 (0.7)	19.1 (1.2)	118.3 (10.1)

a Mean and (standard deviation) of 6 measurements.
b Mean and (standard deviation) of 7 measurements.

Table 4
Summary of Observations in Rats During Exposure

	OBSERVATIONS DURING EXPOSURE			
	Group 1	Group 2	Group 3	Group 4
EXPOSURE	0 ppm	100 ppm	500 ppm	3000 ppm
1	NAD[a]	NAD	NAD	NAD
2	NAD	NAD	NAD	NAD
3	NAD	NAD	NAD	NAD
4	NAD	NAD	NAD	NAD
5	NAD	NAD	NAD	NAD
6	NAD	NAD	NAD	NAD
7	NAD	NAD	NAD	NAD
8	NAD	NAD	NAD	NAD
9	NAD	NAD	NAD	NAD
10	NAD	NAD	NAD	NAD
11	NAD	NAD	NAD	NAD
12	NAD	NAD	NAD	NAD
13	NAD	NAD	NAD	NAD
14	NAD	NAD	NAD	NAD
15	NAD	NAD	NAD	NAD
16	NAD	NAD	NAD	NAD
17	NAD	NAD	NAD	NAD
18	NAD	NAD	NAD	Wet Fur[b]
19	NAD	NAD	NAD	Wet Fur
20	NAD	NAD	NAD	Wet Fur
21	NAD	NAD	NAD	Wet Fur
22	NAD	NAD	NAD	Wet Fur
23	NAD	NAD	NAD	Wet Fur
24	NAD	NAD	NAD	Wet Fur
25	NAD	NAD	NAD	Wet Fur
26	NAD	NAD	NAD	Wet Fur

Table 4
Summary of Observations in Rats During Exposure (Continued)

	OBSERVATIONS DURING EXPOSURE[a]			
EXPOSURE	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
27	NAD	NAD	NAD	Wet Fur
28	NAD	NAD	NAD	Wet Fur
29	NAD	NAD	NAD	Wet Fur
30	NAD	NAD	NAD	Wet Fur
31	NAD	NAD	NAD	Wet Fur
32	NAD	NAD	NAD	Wet Fur
33	NAD	NAD	NAD	Wet Fur
34	NAD	NAD	NAD	Wet Fur
35	NAD	NAD	NAD	Wet Fur
36	NAD	NAD	NAD	Wet Fur
37	NAD	NAD	NAD	Wet Fur
38	NAD	NAD	NAD	Wet Fur
39	[c]	[c]	[c]	Wet Fur
40	[c]	[c]	[c]	Wet Fur
41	[c]	[c]	[c]	Wet Fur
42	[c]	[c]	[c]	Wet Fur
43	[c]	[c]	[c]	Wet Fur
44	[c]	[c]	[c]	Wet Fur
45	[c]	[c]	[c]	Wet Fur
46	[c]	[c]	[c]	Wet Fur
47	[c]	[c]	[c]	Wet Fur
48	[c]	[c]	[c]	Wet Fur

a NAD = no abnormalities detected in animals visible through the chamber window.
b At least one animal visible though the chamber window had wet fur.
c Chamber was not run during this exposure.

Table 5
Summary of Post-Exposure Clinical Observations in Subchronic Male Rats

Group	1	2	3	4
Concentration(ppm)	0	100	500	3000
N	12	12	12	12
Hair Loss				
Number of Animals	1	1	1	0
Scheduled Sacrifice				
Number of Animals	12	12	12	12
Stained Skin/Fur – Red - Face				
Number of Animals	0	0	0	11#
Wet fur – Chest, Face, Perineum				
Number of Animals	0	0	0	7#
Wound - Superficial – Forelimb Left				
Number of Animals	1	0	0	0

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Comparison to control (Fisher's Exact test) significant
\# Trend test (Cochran-Armitage) significant

Table 6
Summary of Detailed Clinical Observations in Subchronic Male Rats

Evaluated Prior to Daily Exposure

Group	1	2	3	4
Concentration(ppm)	0	100	500	3000
N	12	12	12	12
Hair loss – Forelimb Bilateral				
Number of Animals	1	1	1	0
Stained Skin/Fur - Red - Face				
Number of Animals	0	0	0	1
Wound - Superficial – Forelimb Left				
Number of Animals	1	0	0	0

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Comparison to control (Fisher's Exact test) significant
\# Trend test (Cochran-Armitage) significant

Table 7
Summary of Post-Exposure Clinical Observations in Subchronic Female Rats

Group	1	2	3	4
Concentration(ppm)	0	100	500	3000
N	12	12	12	12
Discharge – Black - Eye Right				
Number of Animals	0	0	1	0
Discharge - Red – Eye Right				
Number of Animals	0	0	1	0
Hair Loss – Forelimb Bilateral				
Number of Animals	2	0	1	0
Scab - Tail				
Number of Animals	1	0	0	0
Scheduled Sacrifice				
Number of Animals	12	12	12	12
Stained Skin/Fur - Red - Face				
Number of Animals	7	10	12#	12#
Stained Skin/Fur - Tan - Face				
Number of Animals	0	0	0	1
Wet Fur – Chest, Chin, Face, Perineum				
Number of Animals	0	0	0	12#
Wound - Deep – End of Tail				
Number of Animals	1	0	0	0
Wound - Superficial – Tail				
Number of Animals	1	0	0	0

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Comparison to control (Fisher's Exact test) significant
\# Trend test (Cochran-Armitage) significant

Table 8
Summary of Detailed Clinical Observations in Subchronic Female Rats

Evaluated Prior to Daily Exposure

Group	1	2	3	4
Concentration(ppm)	0	100	500	3000
N	12	12	12	12
Hair Loss – Forelimb Bilateral				
Number of Animals	2	0	1	0
Stained Skin/Fur - Red - Face				
Number of Animals	0	1	1	11#
Wound - Superficial - Tail				
Number of Animals	1	0	0	0

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Comparison to control (Fisher's Exact test) significant
\# Trend test (Cochran-Armitage) significant

Table 9
Summary of Post-Exposure Clinical Observations in Satellite Female Rats During Premating

Group	1	2	3	4
Concentration(ppm)	0	100	500	3000
N	12	12	12	12
Hair Loss – Forelimb Bilateral				
Number of Animals	1	0	0	0
Stained Skin/Fur - Red - Face				
Number of Animals	0	4	9#	12#
Stained Skin/Fur - Tan - Face				
Number of Animals	0	1	0	0
Wet Fur – Chest, Chin, Face				
Number of Animals	0	0	0	11#

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Comparison to control (Fisher's Exact test) significant
\# Trend test (Cochran-Armitage) significant

Table 10
Summary of Post-Exposure Clinical Observations in Satellite Female Rats During Gestation

Group	1	2	3	4
Concentration(ppm)	0	100	500	3000
N	12	12	12	9
Hair Loss – Forelimb Bilateral				
Number of Animals	5	2	2	1
Missing – Tip of Tail				
Number of Animals	0	0	1	0
Stained Skin/Fur - Red - Face				
Number of Animals	1	4	12*	9*
Stained Skin/Fur - Tan - Face				
Number of Animals	0	1	0	0
Wet Fur – Chest, Chin, Face, Perineum				
Number of Animals	0	0	0	9#

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Comparison to control (Fisher's Exact test) significant
\# Trend test (Cochran-Armitage) significant

Note: This table contains data from animals with confirmed mating.

Table 11
Summary of Post-Exposure Clinical Observations in Satellite Female Rats During Lactation

Group	1	2	3	4
Concentration(ppm)	0	100	500	3000
N	12	12	12	11
Hair Loss – Forelimb Bilateral, Hindquarters Left				
Number of Animals	5	2	3	1
Missing – Tip of Tail				
Number of Animals	0	0	1	0
Scheduled Sacrifice				
Number of Animals	12	12	12	11
Stained Skin/Fur - Red - Face				
Number of Animals	0	0	0	5#

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Comparison to control (Fisher's Exact test) significant
\# Trend test (Cochran-Armitage) significant

Table 12
Summary of Detailed Clinical Observations in Satellite Female Rats

Evaluated Prior to Daily Exposure

Group	1	2	3	4
Concentration(ppm)	0	100	500	3000
N	12	12	12	12
Hair loss - Forelimb Bilateral, HindQuarters Left				
Number of Animals	5	2	3	1
Missing - Tip of Tail				
Number of Animals	0	0	1	0
Stained Skin/Fur - Red - Face				
Number of Animals	0	0	2	9#

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Comparison to control (Fisher's Exact test) significant
\# Trend test (Cochran-Armitage) significant

Table 13
Mean Body Weights (grams) of Subchronic Male Rats

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BW:DAY1	301.0	295.5	293.6	301.0
	14.8(12)	13.4(12)	17.6(12)	14.9(12)
BW:DAY8	345.0	341.0	326.3	333.0
	23.4(12)	22.1(12)	35.7(12)	18.3(12)
BW:DAY15	381.2	369.6	358.2	363.4
	33.6(12)	29.5(12)	41.8(12)	20.8(12)
BW:DAY22	405.6	396.9	381.6	387.2
	37.5(12)	31.5(12)	42.2(12)	24.2(12)
BW:DAY29	433.7	422.5	413.6	413.7
	42.8(12)	33.7(12)	47.1(12)	29.1(12)
BW:DAY31	408.1	395.0	384.6	384.4
	40.6(12)	29.9(12)	43.9(12)	27.7(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 14
Mean Body Weight Gains (grams) of Subchronic Male Rats

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BWG:DAY1-DAY8	44.0	45.5	32.7	32.0
	12.9(12)	11.7(12)	25.3(12)	8.6(12)
BWG:DAY8-DAY15	36.2	28.6	31.9	30.4
	13.3(12)	9.5(12)	8.8(12)	6.3(12)
BWG:DAY15-DAY22	24.5	27.3	23.4	23.8
	10.8(12)	4.9(12)	8.0(12)	7.6(12)
BWG:DAY22-DAY29	28.1	25.6	31.9	26.4
	11.4(12)	7.9(12)	10.3(12)	8.2(12)
BWG:DAY1-DAY15	80.2	74.1	64.6	62.4
	25.2(12)	19.1(12)	31.8(12)	11.0(12)
BWG:DAY1-DAY29a	132.7	127.0	120.0	112.6
	35.2(12)	24.7(12)	39.5(12)	16.8(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

a Body weight gain values for the rats after fasting (on test day 32) were not used for the calculation of mean weight gain over the interval.

Table 15
Mean Body Weights (grams) of Subchronic Female Rats

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BW:DAY1	218.5 13.1(12)	216.8 7.6(12)	218.0 10.3(12)	214.9 10.5(12)
BW:DAY8	235.9 17.7(12)	231.6 9.8(12)	236.0 14.5(12)	220.3* 16.1(12)
BW:DAY15	243.3 18.1(12)	241.7 16.5(12)	244.9 19.5(12)	230.0 16.4(12)
BW:DAY22	258.1 21.4(12)	251.9 20.7(12)	255.1 20.8(12)	241.4 17.7(12)
BW:DAY29	269.5 23.0(12)	263.7 18.5(12)	266.7 27.2(12)	248.1 22.7(12)
BW:DAY32	251.2 22.2(12)	246.6 19.4(12)	248.2 25.4(12)	229.5 20.9(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 16
Mean Body Weight Gains (grams) of Subchronic Female Rats

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BWG:DAY1-DAY8	17.5	14.8	18.0	5.4*
	6.8(12)	4.6(12)	7.5(12)	8.6(12)
BWG:DAY8-DAY15	7.3	10.1	8.8	9.7
	5.6(12)	11.5(12)	7.8(12)	5.2(12)
BWG:DAY15-DAY22	14.8	10.2	10.2	11.5
	7.0(12)	17.7(12)	7.3(12)	17.8(12)
BWG:DAY22-DAY29	11.4	11.8	11.6	6.7
	6.3(12)	6.2(12)	7.6(12)	15.9(12)
BWG:DAY1-DAY15	24.8	24.9	26.9	15.1
	6.5(12)	13.8(12)	11.1(12)	10.3(12)
BWG:DAY1-DAY29a	51.1	46.9	48.7	33.3*
	11.4(12)	13.3(12)	18.7(12)	16.2(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

a Body weight gain values for the rats after fasting (on test day 32) were not used for the calculation of mean weight gain over the interval.

Table 17
Mean Body Weights (grams) of Satellite Female Rats During Premating

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BW:DAY1	219.1	218.8	215.4	217.7
	9.8(12)	15.1(12)	13.2(12)	16.5(12)
BW:DAY8	236.0	237.0	234.4	230.3
	14.5(12)	16.1(12)	14.6(12)	15.1(12)
BW:DAY15	245.1	248.9	242.9	236.2
	14.4(12)	19.9(12)	16.8(12)	13.4(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 18
Mean Body Weight Gains (grams) of Satellite Female Rats During Premating

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BWG:DAY1-DAY8	17.0	18.2	18.9	12.6
	6.8(12)	6.7(12)	8.3(12)	5.3(12)
BWG:DAY8-DAY15	9.1	12.0	8.5	5.9
	6.8(12)	6.7(12)	6.6(12)	6.2(12)
BWG:DAY1-DAY15	26.1	30.1	27.5	18.5
	7.8(12)	10.9(12)	9.8(12)	9.8(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 19
Mean Body Weights (grams) of Satellite Female Rats During Gestation

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BW:DAY0	252.9	252.8	249.9	247.3
	17.7(12)	17.8(12)	12.2(12)	15.3(9)
BW:DAY7	287.3	290.7	287.6	276.3
	19.7(12)	26.0(12)	20.1(12)	20.5(9)
BW:DAY14	326.5	329.7	329.0	310.1
	26.6(12)	26.1(12)	24.5(12)	23.3(9)
BW:DAY21	424.1	426.2	421.2	394.0
	31.6(12)	34.0(11)	32.6(11)	29.3(9)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Note: This table contains data from animals with confirmed mating.

Table 20
Mean Body Weight Gains (grams) of Satellite Female Rats During Gestation

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BWG:DAY0-DAY7	34.5	37.9	37.7	29.0
	5.5(12)	11.1(12)	11.5(12)	8.1(9)
BWG:DAY7-DAY14	39.1	39.0	41.4	33.8
	10.4(12)	6.2(12)	9.0(12)	5.0(9)
BWG:DAY14-DAY21	97.6	96.4	93.2	83.9
	10.8(12)	12.6(11)	9.6(11)	14.6(9)
BWG:DAY0-DAY21	171.2	173.4	171.6	146.8
	19.8(12)	22.7(11)	23.7(11)	21.3(9)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Note: This table contains data from animals with confirmed mating.

Table 21
Mean Body Weights (grams) of Satellite Female Rats During Lactation

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BW:DAY0	307.3 21.9(12)	313.6 22.3(12)	305.9 22.3(12)	285.6* 13.5(11)
BW:DAY4	318.7 25.1(12)	319.0 25.9(12)	319.4 17.5(12)	296.5 18.1(11)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 22
Mean Body Weight Gains (grams) of Satellite Female Rats During Lactation

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
BWG:DAY0-DAY4	11.4	5.4	13.5	10.9
	10.5(12)	12.5(12)	15.2(12)	12.1(11)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 23
Mean Food Consumption (grams/day) by Subchronic Male Rats

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FC:DAY1-DAY8	29.9	28.7	27.1	26.1*
	2.5(12)	3.1(12)	4.5(12)	2.5(12)
FC:DAY8-DAY15	30.1	28.2	27.2	27.1
	2.7(12)	3.4(12)	3.9(12)	2.3(12)
FC:DAY1-DAY15	30.0	28.4	27.2	26.6*
	2.4(12)	3.2(12)	4.1(12)	2.2(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 24
Mean Food Efficiency (grams weight gain/grams food consumed) by Subchronic Male Rats

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FE:DAY1-DAY8	0.208 0.051(12)	0.223 0.044(12)	0.158 0.128(12)	0.174 0.044(12)
FE:DAY8-DAY15	0.169 0.054(12)	0.143 0.036(12)	0.166 0.033(12)	0.160 0.031(12)
FE:DAY1-DAY15	0.189 0.050(12)	0.184 0.031(12)	0.163 0.072(12)	0.167 0.025(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 25
Mean Food Consumption (grams/day) by Subchronic Female Rats

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FC:DAY1-DAY8	20.9	21.1	21.1	19.7
	2.3(12)	1.9(12)	2.9(12)	2.9(12)
FC:DAY8-DAY15	21.0	20.9	21.0	20.0
	1.9(12)	1.7(12)	3.0(12)	2.2(12)
FC:DAY15-DAY18a	21.8	21.5	21.5	21.0
	2.6(12)	7.5(12)	3.4(12)	2.4(12)
FC:DAY18-DAY22a	20.9	21.5	20.8	20.5
	2.0(12)	2.4(12)	3.6(12)	1.9(12)
FC:DAY22-DAY29	22.6	22.4	22.1	21.1
	2.9(12)	1.8(12)	3.6(12)	1.8(12)
FC:DAY1-DAY29	21.4	21.5	21.4	20.4
	2.0(12)	1.9(12)	3.1(12)	2.1(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

a In error, the food consumption period was ended on test day 18, rather than test day 22. The 2 intervals for days 15-18 and 18-22 are reported rather than the 7-day interval of days 15-22.

Table 26
Mean Food Efficiency (grams weight gain/grams food consumed) by Subchronic Female Rats

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FE:DAY1-DAY8	0.117	0.100	0.119	0.033*
	0.040(12)	0.028(12)	0.037(12)	0.055(12)
FE:DAY8-DAY15a	0.050	0.069	0.058	0.071
	0.040(12)	0.076(12)	0.047(12)	0.038(12)
FE:DAY22-DAY29	0.073	0.077	0.071	0.042
	0.038(12)	0.041(12)	0.047(12)	0.101(12)
FE:DAY1-DAY29	0.084	0.077	0.079	0.057*
	0.014(12)	0.019(12)	0.021(12)	0.024(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

a In error, the food consumption period was ended on test day 18, rather than test day 22. The 2 intervals for days 15-18 and 18-22 could not be reported for food efficiency because body weights were not collected on test day 18.

Table 27
Mean Food Consumption (grams/day) by Satellite Female Rats During Premating

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FC:DAY1-DAY8	21.5	21.6	20.6	20.3
	1.6(12)	2.0(12)	2.6(12)	1.9(12)
FC:DAY8-DAY15	21.1	21.5	20.5	20.1
	1.5(12)	2.2(12)	1.7(12)	1.8(12)
FC:DAY1-DAY15	21.3	21.5	20.5	20.2
	1.5(12)	2.0(12)	1.9(12)	1.7(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 28
Mean Food Efficiency (grams weight gain/grams food consumed) by Satellite Female Rats During Premating

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FE:DAY1-DAY8	0.112	0.119	0.128	0.089
	0.042(12)	0.042(12)	0.056(12)	0.036(12)
FE:DAY8-DAY15	0.060	0.077	0.057	0.041
	0.045(12)	0.044(12)	0.046(12)	0.042(12)
FE:DAY1-DAY15	0.087	0.099	0.094	0.065
	0.024(12)	0.032(12)	0.030(12)	0.034(12)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 29
Mean Food Consumption (grams/day) by Satellite Female Rats During Gestation

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FC:DAY0-DAY7	25.3	26.5	25.7	22.7
	1.6(12)	3.5(12)	2.9(12)	2.6(9)
FC:DAY7-DAY14	27.8	29.2	27.9	25.4
	2.4(12)	3.4(12)	4.7(12)	3.1(9)
FC:DAY14-DAY21	28.9	29.5	28.9	26.6
	2.3(12)	2.4(12)	3.7(12)	2.5(9)
FC:DAY0-DAY21	27.3	28.4	27.5	24.9
	2.0(12)	2.8(12)	3.5(12)	2.7(9)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Note: This table contains data from animals with confirmed mating.

Table 30
Mean Food Efficiency (grams weight gain/grams food consumed) by Satellite Female Rats During Gestation

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FE:DAY0-DAY7	0.194	0.202	0.207	0.181
	0.027(12)	0.044(12)	0.047(12)	0.046(9)
FE:DAY7-DAY14	0.200	0.193	0.212	0.191
	0.042(12)	0.038(12)	0.030(12)	0.021(9)
FE:DAY14-DAY21	0.483	0.469	0.464	0.452
	0.044(12)	0.045(11)	0.036(11)	0.070(9)
FE:DAY0-DAY21	0.298	0.292	0.300	0.281
	0.025(12)	0.033(11)	0.017(11)	0.033(9)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Note: This table contains data from animals with confirmed mating.

Table 31
Mean Food Consumption (grams/day) by Satellite Female Rats During Lactation

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FC:DAY0-DAY4	37.8 5.6(12)	34.1 4.8(12)	37.0 4.7(12)	33.9 6.3(11)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 32
Mean Food Efficiency (grams weight gain/grams food consumed) by Satellite Female Rats During Lactation

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
FE:DAY0-DAY4	0.068	0.031	0.083	0.070
	0.066(12)	0.094(12)	0.096(12)	0.078(11)

Data summarized as: Mean
Standard Deviation (n)

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

^ Cochran-Armitage test for trend
* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
# Trend test (Jonckheere-Terpstra) significant
~ next to control mean indicates no analyses were performed

Table 33
Summary of Reproductive Outcome

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
No. of females paired	12	12	12	12
No. of females mated	12	12	12	11
No. of females pregnant[a]	12	12	12	11
No. of females that littered	12	12	12	11
Mating Index (%)[b]	100.0	100.0	100.0	91.7
Fertility Index (%)[c]	100.0~	100.0	100.0	100.0
Pre-coital Interval (Days)	3.2[d]	2.7	3.0	2.9
	0.9(12)	0.7(12)	1.0(12)	1.2(9)
Gestation Length (Days)	22.0	21.9	21.9	21.9
	0.0(12)	0.3(12)	0.3(12)	0.3(9)
Corpora Lutea	16.0	15.3	15.9	15.1
	1.6(12)	1.9(12)	1.3(12)	2.5(11)
Implantation Sites	15.9	15.3	15.9	15.0
	1.8(12)	1.9(12)	1.3(12)	2.6(11)
Post-Implantation Loss (%)[e]	3.5	6.2	5.3	7.5
	4.7(12)	6.3(12)	6.0(12)	7.1(11)

a Pregnant = uterine implantation sites
b No. of females mated ÷ No. of females paired X 100
c No. of females pregnant ÷ No. of females mated X 100
d Data summarized as: Mean
Standard Deviation (n)
e (No. of implantation sites – No. of Pups Born) ÷ No. of implantation sites X 100.

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
~ next to control mean indicates no analyses were performed

Table 34
Summary of Pup Survival

		Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
No. of viable litters					
	PND 0	12	12	12	11
	PND 4	12	12	12	11
No. of pups					
Born		15.3[a] 1.7(12)	14.3 2.1(12)	15.1 1.7(12)	13.8 2.4(11)
Born Alive		15.3 1.7(12)	14.3 2.1(12)	15.1 1.7(12)	13.8 2.4(11)
No. of pups alive on:					
	PND 4	15.3 1.6(12)	14.3 2.1(12)	15.1 1.7(12)	13.4 3.1(11)
Live Born Index (%)[b]		100.0~ 0.0(12)	100.0 0.0(12)	100.0 0.0(12)	100.0 0.0(11)
Viability Index (%)[c]		99.5[d] 1.7(12)	99.5[d] 1.8(12)	100.0 0.0(12)	100.0[e] 0.0(10)
Sex Ratio (%)[f]					
	PND 0	55.8 14.2(12)	46.0 14.7(12)	51.4 11.2(12)	45.9 9.7(11)

a Data summarized as: Mean
Standard Deviation (n)

b Number of pups born alive ÷ Number of pups born X 100

c Number of pups alive on day 4 ÷ Number of pups born alive X 100

d Groups 1 and 2 lost one female pup in one litter each by day 4, which did not change the average rounded pups/litter but did reduce the Viability Index. Actual values were 15.33 born alive and 15.25 alive on PND 4 in Group 1; and 14.33 born alive and 14.25 alive on PND 4 in Group 2.

e The offspring of dam #434 were excluded because they were delivered during exposure, in the exposure chamber.

f Number of male fetuses ÷ total number fetuses X 100

Statistical Analysis: Statistical significance is indicated by the following ($p < 0.05$):

* Parametric comparison to control (Dunnett/Tamhane-Dunnett) significant
@ Nonparametric comparison to control (Dunn's) significant
! Analysis of Covariance and Dunnett-Hsu
~ next to control mean indicates no analyses were performed

Table 35
Summary of Pup Clinical Observations

Group:	1	2	3	4
Concentration(ppm)	0	100	500	3000
No. of Litters/Pups Affected	0	0	0	0

Table 36
Mean Pup Weights (grams)

Group:		1	2	3	4
Concentration(ppm)		0	100	500	3000
PND 0	(Combined)	6.5 0.3(12)	6.6 0.4(12)	6.4 0.5(12)	6.2 0.6(11)
	(Males)	6.7 0.3(12)	6.8 0.4(12)	6.7 0.4(11)a	6.3 0.6(11)
	(Females)	6.3 0.4(12)	6.4 0.5(12)	6.4 0.4(11)a	6.2 0.7(11)
PND 4	(Combined)	10.3 0.5(12)	10.6 0.7(12)	10.0 0.8(12)	9.7 1.2(11)
	(Males)	10.5 0.5(12)	10.8 0.6(12)	10.3 0.9(12)	9.9 1.3(11)
	(Females)	9.9 0.6(12)	10.4 0.8(12)	9.8 0.9(12)	9.6 1.2(11)

Data summarized as: Mean of individual pup weights
Standard Deviation (number of litters)

Statistical Analysis: Data were statistically evaluated for the combined means only. Statistical significance is indicated by the following ($p < 0.05$):

* Analysis of Covariance and Dunnett-Hsu
\# Nonparametric Analysis of Covariance

a = The data for dam #333 were excluded from the mean values because one pup was missexed on PND 0.

Table 37
Mean Forelimb and Hindlimb Grip Strength for Subchronic Male Rats
(Mean of Three Trials)

Assessment Period	Group Number	ppm	Mean Body Weight (g)	Forelimb Grip Strength (kg)	Hindlimb Grip Strength (kg)
Baseline					
	1	0	236.8 (15.2)	0.64 (0.07)	0.45 (0.08)
	2	100	235.7 (13.5)	0.64 (0.12)	0.42 (0.09)
	3	500	234.8 (16.4)	0.62 (0.08)	0.39 (0.09)
	4	3000	230.2 (35.1)	0.63 (0.07)	0.46 (0.11)
Week 4					
	1	0	432.5 (41.6)	0.94 (0.26)	0.65 (0.13)
	2	100	422.7 (31.9)	0.80 (0.22)	0.53 (0.10)
	3	500	413.7 (48.2)	0.78 (0.33)	0.57 (0.11)
	4	3000	416.6 (30.0)	0.92 (0.20)	0.60 (0.10)

Data arranged as: Mean (Standard Deviation).
Number in Group (N) = 12.

There were no statistically significant differences compared to the control group at $p < 0.05$.

Table 38
Mean Forelimb and Hindlimb Grip Strength for Subchronic Female Rats
(Mean of Three Trials)

Assessment Period	Group Number	ppm	Mean Body Weight (g)	Forelimb Grip Strength (kg)	Hindlimb Grip Strength (kg)
Baseline					
	1	0	194.0 (10.4)	0.72 (0.12)	0.40 (0.08)
	2	100	197.5 (9.4)	0.67 (0.13)	0.41 (0.08)
	3	500	194.3 (11.9)	0.71 (0.16)	0.43 (0.07)
	4	3000	201.9 (30.9)	0.69 (0.07)	0.43 (0.10)
Week 4					
	1	0	269.4 (25.8)	0.68 (0.19)	0.51 (0.09)
	2	100	255.5 (34.4)	0.78 (0.16)	0.49 (0.07)
	3	500	268.0 (24.9)	0.77 (0.19)	0.48 (0.11)
	4	3000	251.9 (20.4)	0.68 (0.22)	0.50 (0.09)

Data arranged as: Mean (Standard Deviation).
Number in Group (N) = 12.

There were no statistically significant differences compared to the control group at $p < 0.05$.

Table 39
Mean Forelimb and Hindlimb Grip Strength for Satellite Female Rats
(Mean of Three Trials)

Assessment Period	Group Number	ppm	Mean Body Weight (g)	Forelimb Grip Strength (kg)	Hindlimb Grip Strength (kg)
Baseline					
	1	0	204.6 (7.2)	0.70 (0.07)	0.47 (0.06)
	2	100	202.9 (12.2)	0.79 (0.14)	0.50 (0.06)
	3	500	202.1 (10.7)	0.77 (0.10)	0.50 (0.07)
	4	3000	205.2 (14.2)	0.69 (0.11)	0.41 (0.09)
Lactation Day 4					
	1	0	330.3 (27.0)	0.70 (0.17)	0.52 (0.08)
	2	100	330.2 (25.2)	0.83 (0.12)	0.54 (0.12)
	3	500	331.5 (20.1)	0.78 (0.16)	0.48 (0.07)
	4	3000	306.9 (21.2)	0.76 (0.15)	0.50 (0.11)

Data arranged as: Mean (Standard Deviation).
Number in Groups 1, 2, and 3 (N) = 12.
Number in Group 4 (N) = 11 (due to non-pregnant rat #430).

There were no statistically significant differences compared to the control group at $p < 0.05$.

Table 40
Summary of Abbreviated Functional Observational Battery Findings for Subchronic Male Rats

	BASELINE				WEEK 4			
GROUP:	1	2	3	4	1	2	3	4
CONCENTRATION (ppm):	0	100	500	3000	0	100	500	3000
NUMBER EXAMINED:	12	12	12	12	12	12	12	12
MANIPULATIONS IN OPEN FIELD:								
APPROACH & TOUCH:								
no reaction	0	0	0	0	0	0	0	0
normal	12	12	12	12	12	12	12	12
increased reaction (jumps away or attacks)	0	0	0	0	0	0	0	0
AUDITORY STIMULUS:								
no reaction	0	0	0	0	0	0	0	0
normal reaction (rat flinches or flicks ear)	12	12	12	12	12	12	12	12
exaggerated reaction (rat jumps, flips)	0	0	0	0	0	0	0	0
TAIL PINCH:								
no response	0	0	0	0	0	0	0	0
normal (turns toward site)	12	12	12	12	12	10	11	12
exaggerated response	0	0	0	0	0	2	1	0

Table 40
Summary of Abbreviated Functional Observational Battery Findings for Subchronic Male Rats (Continued)

	BASELINE				WEEK 4			
GROUP:	1	2	3	4	1	2	3	4
CONCENTRATION (ppm):	0	100	500	3000	0	100	500	3000
NUMBER EXAMINED:	12	12	12	12	12	12	12	12
IN MOTOR ACTIVITY MONITOR:								
PUPILLARY RESPONSE:								
present	12	12	12	12	12	12	12	12
absent	0	0	0	0	0	0	0	0
DIARRHEA:								
absent	12	12	12	12	12	12	12	12
present	0	0	0	0	0	0	0	0
POLYURIA:								
absent	12	12	12	12	12	12	12	12
present	0	0	0	0	0	0	0	0
ADDITIONAL SIGNS:								
MISSING TOE(S):								
absent	12	12	12	12	12	11	12	12
present	0	0	0	0	0	1	0	0
STAIN PERINEUM, BROWN:								
absent	12	12	12	12	12	12	12	11
present	0	0	0	0	0	0	0	1

There were no statistically significant trends compared to the control group at $p < 0.05$.

Table 41
Summary of Abbreviated Functional Observational Battery Findings for Subchronic Female Rats

	BASELINE				WEEK 4			
GROUP:	1	2	3	4	1	2	3	4
CONCENTRATION (ppm):	0	100	500	3000	0	100	500	3000
NUMBER EXAMINED:	12	12	12	12	12	12	12	12
MANIPULATIONS IN OPEN FIELD:								
APPROACH & TOUCH:								
no reaction	0	0	0	0	0	0	0	0
normal	12	12	12	12	12	12	12	12
increased reaction (jumps away or attacks)	0	0	0	0	0	0	0	0
AUDITORY STIMULUS:								
no reaction	0	0	0	0	1	0	0	0
normal reaction (rat flinches or flicks ear)	12	12	12	12	11	12	12	12
exaggerated reaction (rat jumps, flips)	0	0	0	0	0	0	0	0
TAIL PINCH:								
no response	0	0	0	0	0	0	0	0
normal (turns toward site)	12	12	12	12	10	12	12	12
exaggerated response	0	0	0	0	2	0	0	0

Table 41
Summary of Abbreviated Functional Observational Battery Findings for Subchronic Female Rats (Continued)

	BASELINE				WEEK 4			
GROUP:	1	2	3	4	1	2	3	4
CONCENTRATION (ppm):	0	100	500	3000	0	100	500	3000
NUMBER EXAMINED:	12	12	12	12	12	12	12	12
IN MOTOR ACTIVITY MONITOR:								
PUPILLARY RESPONSE:								
present	12	12	12	12	12	12	12	12
absent	0	0	0	0	0	0	0	0
DIARRHEA:								
absent	12	12	12	12	12	12	12	12
present	0	0	0	0	0	0	0	0
POLYURIA:								
absent	12	12	12	12	12	12	12	12
present	0	0	0	0	0	0	0	0

Table 41
Summary of Abbreviated Functional Observational Battery Findings for Subchronic Female Rats (Continued)

	BASELINE				WEEK 4			
GROUP:	1	2	3	4	1	2	3	4
CONCENTRATION (ppm):	0	100	500	3000	0	100	500	3000
NUMBER EXAMINED:	12	12	12	12	12	12	12	12
ADDITIONAL SIGNS:								
SWOLLEN TOES(S) AND/OR PAW(S):								
absent	12	12	12	12	10	12	12	12
present	0	0	0	0	2	0	0	0
EAR FLICKS, DURING MANIPULATIONS:								
absent	12	12	12	12	11	12	12	12
present	0	0	0	0	1	0	0	0
END OF TAIL MISSING:								
absent	12	12	12	12	11	12	12	12
present	0	0	0	0	1	0	0	0
STAIN FACE, RED:								
absent	12	12	12	12	12	12	12	2
present	0	0	0	0	0	0	0	10*

* Statistically significant trend compared to the control group at $p < 0.05$ by Cochran Armitage test for trend.

Table 42
Summary of Abbreviated Functional Observational Battery Findings for Satellite Female Rats

	BASELINE				LACTATION DAY 4			
GROUP:	1	2	3	4	1	2	3	4
CONCENTRATION (ppm):	0	100	500	3000	0	100	500	3000
NUMBER EXAMINED:	12	12	12	11[a]	12	12	12	11[a]
MANIPULATIONS IN OPEN FIELD:								
APPROACH & TOUCH:								
no reaction	0	0	0	0	0	0	0	0
normal	12	12	12	11	12	12	12	11
increased reaction (jumps away or attacks)	0	0	0	0	0	0	0	0
AUDITORY STIMULUS:								
no reaction	0	0	0	0	0	0	0	0
normal reaction (rat flinches or flicks ear)	12	12	12	11	12	12	12	11
exaggerated reaction (rat jumps, flips)	0	0	0	0	0	0	0	0
TAIL PINCH:								
no response	0	1	0	1	1	0	0	0
normal (turns toward site)	12	11	12	10	11	12	12	11
exaggerated response	0	0	0	0	0	0	0	0

Table 42
Summary of Abbreviated Functional Observational Battery Findings for Satellite Female Rats (Continued)

	BASELINE				LACTATION DAY 4			
GROUP:	1	2	3	4	1	2	3	4
CONCENTRATION (ppm):	0	100	500	3000	0	100	500	3000
NUMBER EXAMINED:	12	12	12	11[a]	12	12	12	11[a]
IN MOTOR ACTIVITY MONITOR:								
PUPILLARY RESPONSE:								
present	12	12	12	11	12	12	12	11
absent	0	0	0	0	0	0	0	0
DIARRHEA:								
absent	12	12	12	11	12	12	12	11
present	0	0	0	0	0	0	0	0
POLYURIA:								
absent	12	12	12	11	12	12	12	11
present	0	0	0	0	0	0	0	0

Table 42
Summary of Abbreviated Functional Observational Battery Findings for Satellite Female Rats (Continued)

	BASELINE				LACTATION DAY 4			
GROUP:	1	2	3	4	1	2	3	4
CONCENTRATION (ppm):	0	100	500	3000	0	100	500	3000
NUMBER EXAMINED:	12	12	12	11[a]	12	12	12	11[a]
ADDITIONAL SIGNS:								
SWOLLEN TOE(S) AND/OR PAW(S):								
absent	12	12	12	11	11	12	12	11
present	0	0	0	0	1	0	0	0
END OF TAIL MISSING:								
absent	12	12	11	11	12	12	11	11
present	0	0	1	0	0	0	1	0
EAR FLICKS:								
absent	12	12	12	10	12	12	12	12
present	0	0	0	1	0	0	0	0

There were no statistically significant trends compared to the control group at $p < 0.05$.

a One rat did not produce a litter. Baseline data were excluded from the summary table and statistics.

Table 43
Motor Activity Assessment: Mean Duration of Movement (Sec) for Subchronic Male Rats

ASSESSMENT PERIOD	GROUP NUMBER	ppm	SUCCESSIVE 10-MINUTE INTERVALS						
BASELINE			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	440 (46)	355 (62)	323 (64)	285 (97)	196 (93)	97 (128)	1697 (3 52)
	2	100	429 (37)	363 (45)	288 (65)	266 (109)	201 (128)	116 (120)	1663 (416)
	3	500	425 (38)	343 (46)	281 (80)	230 (135)	190 (144)	108 (98)	1577 (444)
	4	3000	400 (64)	300 (84)	265 (93)	179* (146)	87* (113)	27 (39)	1258* (388)
WEEK 4			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	398 (63)	310 (62)	271 (55)	241 (63)	220 (57)	222 (96)	1660 (2 75)
	2	100	388 (56)	322 (43)	278 (67)	270 (72)	233 (81)	226 (60)	1717 (292)
	3	500	394 (67)	335 (70)	254 (101)	226 (71)	230 (85)	175 (85)	1612 (302)
	4	3000	348 (46)	250 (74)	220 (49)	162 (84)	156 (91)	108* (97)	1243* (295)

Data arranged as: Mean (Standard Deviation).
Number in Group (N) = 12.

* Statistically significant by repeated measures analysis of variance $p < 0.05$.

Table 44
Motor Activity Assessment: Mean Duration of Movement (Sec) for Subchronic Female Rats

ASSESSMENT PERIOD	GROUP NUMBER	ppm	SUCCESSIVE 10-MINUTE INTERVALS						
BASELINE			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	390 (56)	259 (113)	168 (112)	191 (135)	179 (98)	157 (124)	1344 (448)
	2	100	394 (49)	219 (83)	149 (103)	183 (96)	199 (70)	172 (92)	1315 (365)
	3	500	375 (72)	268 (149)	258 (107)	191 (109)	168 (115)	186 (96)	1445 (464)
	4	3000	403 (25)	276 (98)	223 (87)	250 (83)	226 (103)	174 (94)	1551 (330)
WEEK 4			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	391 (61)	254 (61)	194 (68)	197 (76)	175 (62)	171 (69)	1380 (238)
	2	100	373 (55)	251 (74)	215 (100)	201 (71)	192 (74)	170 (76)	1401 (370)
	3	500	389 (62)	282 (61)	227 (83)	200 (80)	198 (67)	177 (79)	1473 (334)
	4	3000	376 (46)	287 (58)	210 (99)	223 (82)	183 (73)	161 (111)	1440 (367)

Data arranged as: Mean (Standard Deviation).
Number in Group (N) = 12.

There were no statistically significant differences compared to the control group at $p < 0.05$.

Table 45
Motor Activity Assessment: Mean Duration of Movement (Sec) for Satellite Female Rats

ASSESSMENT PERIOD	GROUP NUMBER	ppm	SUCCESSIVE 10-MINUTE INTERVALS						
BASELINE			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	384 (53)	293 (68)	233 (53)	202 (95)	137 (96)	143 (95)	1392 (3 14)
	2	100	382 (38)	258 (91)	206 (74)	171 (125)	215 (91)	192 (93)	1422 (369)
	3	500	387 (73)	298 (113)	207 (77)	144 (124)	95 (86)	90 (84)	1221 (388)
	4	3000	370 (48)	281 (68)	188 (90)	145 (113)	114 (87)	130 (78)	1229 (442)
LACTATION DAY 4			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	359 (47)	246 (78)	210 (87)	174 (72)	126 (97)	159 (91)	1274 (3 96)
	2	100	371 (71)	282 (67)	226 (71)	197 (64)	191 (65)	159 (54)	1426 (319)
	3	500	381 (70)	266 (78)	205 (95)	186 (86)	151 (103)	156 (88)	1344 (395)
	4	3000	351 (59)	266 (51)	206 (45)	176 (49)	190 (63)	169 (44)	1359 (225)

Data arranged as: Mean (Standard Deviation).
Number in Groups 1, 2, and 3 (N) = 12.
Number in Group 4 (N) = 11 (due to non-pregnant rat #430).

There were no statistically significant differences compared to the control group at $p < 0.05$.

Table 46
Motor Activity Assessment: Mean Number of Movements for Subchronic Male Rats

ASSESSMENT PERIOD	GROUP NUMBER	ppm	SUCCESSIVE 10-MINUTE INTERVALS						
BASELINE			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	127 (17)	137 (13)	142 (18)	135 (27)	108 (38)	54 (59)	703 (103)
	2	100	123 (14)	132 (12)	129 (14)	118 (24)	101 (47)	68 (61)	671 (102)
	3	500	129 (18)	141 (14)	133 (14)	110 (53)	91 (60)	66 (59)	670 (154)
	4	3000	135 (18)	129 (17)	122 (33)	88# (55)	39# (42)	20 (27)	532* (100)
WEEK 4			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	131 (14)	136 (18)	123 (22)	122 (26)	125 (20)	120 (36)	757 (84)
	2	100	128 (17)	135 (16)	125 (17)	122 (16)	122 (29)	108 (15)	740 (79)
	3	500	131 (20)	137 (18)	117 (40)	122 (32)	113 (27)	101 (46)	721 (94)
	4	3000	133 (13)	119# (15)	116 (19)	98 (41)	98 (49)	66# (51)	630* (139)

Data arranged as: Mean (Standard Deviation).
Number in Group (N) = 12.

* Statistically significant by repeated measures analysis of variance $p < 0.05$.
\# Statistically significant by Jonckheere-Terpstra trend test at $p < 0.05$.

Table 47
Motor Activity Assessment: Mean Number of Movements for Subchronic Female Rats

ASSESSMENT PERIOD	GROUP NUMBER	ppm	SUCCESSIVE 10-MINUTE INTERVALS						
BASELINE			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	133 (13)	118 (39)	97 (55)	93 (54)	92 (40)	91 (57)	623 (183)
	2	100	139 (14)	117 (28)	87 (47)	106 (45)	116 (29)	110 (46)	674 (126)
	3	500	130 (11)	107 (45)	123 (21)	110 (52)	93 (53)	107 (46)	669 (149)
	4	3000	136 (14)	123 (27)	116 (37)	126# (34)	111 (43)	97 (39)	709 (98)
WEEK 4			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	132 (21)	130 (14)	112 (26)	114 (27)	115 (42)	108 (26)	710 (82)
	2	100	138 (15)	133 (24)	113 (23)	115 (28)	117 (35)	104 (24)	719 (90)
	3	500	131 (17)	130 (22)	121 (22)	113 (29)	119 (34)	106 (37)	721 (102)
	4	3000	126 (17)	131 (16)	109 (33)	113 (30)	102 (32)	92 (54)	672 (134)

Data arranged as: Mean (Standard Deviation).
Number in Group (N) = 12.

Statistically significant by Jonckheere-Terpstra trend test at $p < 0.05$.

Table 48
Motor Activity Assessment: Mean Number of Movements for Satellite Female Rats

ASSESSMENT PERIOD	GROUP NUMBER	ppm	SUCCESSIVE 10-MINUTE INTERVALS						
BASELINE			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	135 (15)	131 (14)	123 (21)	111 (40)	86 (51)	87 (51)	672 (1 02)
	2	100	138 (13)	126 (34)	115 (27)	88 (57)	123 (37)	115 (36)	705 (131)
	3	500	137 (21)	128 (27)	116 (32)	74 (51)	62 (49)	65 (51)	581 (122)
	4	3000	134 (15)	131 (13)	99 (28)	90 (52)	69 (53)	85 (43)	607 (163)
LACTATION DAY 4			**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
	1	0	134 (19)	124 (16)	116 (27)	96 (33)	75 (45)	90 (40)	635 (1 08)
	2	100	131 (7)	125 (17)	119 (18)	114 (19)	115 (26)	99 (27)	703 (70)
	3	500	130 (19)	124 (22)	107 (45)	103 (44)	84 (50)	86 (45)	635 (157)
	4	3000	133 (17)	130 (23)	114 (21)	103 (28)	114 (38)	108 (26)	702 (114)

Data arranged as: Mean (Standard Deviation).
Number in Groups 1, 2, and 3 (N) = 12.
Number in Group 4 (N) = 11 (due to non-pregnant rat #430).

There were no statistically significant differences compared to the control group at $p < 0.05$.

Table 49
Summary of Hematology Values for Subchronic Male Rats

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
RBC ($x10^6/\mu L$)				
DAY 31	8.51	8.52	8.35	8.24
	0.40(12)	0.26(12)	0.20(12)	0.35(12)
HGB (g/dL)				
DAY 31	15.8	16.0	15.8	15.5
	0.5(12)	0.5(12)	0.4(12)	0.5(12)
HCT (%)				
DAY 31	49.0	49.6	48.6	48.3
	1.6(12)	2.0(12)	1.3(12)	2.1(12)
MCV (fL)				
DAY 31	57.7	58.2	58.2	58.6
	1.6(12)	2.0(12)	1.5(12)	2.2(12)
MCH (pg)				
DAY 31	18.6	18.8	19.0	18.9
	0.4(12)	0.6(12)	0.4(12)	0.6(12)
MCHC (g/dL)				
DAY 31	32.3	32.3	32.6	32.2
	0.4(12)	0.5(12)	0.6(12)	0.5(12)
RDW (%)				
DAY 31	11.7	11.5	11.5	11.8
	0.5(12)	0.3(12)	0.4(12)	0.4(12)
ARET ($x10^3/\mu L$)				
DAY 31	198.3	181.6	191.7	193.4
	35.7(12)	22.2(12)	29.3(12)	30.2(12)
PLT ($x10^3/\mu L$)				
DAY 31	1329	1291	1332	1341
	146(11)	121(12)	245(12)	143(12)
WBC ($x10^3/\mu L$)				
DAY 31	12.99	13.11	13.07	14.26
	2.12(12)	3.34(12)	3.64(12)	3.73(12)
ANEU ($x10^3/\mu L$)				
DAY 31	1.98	1.64	1.99	2.19
	0.57(12)	0.73(12)	1.19(12)	0.45(12)
ALYM ($x10^3/\mu L$)				
DAY 31	10.44	10.92	10.55	11.28
	1.75(12)	2.77(12)	2.77(12)	3.07(12)

Table 49
Summary of Hematology Values for Subchronic Male Rats (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
AMON ($x10^3/\mu L$)				
DAY 31	0.23	0.23	0.25	0.44
	0.12(12)	0.05(12)	0.16(12)	0.47(12)
AEOS ($x10^3/\mu L$)				
DAY 31	0.17	0.13	0.13	0.17
	0.11(12)	0.06(12)	0.05(12)	0.08(12)
ABAS ($x10^3/\mu L$)				
DAY 31	0.09	0.10	0.08	0.10
	0.05(12)	0.04(12)	0.03(12)	0.05(12)
ALUC ($x10^3/\mu L$)				
DAY 31	0.08	0.08	0.08	0.09
	0.04(12)	0.03(12)	0.03(12)	0.04(12)

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

There were no statistically significant differences from control at $p < 0.05$.

Table 50
Summary of Hematology Values for Subchronic Female Rats [Day 32]
and Satellite Female Rats [Days 42-45]

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
RBC ($x10^6/\mu L$)				
DAY 32	8.13 0.27(12)	8.36 0.42(12)	8.20 0.43(12)	8.11 0.32(12)
DAY 42-45	6.83 0.44(12)	6.71 0.40(11)	6.97 0.39(12)	6.95 0.36(11)
HGB (g/dL)				
DAY 32	15.5 0.4(12)	15.8 0.6(12)	15.6 0.7(12)	15.5 0.4(12)
DAY 42-45	12.9 0.8(12)	12.8 0.6(11)	13.2 0.6(12)	13.5 0.5(11)
HCT (%)				
DAY 32	46.4 1.4(12)	47.1 1.9(12)	46.8 2.2(12)	46.3 1.5(12)
DAY 42-45	40.9 2.3(12)	40.8 2.0(11)	42.1 1.9(12)	41.9 1.9(11)
MCV (fL)				
DAY 32	57.1 2.0(12)	56.3 1.1(12)	57.1 1.8(12)	57.2 2.4(12)
DAY 42-45	59.9 1.7(12)	61.0 2.2(11)	60.4 2.0(12)	60.3 1.6(11)
MCH (pg)				
DAY 32	19.1 0.5(12)	18.9 0.5(12)	19.1 0.5(12)	19.1 0.8(12)
DAY 42-45	19.0 0.6(12)	19.1 0.7(11)	19.0 0.7(12)	19.4 0.4(11)
MCHC (g/dL)				
DAY 32	33.3 0.6(12)	33.6 0.5(12)	33.4 0.5(12)	33.4 0.5(12)
DAY 42-45	31.6 0.6(12)	31.3 0.7(11)	31.5 0.7(12)	32.3 0.8(11)
RDW (%)				
DAY 32	11.6 0.5(12)	11.4 0.3(12)	11.4 0.4(12)	11.9 0.4(12)
DAY 42-45	16.7 1.6(12)	17.0 2.1(11)	16.0 1.1(12)	15.2 1.4(11)

Table 50
Summary of Hematology Values for Subchronic Female Rats [Day 32]
and Satellite Female Rats [Days 42-45] (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
ARET ($x10^3/\mu L$)				
DAY 32	174.0	168.4	169.6	204.7
	40.3(12)	36.8(12)	24.9(12)	49.9(12)
DAY 42-45	465.9	510.4	450.0	360.6*
	71.7(12)	129.7(11)	69.5(12)	89.7(11)
PLT ($x10^3/\mu L$)				
DAY 32	1283	1331	1387	1192
	175(11)	198(11)	172(10)	261(12)
DAY 42-45	1553	1455	1313	1697
	214(10)	337(6)	194(7)	284(8)
WBC ($x10^3/\mu L$)				
DAY 32	12.33	12.87	12.94	12.69
	1.62(12)	2.34(12)	3.25(12)	2.82(12)
DAY 42-45	12.86	13.47	12.51	12.82
	1.64(12)	3.85(11)	2.68(12)	4.06(11)
ANEU ($x10^3/\mu L$)				
DAY 32	1.00	1.15	1.72	1.20
	0.31(12)	0.57(12)	0.96(12)	0.56(12)
DAY 42-45	3.62	3.74	3.14	2.64@
	0.90(12)	1.55(11)	0.82(12)	0.62(11)
ALYM ($x10^3/\mu L$)				
DAY 32	10.60	10.96	10.41	10.89
	1.59(12)	2.31(12)	2.66(12)	2.67(12)
DAY 42-45	8.75	9.32	8.95	9.73
	1.45(12)	2.51(11)	2.32(12)	3.58(11)
AMON ($x10^3/\mu L$)				
DAY 32	0.34	0.37	0.36	0.26
	0.19(12)	0.14(12)	0.15(12)	0.12(12)
DAY 42-45	0.27	0.19	0.20	0.23
	0.08(12)	0.11(11)	0.07(12)	0.14(11)
AEOS ($x10^3/\mu L$)				
DAY 32	0.19	0.18	0.19	0.16
	0.09(12)	0.06(12)	0.08(12)	0.06(12)
DAY 42-45	0.11	0.11	0.12	0.10
	0.03(12)	0.05(11)	0.07(12)	0.06(11)

Table 50
Summary of Hematology Values for Subchronic Female Rats [Day 32]
and Satellite Female Rats [Days 42-45] (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
ABAS ($x10^3/\mu L$)				
DAY 32	0.11 0.06(12)	0.11 0.05(12)	0.09 0.05(12)	0.11 0.04(12)
DAY 42-45	0.07 0.03(12)	0.07 0.04(11)	0.06 0.04(12)	0.07 0.04(11)
ALUC ($x10^3/\mu L$)				
DAY 32	0.08 0.05(12)	0.07 0.03(12)	0.06 0.04(12)	0.08 0.02(12)
DAY 42-45	0.05 0.01(12)	0.05 0.03(11)	0.05 0.02(12)	0.05 0.04(11)
ABAN ($x10^3/\mu L$)[a]				
DAY 32	-	-	0.35 NC(1)	-
AHSN ($x10^3/\mu L$)[a]				
DAY 32	-	-	0.23 NC(1)	-
AAL ($x10^3/\mu L$)[a]				
DAY 32	0.13 NC(1)	0.14 NC(1)	0.35 0.33(2)	-

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

a Statistics were unable to be performed due to low number of observations.

* Statistically significant difference from control at $p < 0.05$ by Dunnett/Tamhane-Dunnett test.
@ Statistically significant difference from control at $p < 0.05$ by Dunn's test.

Table 51
Summary of Coagulation Values for Subchronic Male Rats

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
PT (sec)				
DAY 31	14.4 1.1(12)	14.5 0.7(12)	14.6 1.1(12)	15.2 1.6(12)
APTT (sec)				
DAY 31	15.0 1.3(12)	15.5 1.1(12)	16.5* 1.5(12)	16.1 1.3(12)

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

* Statistically significant difference from control at $p < 0.05$ by Dunnett/Tamhane-Dunnett test.

Table 52
Summary of Coagulation Values for Subchronic Female Rats [Day 32]
and Satellite Female Rats (Days 42-45]

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
PT (sec)				
DAY 32	13.6 0.4(12)	13.8 0.3(12)	13.8 0.4(12)	13.6 0.5(12)
DAY 42-45	15.5 0.3(12)	15.6 0.5(12)	15.4 0.3(12)	15.6 0.4(11)
APTT (sec)				
DAY 32	13.6 1.7(12)	13.7 1.5(12)	14.6 1.1(12)	13.6 1.6(12)
DAY 42-45	15.7 2.0(12)	14.8 1.5(12)	15.4 1.6(12)	15.4 1.8(11)

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

There were no statistically significant differences from control at $p < 0.05$.

Table 53
Summary of Clinical Chemistry Values for Subchronic Male Rats

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
AST (U/L)				
DAY 31	74	76	73	71
	16(12)	13(12)	7(12)	18(12)
ALT (U/L)				
DAY 31	27	25	25	32
	4(12)	5(12)	4(12)	14(12)
SDH (U/L)				
DAY 31	16.6	17.5	18.1	18.3
	4.6(12)	3.6(12)	4.7(12)	7.0(12)
ALKP (U/L)				
DAY 31	156	159	147	132
	34(12)	18(12)	38(12)	24(12)
GGT (U/L)				
DAY 31	0	0	0	1
	0(12)	0(12)	0(12)	2(12)
BILI (mg/dL)				
DAY 31	0.14	0.14	0.15	0.16
	0.02(12)	0.03(12)	0.02(12)	0.02(12)
BUN (mg/dL)				
DAY 31	13	13	13	13
	2(12)	2(12)	1(12)	2(12)
CREA (mg/dL)				
DAY 31	0.35	0.36	0.37	0.34
	0.03(12)	0.03(12)	0.03(12)	0.03(12)
CHOL (mg/dL)				
DAY 31	50	47	56	56
	18(12)	13(12)	12(12)	12(12)
TRIG (mg/dL)				
DAY 31	64	45	44	41
	31(12)	20(12)	13(12)	12(12)
GLUC (mg/dL)				
DAY 31	110	102	98	92@
	22(12)	20(12)	10(12)	7(12)
TP (g/dL)				
DAY 31	6.1	6.1	6.1	6.2
	0.3(12)	0.2(12)	0.2(12)	0.3(12)

Table 53
Summary of Clinical Chemistry Values for Subchronic Male Rats (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
ALB (g/dL)				
DAY 31	3.4	3.4	3.3	3.4
	0.1(12)	0.1(12)	0.1(12)	0.2(12)
GLOB (g/dL)				
DAY 31	2.7	2.7	2.8	2.8
	0.2(12)	0.1(12)	0.1(12)	0.2(12)
CALC (mg/dL)				
DAY 31	10.7	10.6	10.5	10.8
	0.3(12)	0.3(12)	0.4(12)	0.3(12)
IPHS (mg/dL)				
DAY 31	7.9	7.6	7.6	7.8
	0.8(12)	0.5(12)	0.5(12)	0.4(12)
NA (mmol/L)				
DAY 31	147.1	146.5	146.1	146.2
	1.5(12)	1.7(12)	1.0(12)	1.7(12)
K (mmol/L)				
DAY 31	5.74	5.73	5.69	5.66
	0.35(12)	0.30(12)	0.35(12)	0.31(12)
CL (mmol/L)				
DAY 31	100.4	100.8	100.4	99.1
	2.6(12)	2.1(12)	2.7(12)	1.8(12)
A/G				
DAY 31	1.3	1.3	1.2	1.2
	0.1(12)	0.1(12)	0.1(12)	0.1(12)

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

@ Statistically significant difference from control at $p < 0.05$ by Dunn's test.

Table 54
Summary of Clinical Chemistry Values for Subchronic Female Rats [Day 32]
and Satellite Female Rats [Days 42-45]

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
AST (U/L)				
DAY 32	64 7(12)	68 8(12)	70 18(12)	57 6(12)
DAY 42-45	117 46(12)	97 15(12)	105 43(12)	86 11(11)
ALT (U/L)				
DAY 32	23 4(12)	23 4(12)	26 11(12)	25 5(12)
DAY 42-45	100 22(12)	82 15(12)	96 27(12)	87 21(11)
SDH (U/L)				
DAY 32	14.7 2.0(12)	17.5@ 3.3(12)	15.0 5.2(12)	13.8 1.6(12)
DAY 42-45	17.1 6.9(12)	14.2 2.7(12)	14.7 7.1(12)	12.1 3.0(11)
ALKP (U/L)				
DAY 32	85 26(12)	82 19(12)	77 17(12)	78 18(12)
DAY 42-45	293 138(12)	343 140(12)	316 125(12)	271 112(11)
GGT (U/L)				
DAY 32	0~ 0(12)	0~ 0(12)	0~ 0(12)	0~ 0(12)
DAY 42-45	0~ 0(12)	0~ 0(12)	0~ 0(12)	0~ 0(11)
BILI (mg/dL)				
DAY 32	0.18 0.02(12)	0.19 0.02(12)	0.18 0.02(12)	0.19 0.02(12)
DAY 42-45	0.18 0.03(12)	0.16 0.03(12)	0.16 0.01(12)	0.16 0.02(11)
BUN (mg/dL)				
DAY 32	15 2(12)	15 2(12)	15 2(12)	15 2(12)
DAY 42-45	20 3(12)	20 2(12)	19 2(12)	21 2(11)

Table 54
Summary of Clinical Chemistry Values for Subchronic Female Rats [Day 32]
and Satellite Female Rats [Days 42-45] (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
CREA (mg/dL)				
DAY 32	0.37	0.40	0.38	0.35
	0.03(12)	0.03(12)	0.03(12)	0.04(12)
DAY 42-45	0.38	0.40	0.39	0.39
	0.03(12)	0.02(12)	0.03(12)	0.03(11)
CHOL (mg/dL)				
DAY 32	74	72	80	98*
	15(12)	12(12)	20(12)	18(12)
DAY 42-45	79	81	82	84
	10(12)	13(12)	12(12)	13(11)
TRIG (mg/dL)				
DAY 32	35	39	41	45@
	8(12)	13(12)	19(12)	10(12)
DAY 42-45	60	57	63	67
	20(12)	7(12)	21(12)	19(11)
GLUC (mg/dL)				
DAY 32	97	94	93	89*
	5(12)	7(12)	5(12)	5(12)
DAY 42-45	98	101	109@	105
	8(12)	14(12)	14(12)	8(11)
TP (g/dL)				
DAY 32	6.6	6.7	6.7	6.7
	0.4(12)	0.3(12)	0.5(12)	0.3(12)
DAY 42-45	6.6	6.7	6.6	6.7
	0.2(12)	0.3(12)	0.3(12)	0.4(11)
ALB (g/dL)				
DAY 32	3.7	3.8	3.7	3.7
	0.2(12)	0.2(12)	0.3(12)	0.2(12)
DAY 42	3.5	3.5	3.5	3.5
	0.1(12)	0.2(12)	0.1(12)	0.2(11)
GLOB (g/dL)				
DAY 32	2.9	2.9	3.0	3.0
	0.2(12)	0.2(12)	0.2(12)	0.2(12)
DAY 42-45	3.1	3.2	3.2	3.2
	0.2(12)	0.2(12)	0.2(12)	0.2(11)

Table 54
Summary of Clinical Chemistry Values for Subchronic Female Rats [Day 32]
and Satellite Female Rats [Days 42-45] (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
CALC (mg/dL)				
DAY 32	11.1	11.1	11.1	11.1
	0.3(12)	0.3(12)	0.3(12)	0.2(12)
DAY 42-45	10.9	11.0	11.0	11.1
	0.3(12)	0.3(12)	0.4(12)	0.5(11)
IPHS (mg/dL)				
DAY 32	7.0	7.0	6.9	6.8
	0.6(12)	0.7(12)	0.7(12)	0.5(12)
DAY 42-45	5.3	5.9	5.9	6.2
	1.3(12)	0.9(12)	1.6(12)	1.7(11)
NA (mmol/L)				
DAY 32	144.1	144.8	144.4	145.0
	1.3(12)	2.1(12)	0.7(12)	1.3(12)
DAY 42-45	148.2	148.6	148.4	148.9
	3.3(12)	2.2(12)	2.1(12)	1.4(11)
K (mmol/L)				
DAY 32	5.61	5.76	5.69	5.58
	0.36(12)	0.49(12)	0.49(12)	0.29(12)
DAY 42-45	5.92	5.68	5.66	5.63
	0.46(12)	0.55(12)	0.46(12)	0.54(11)
CL (mmol/L)				
DAY 32	101.5	101.8	101.8	101.4
	1.8(12)	2.5(12)	1.9(12)	1.6(12)
DAY 42-45	102.4	103.7	104.4	103.0
	1.9(12)	2.5(12)	2.4(12)	2.5(11)
A/G				
DAY 32	1.3	1.3	1.3	1.3
	0.1(12)	0.1(12)	0.1(12)	0.1(12)
DAY 42-45	1.1	1.1	1.1	1.1
	0.1(12)	0.1(12)	0.1(12)	0.1(11)

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

* Statistically significant difference from control at $p < 0.05$ by Dunnett/Tamhane-Dunnett test.
@ Statistically significant difference from control at $p < 0.05$ by Dunn's test.
~ Due to lack of variability among group means, statistical analyses were unable to be performed.

Table 55
Mean Final Body and Organ Weights from Subchronic Male Rats

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
MEAN FINAL BODY AND ABSOLUTE ORGAN WEIGHTS (grams)				
LIVER	12.584 1.784(12)	11.807 1.302(12)	12.392 1.727(12)	15.143* 1.908(12)
KIDNEYS	3.479 0.372(12)	3.600 0.460(12)	3.782 0.627(12)	4.121* 0.522(12)
LUNGS	1.752 0.127(12)	1.749 0.144(12)	1.840 0.264(12)	1.646 0.121(12)
HEART	1.500 0.104(12)	1.452 0.143(12)	1.494 0.215(12)	1.443 0.143(12)
SPLEEN	0.720 0.102(12)	0.704 0.150(12)	0.692 0.117(12)	0.728 0.130(12)
THYMUS	0.475 0.142(12)	0.451 0.113(12)	0.528 0.098(12)	0.417 0.066(12)
ADRENAL GLANDS	0.067 0.009(12)	0.073 0.012(12)	0.070 0.012(12)	0.070 0.009(12)
BRAIN	2.053 0.071(12)	2.097 0.088(12)	2.038 0.104(12)	2.052 0.114(12)
TESTES	3.411 0.216(12)	3.522 0.225(12)	3.460 0.213(12)	3.569 0.161(12)
EPIDIDYMIDES	1.218 0.076(12)	1.253 0.095(12)	1.191 0.084(12)	1.249 0.108(12)
PROSTATE	0.594 0.150(12)	0.668 0.133(12)	0.661 0.208(12)	0.666 0.106(12)
FINAL BODY WEIGHT (grams)				
	408.1 40.6(12)	395.0 29.9(12)	384.6 43.9(12)	384.4 27.7(12)

Table 55
Mean Final Body and Organ Weights from Subchronic Male Rats (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
MEAN RELATIVE ORGAN WEIGHTS (% of body weight)				
LIVER/ FINAL BODY * 100	3.077 0.232(12)	2.986 0.189(12)	3.218 0.229(12)	3.936* 0.344(12)
KIDNEYS/ FINAL BODY * 100	0.854 0.056(12)	0.910 0.077(12)	0.979* 0.073(12)	1.069* 0.081(12)
LUNGS/ FINAL BODY * 100	0.433 0.049(12)	0.444 0.040(12)	0.479@ 0.049(12)	0.429 0.024(12)
HEART/ FINAL BODY * 100	0.370 0.040(12)	0.368 0.024(12)	0.390 0.050(12)	0.375 0.018(12)
SPLEEN/ FINAL BODY * 100	0.177 0.022(12)	0.178 0.036(12)	0.181 0.029(12)	0.189 0.026(12)
THYMUS/ FINAL BODY * 100	0.116 0.031(12)	0.114 0.023(12)	0.137 0.018(12)	0.108 0.014(12)
ADRENAL GLANDS/ FINAL BODY * 100	0.016 0.002(12)	0.018 0.002(12)	0.018 0.002(12)	0.018 0.002(12)
BRAIN/ FINAL BODY * 100	0.507 0.052(12)	0.533 0.038(12)	0.535 0.048(12)	0.536 0.042(12)
TESTES/ FINAL BODY * 100	0.842 0.082(12)	0.896 0.077(12)	0.914 0.151(12)	0.932@ 0.068(12)
EPIDIDYMIDES/ FINAL BODY * 100	0.300 0.029(12)	0.318 0.024(12)	0.314 0.047(12)	0.325 0.022(12)
PROSTATE/ FINAL BODY * 100	0.148 0.043(12)	0.170 0.034(12)	0.173 0.053(12)	0.173 0.025(12)

Table 55
Mean Final Body and Organ Weights from Subchronic Male Rats (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
MEAN RELATIVE ORGAN WEIGHTS (% organ to brain weight)				
LIVER/ BRAIN * 100	614.095 92.538(12)	563.561 63.507(12)	606.566 68.688(12)	737.286* 73.563(12)
KIDNEYS/ BRAIN * 100	169.460 16.500(12)	171.850 22.393(12)	185.048 26.746(12)	201.237* 26.503(12)
LUNGS/ BRAIN * 100	85.490 7.298(12)	83.417 6.001(12)	90.019 9.764(12)	80.371 6.764(12)
HEART/ BRAIN * 100	73.170 5.584(12)	69.229 6.146(12)	73.095 8.275(12)	70.363 6.386(12)
SPLEEN/ BRAIN * 100	35.071 4.631(12)	33.555 7.110(12)	33.991 5.431(12)	35.380 5.219(12)
THYMUS/ BRAIN * 100	23.159 7.022(12)	21.497 5.288(12)	25.796 4.192(12)	20.302 2.816(12)
ADRENAL GLANDS/ BRAIN * 100	3.246 0.430(12)	3.484 0.519(12)	3.443 0.519(12)	3.404 0.430(12)
TESTES/ BRAIN * 100	166.367 12.347(12)	168.240 13.391(12)	170.242 14.624(12)	174.487 14.068(12)
EPIDIDYMIDES/ BRAIN * 100	59.392 4.155(12)	59.889 5.624(12)	58.650 5.757(12)	61.125 7.300(12)
PROSTATE/ BRAIN * 100	28.964 7.293(12)	31.988 7.031(12)	32.591 10.616(12)	32.389 4.546(12)

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

* Statistically significant difference from control at $p < 0.05$ by Dunnett/Tamhane-Dunnett test.
@ Statistically significant difference from control at $p < 0.05$ by Dunn's test.

Table 56
Mean Final Body and Organ Weights from Subchronic Female Rats

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
MEAN FINAL BODY AND ABSOLUTE ORGAN WEIGHTS (grams)				
LIVER	7.737 0.866(12)	7.590 0.731(12)	7.903 0.922(12)	9.026* 1.086(12)
KIDNEYS	2.058 0.251(12)	2.003 0.256(12)	2.100 0.172(12)	2.125 0.157(12)
LUNGS	1.447 0.140(12)	1.439 0.176(12)	1.394 0.153(12)	1.364 0.155(12)
HEART	1.002 0.071(12)	0.987 0.093(12)	0.993 0.103(12)	0.958 0.102(12)
SPLEEN	0.541 0.066(12)	0.558 0.056(12)	0.535 0.104(12)	0.545 0.093(12)
THYMUS	0.457 0.096(12)	0.444 0.113(12)	0.456 0.114(12)	0.421 0.139(12)
ADRENAL GLANDS	0.075 0.011(12)	0.075 0.011(12)	0.074 0.011(12)	0.082 0.009(12)
BRAIN	1.873 0.064(12)	1.896 0.060(12)	1.933 0.076(12)	1.846 0.092(12)
OVARIES	0.140 0.028(12)	0.145 0.025(12)	0.140 0.019(12)	0.136 0.022(12)
UTERUS	0.526 0.162(12)	0.617 0.219(12)	0.564 0.159(12)	0.587 0.170(12)
FINAL BODY WEIGHT (grams)				
	251.2 22.2(12)	246.6 19.4(12)	248.2 25.4(12)	229.5 20.9(12)

Table 56
Mean Final Body and Organ Weights from Subchronic Female Rats (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
MEAN RELATIVE ORGAN WEIGHTS (% of body weight)				
LIVER/ FINAL BODY * 100	3.077 0.159(12)	3.079 0.192(12)	3.195 0.336(12)	3.927@ 0.217(12)
KIDNEYS/ FINAL BODY * 100	0.818 0.053(12)	0.813 0.091(12)	0.849 0.046(12)	0.929* 0.066(12)
LUNGS/ FINAL BODY * 100	0.577 0.044(12)	0.584 0.058(12)	0.564 0.054(12)	0.594 0.041(12)
HEART/ FINAL BODY * 100	0.400 0.024(12)	0.401 0.026(12)	0.401 0.031(12)	0.418 0.033(12)
SPLEEN/ FINAL BODY * 100	0.217 0.032(12)	0.227 0.025(12)	0.216 0.040(12)	0.237 0.030(12)
THYMUS/ FINAL BODY * 100	0.181 0.031(12)	0.179 0.037(12)	0.186 0.052(12)	0.183 0.059(12)
ADRENAL GLANDS/ FINAL BODY * 100	0.030 0.005(12)	0.030 0.004(12)	0.030 0.005(12)	0.036* 0.006(12)
BRAIN/ FINAL BODY * 100	0.751 0.067(12)	0.773 0.063(12)	0.788 0.104(12)	0.809 0.074(12)
OVARIES/ FINAL BODY * 100	0.056 0.011(12)	0.059 0.009(12)	0.057 0.008(12)	0.060 0.010(12)
UTERUS/ FINAL BODY * 100	0.211 0.065(12)	0.247 0.070(12)	0.230 0.072(12)	0.257 0.073(12)

Table 56
Mean Final Body and Organ Weights from Subchronic Female Rats (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
MEAN RELATIVE ORGAN WEIGHTS (% organ to brain weight)				
LIVER/ BRAIN * 100	413.012 44.418(12)	400.519 37.910(12)	409.803 52.430(12)	489.377* 56.471(12)
KIDNEYS/ BRAIN * 100	109.802 12.526(12)	105.707 13.867(12)	109.053 12.349(12)	115.447 10.629(12)
LUNGS/ BRAIN * 100	77.204 6.943(12)	75.929 9.247(12)	72.352 9.209(12)	74.070 9.428(12)
HEART/ BRAIN * 100	53.508 4.128(12)	52.119 5.154(12)	51.586 6.737(12)	52.097 6.616(12)
SPLEEN/ BRAIN * 100	28.910 3.561(12)	29.466 3.303(12)	27.772 5.823(12)	29.524 4.797(12)
THYMUS/ BRAIN * 100	24.316 4.788(12)	23.417 5.807(12)	23.610 5.673(12)	22.839 7.674(12)
ADRENAL GLANDS/ BRAIN * 100	4.015 0.590(12)	3.933 0.532(12)	3.822 0.536(12)	4.424 0.464(12)
OVAIRES/ BRAIN * 100	7.501 1.543(12)	7.612 1.221(12)	7.292 1.126(12)	7.378 1.073(12)
UTERUS/ BRAIN * 100	28.125 8.741(12)	32.536 11.446(12)	29.259 8.342(12)	31.689 8.655(12)

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

* Statistically significant difference from control at $p < 0.05$ by Dunnett/Tamhane-Dunnett test.
@ Statistically significant difference from control at $p < 0.05$ by Dunn's test.

Table 57
Mean Final Body and Organ Weights from Satellite Female Rats

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
MEAN FINAL BODY AND ABSOLUTE ORGAN WEIGHTS (grams)				
LIVER	14.415 1.482(12)	13.781 1.354(12)	14.450 0.737(12)	13.774 1.528(12)
KIDNEYS	2.420 0.233(12)	2.352 0.162(12)	2.428 0.188(12)	2.269 0.215(12)
LUNGS	1.529 0.095(12)	1.458 0.095(12)	1.519 0.127(12)	1.471 0.160(12)
OVARIES	0.146 0.019(12)	0.146 0.014(12)	0.147 0.012(12)	0.140 0.018(12)
UTERUS	0.764 0.127(12)	0.773 0.104(12)	0.742 0.117(12)	0.762 0.093(12)
FINAL BODY WEIGHT (grams)				
	318.7 25.1(12)	319.0 25.9(12)	319.4 17.5(12)	294.9* 18.1(12)

Table 57
Mean Final Body and Organ Weights from Satellite Female Rats (Continued)

	Group 1 0 ppm	Group 2 100 ppm	Group 3 500 ppm	Group 4 3000 ppm
MEAN RELATIVE ORGAN WEIGHTS (% of body weight)				
LIVER/ FINAL BODY * 100	4.518 0.203(12)	4.323 0.279(12)	4.529 0.199(12)	4.662 0.321(12)
KIDNEYS/ FINAL BODY * 100	0.760 0.049(12)	0.739 0.044(12)	0.761 0.061(12)	0.770 0.058(12)
LUNGS/ FINAL BODY * 100	0.481 0.032(12)	0.458 0.020(12)	0.476 0.035(12)	0.498 0.037(12)
OVARIES/ FINAL BODY * 100	0.046 0.005(12)	0.046 0.005(12)	0.046 0.004(12)	0.048 0.006(12)
UTERUS/ FINAL BODY * 100	0.240 0.033(12)	0.243 0.035(12)	0.233 0.038(12)	0.259 0.033(12)

Data arranged as: Mean
Standard deviation (Number of values included in calculation)

* Statistically significant difference from control at $p < 0.05$ by Dunnett/Tamhane-Dunnett test.

Table 58
Incidences of Gross Observations in Subchronic Male Rats

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
ADRENAL GLANDS;				
No Visible Lesions	12	12	12	12
BRAIN;				
No Visible Lesions	12	12	12	12
CECUM;				
No Visible Lesions	12	12	12	12
COAGULATING GLANDS;				
No Visible Lesions	12	12	12	12
COLON;				
No Visible Lesions	12	12	12	12
DUODENUM;				
No Visible Lesions	12	12	12	12
EPIDIDYMIDES;				
No Visible Lesions	12	12	12	12
FEMUR/KNEE JOINT;				
No Visible Lesions	12	12	12	12
HEART;				
No Visible Lesions	12	12	12	12
ILEUM;				
No Visible Lesions	12	12	12	12
JEJUNUM;				
No Visible Lesions	12	12	12	12
KIDNEYS;				
No Visible Lesions	11	12	11	12
Dilatation	1	0	1	0

Table 58
Incidences of Gross Observations in Subchronic Male Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
LIVER;				
No Visible Lesions	10	12	12	12
Discoloration	2	0	0	0
LUNGS;				
No Visible Lesions	12	12	12	12
MANDIBULAR LYMPH NODE;				
No Visible Lesions	12	12	12	12
MESENTERIC LYMPH NODE;				
No Visible Lesions	12	12	12	12
PROSTATE;				
No Visible Lesions	12	12	12	12
RECTUM;				
No Visible Lesions	12	12	12	12
SCIATIC NERVE;				
No Visible Lesions	12	12	12	12
SEMINAL VESICLES;				
No Visible Lesions	12	12	12	12
SPINAL CORD;				
No Visible Lesions	12	12	12	12
SPLEEN;				
No Visible Lesions	12	12	12	12
STOMACH;				
No Visible Lesions	12	12	12	12
TESTES;				
No Visible Lesions	12	12	12	12

Table 58
Incidences of Gross Observations in Subchronic Male Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
THYMUS;				
No Visible Lesions	12	12	12	12
THYROID GLAND;				
No Visible Lesions	12	12	12	12
TRACHEA;				
No Visible Lesions	12	12	12	12
URINARY BLADDER;				
No Visible Lesions	12	12	12	12

Table 59
Incidences of Gross Observations in Subchronic Female Rats

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
ADRENAL GLANDS;				
No Visible Lesions	12	12	12	12
BRAIN;				
No Visible Lesions	12	12	12	12
CECUM;				
No Visible Lesions	12	12	12	12
CERVIX;				
No Visible Lesions	12	12	12	12
COLON;				
No Visible Lesions	12	12	12	12
DUODENUM;				
No Visible Lesions	12	12	12	12
FEMUR/KNEE JOINT;				
No Visible Lesions	12	12	12	12
HEART;				
No Visible Lesions	12	12	12	12
ILEUM;				
No Visible Lesions	12	12	12	12
JEJUNUM;				
No Visible Lesions	12	12	12	12
KIDNEYS;				
No Visible Lesions	11	12	12	12
Dilatation	1	0	0	0
LIVER;				
No Visible Lesions	12	11	12	12
Adhesion	0	1	0	0

Table 59
Incidences of Gross Observations in Subchronic Female Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
LUNGS;				
No Visible Lesions	12	12	12	12
MANDIBULAR LYMPH NODE;				
No Visible Lesions	12	12	12	12
MESENTERIC LYMPH NODE;				
No Visible Lesions	12	12	12	12
OVARIES;				
No Visible Lesions	12	12	12	12
OVIDUCT;				
No Visible Lesions	12	12	12	12
RECTUM;				
No Visible Lesions	12	12	12	12
SCIATIC NERVE;				
No Visible Lesions	12	12	12	12
SPINAL CORD;				
No Visible Lesions	12	12	12	12
SPLEEN;				
No Visible Lesions	12	12	12	12
STOMACH;				
No Visible Lesions	12	12	12	12
THYMUS;				
No Visible Lesions	12	12	12	12
THYROID GLAND;				
No Visible Lesions	12	12	12	12
TRACHEA;				
No Visible Lesions	12	12	12	12

Table 59
Incidences of Gross Observations in Subchronic Female Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
URINARY BLADDER;				
No Visible Lesions	12	12	12	12
UTERUS;				
No Visible Lesions	12	12	12	12
VAGINA;				
No Visible Lesions	12	12	12	12

Table 60
Incidences of Gross Observations in Satellite Female Rats

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
ADRENAL GLANDS;				
No Visible Lesions	12	12	12	12
BRAIN;				
No Visible Lesions	12	12	12	12
CECUM;				
No Visible Lesions	12	12	12	12
CERVIX;				
No Visible Lesions	12	12	12	12
COLON;				
No Visible Lesions	12	12	12	12
DUODENUM;				
No Visible Lesions	12	12	12	12
FEMUR/KNEE JOINT;				
No Visible Lesions	12	12	12	12
HEART;				
No Visible Lesions	12	12	12	12
ILEUM;				
No Visible Lesions	12	12	12	12
JEJUNUM;				
No Visible Lesions	12	12	12	12
KIDNEYS;				
No Visible Lesions	11	12	12	12
Dilatation; right	1	0	0	0
LIVER;				
No Visible Lesions	12	12	12	12
LUNGS;				
No Visible Lesions	12	12	12	12

Table 60
Incidences of Gross Observations in Satellite Female Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
MANDIBULAR LYMPH NODE;				
No Visible Lesions	12	12	12	12
MESENTERIC LYMPH NODE;				
No Visible Lesions	12	12	12	12
OVARIES;				
No Visible Lesions	12	12	12	12
OVIDUCT;				
No Visible Lesions	12	12	12	12
RECTUM;				
No Visible Lesions	12	12	12	12
SCIATIC NERVE;				
No Visible Lesions	12	12	12	12
SKIN;				
No Visible Lesions	0	0	0	0
Alopecia; left	1	0	0	0
SPINAL CORD;				
No Visible Lesions	12	12	12	12
SPLEEN;				
No Visible Lesions	12	12	12	12
STOMACH;				
No Visible Lesions	12	12	12	12
THYMUS;				
No Visible Lesions	12	12	12	12
THYROID GLAND;				
No Visible Lesions	12	12	12	12
TRACHEA;				
No Visible Lesions	12	12	12	12

Table 60
Incidences of Gross Observations in Satellite Female Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
URINARY BLADDER;				
No Visible Lesions	12	12	12	12
UTERUS;				
No Visible Lesions	12	12	12	12
VAGINA;				
No Visible Lesions	12	12	12	12

Table 61
Incidences and Lesion Grades of Microscopic Observations in Subchronic Male Rats

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
ADRENAL GLANDS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
BONE MARROW;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
BRAIN;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
CECUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	10	0	0	11
Inflammation, subacute	(2)	(0)	(0)	(1)
minimal	2	0	0	1
COAGULATING GLANDS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
COLON;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
DUODENUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
EPIDIDYMIDES;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	11
Sperm granuloma	(0)	(0)	(0)	(1)
mild	0	0	0	1
FEMUR;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12

Table 61
Incidences and Lesion Grades of Microscopic Observations in Subchronic Male Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
HEART;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	8	0	0	9
Cardiomyopathy	(4)	(0)	(0)	(3)
minimal	4	0	0	3
ILEUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
JEJUNUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
KIDNEYS;				
Examined	(12)	(12)	(12)	(12)
Within Normal Limits	4	2	0	0
Chronic progressive nephropathy	(7)	(10)	(12)	(12)
minimal	7	9	9	11
mild	0	1	3	1
Hyaline droplets; increased	(1)	(10)	(12)	(12)
minimal	1	10	4	0
mild	0	0	8	12
Dilatation; tubules; focal	(1)	(0)	(0)	(0)
minimal	1	0	0	0
Hydronephrosis; bilateral	(1)	(0)	(0)	(0)
mild	1	0	0	0
Hydronephrosis; unilateral	(1)	(0)	(1)	(0)
minimal	1	0	0	0
mild	0	0	1	0
Casts; tubules	(0)	(3)	(7)	(2)
minimal	0	2	5	2
mild	0	1	2	0
Aggregates; lymphoid	(0)	(0)	(0)	(1)
minimal	0	0	0	1

Table 61
Incidences and Lesion Grades of Microscopic Observations in Subchronic Male Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
LIVER;				
Examined	(12)	(0)	(12)	(12)
Within Normal Limits	2	0	6	1
Inflammation, subacute	(9)	(0)	(6)	(11)
minimal	9	0	6	11
Necrosis, focal	(0)	(0)	(0)	(3)
minimal	0	0	0	2
mild	0	0	0	1
Hypertrophy; centrilobular	(0)	(0)	(0)	(2)
minimal	0	0	0	2
Fatty change; median cleft	(1)	(0)	(0)	(0)
minimal	1	0	0	0
Infarct; lobe	(1)	(0)	(0)	(0)
severe	1	0	0	0
LUNGS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	9	0	0	9
Histiocytosis; alveolar	(0)	(0)	(0)	(2)
minimal	0	0	0	2
Inflammation, subacute	(2)	(0)	(0)	(1)
minimal	2	0	0	1
Inflammation; perivascular/peribronchiolar	(1)	(0)	(0)	(0)
minimal	1	0	0	0
MANDIBULAR LYMPH NODE;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
MESENTERIC LYMPH NODE;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	11
Histiocytosis	(0)	(0)	(0)	(1)
minimal	0	0	0	1
PEYERS PATCH;				
Examined	(10)	(0)	(0)	(9)
Within Normal Limits	10	0	0	9
Not Examined: MISSING	2	0	0	3

Table 61
Incidences and Lesion Grades of Microscopic Observations in Subchronic Male Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
PROSTATE;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	11	0	0	11
Inflammation, subacute	(1)	(0)	(0)	(1)
minimal	1	0	0	1
RECTUM;				
Examined	(11)	(0)	(0)	(12)
Within Normal Limits	11	0	0	12
Not Examined: MISSING	1	0	0	0
SCIATIC NERVE;				
Examined	(11)	(0)	(0)	(11)
Within Normal Limits	11	0	0	9
Not Examined: MISSING	1	0	0	1
Degeneration; axon/myelin	(0)	(0)	(0)	(2)
minimal	0	0	0	2
SEMINAL VESICLES;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
SPINAL CORD;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
SPLEEN;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
STOMACH;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
TESTES;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12

Table 61
Incidences and Lesion Grades of Microscopic Observations in Subchronic Male Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
THYMUS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
THYROID GLAND;				
Examined	(12)	(0)	(12)	(12)
Within Normal Limits	11	0	12	9
Ectopic thymus tissue	(1)	(0)	(0)	(1)
present	1	0	0	1
Hypertrophy; follicular cell	(0)	(0)	(0)	(2)
minimal	0	0	0	2
TRACHEA;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
URINARY BLADDER;				
Examined	(12)	(0)	(0)	(11)
Within Normal Limits	12	0	0	11
Not Examined: MISSING	0	0	0	1

Table 62
Incidences and Lesion Grades of Microscopic Observations in Subchronic Female Rats

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
ADRENAL GLANDS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
BONE MARROW;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
BRAIN;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
CECUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	11
Inflammation, subacute	(0)	(0)	(0)	(1)
minimal	0	0	0	1
CERVIX;				
Examined	(11)	(0)	(0)	(12)
Within Normal Limits	11	0	0	11
Not Examined: MISSING	1	0	0	0
Cyst; keratin	(0)	(0)	(0)	(1)
present	0	0	0	1
COLON;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
DUODENUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
FEMUR;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12

Table 62
Incidences and Lesion Grades of Microscopic Observations in Subchronic Female Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
HEART;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	10	0	0	11
Cardiomyopathy	(1)	(0)	(0)	(1)
minimal	1	0	0	1
Inflammation/degeneration; subendocardial	(1)	(0)	(0)	(0)
minimal	1	0	0	0
ILEUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
JEJUNUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
KIDNEYS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	11	0	0	10
Chronic progressive nephropathy	(0)	(0)	(0)	(2)
minimal	0	0	0	2
Hydronephrosis; unilateral	(1)	(0)	(0)	(0)
mild	1	0	0	0
LIVER;				
Examined	(12)	(1)	(12)	(12)
Within Normal Limits	3	0	4	0
Inflammation, subacute	(5)	(1)	(8)	(9)
minimal	5	1	8	9
Necrosis, focal	(0)	(0)	(1)	(0)
minimal	0	0	1	0
Hypertrophy; centrilobular	(0)	(0)	(0)	(9)
minimal	0	0	0	9
Fatty change; median cleft	(4)	(0)	(0)	(2)
minimal	4	0	0	2
Fatty change; periportal	(0)	(0)	(0)	(1)
minimal	0	0	0	1
Fibrosis; capsule	0	1	0	0

Table 62
Incidences and Lesion Grades of Microscopic Observations in Subchronic Female Rats (Continued)

Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
LUNGS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	10	0	0	11
Histiocytosis; alveolar	(0)	(0)	(0)	(1)
minimal	0	0	0	1
Inflammation; perivascular/peribronchiolar	(2)	(0)	(0)	(0)
minimal	2	0	0	0
MANDIBULAR LYMPH NODE;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
MESENTERIC LYMPH NODE;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
OVARIES;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
OVIDUCT;				
Examined	(12)	(0)	(0)	(11)
Within Normal Limits	12	0	0	11
Not Examined: MISSING	0	0	0	1
PEYERS PATCH;				
Examined	(11)	(0)	(0)	(12)
Within Normal Limits	11	0	0	12
Not Examined: MISSING	1	0	0	0
RECTUM;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	11
Inflammation, subacute; tunica muscularis	(0)	(0)	(0)	(1)
minimal	0	0	0	1
SCIATIC NERVE;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12

Table 62
Incidences and Lesion Grades of Microscopic Observations in Subchronic Female Rats (Continued)

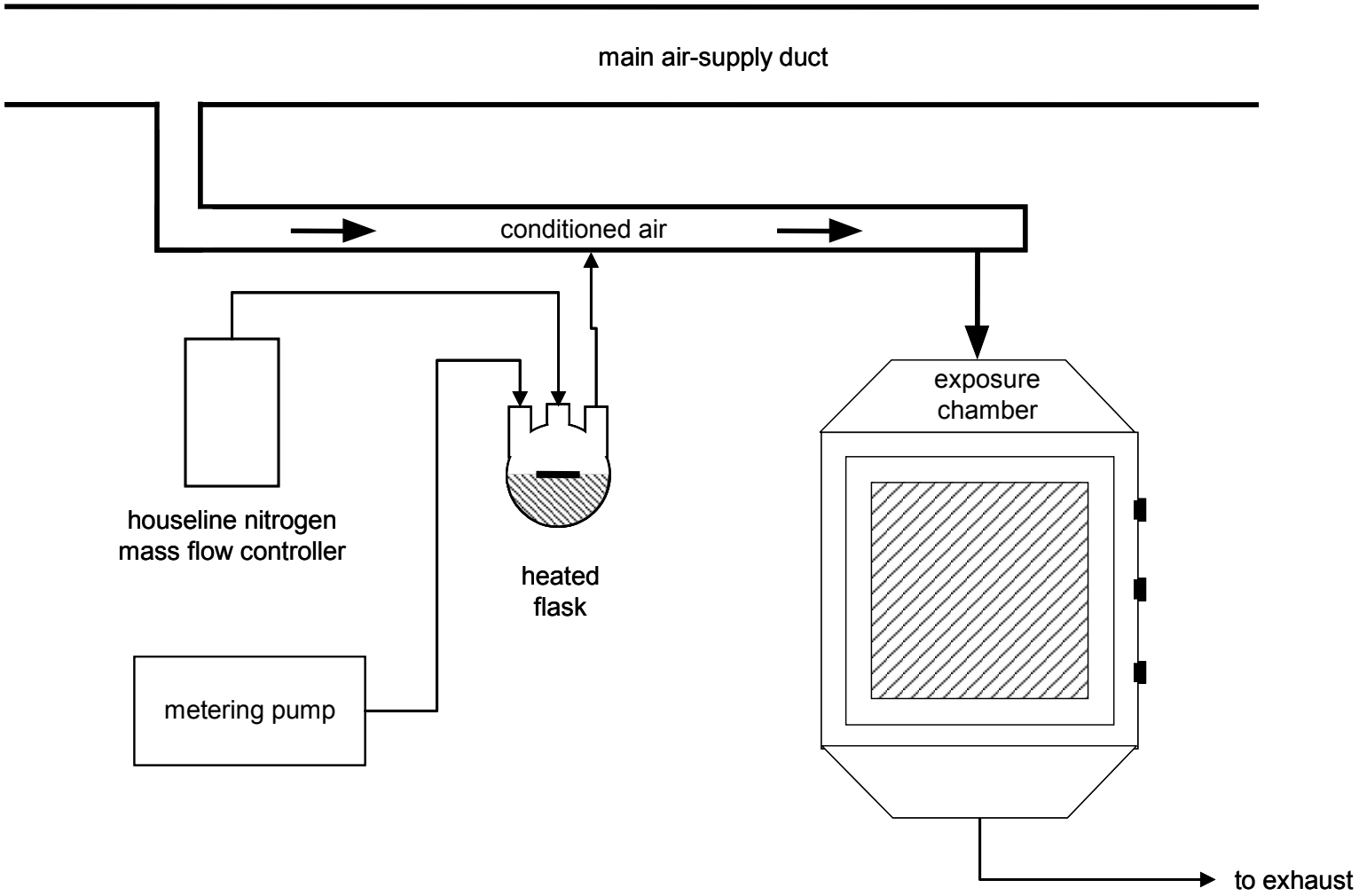
Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
SPINAL CORD;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
SPLEEN;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
STOMACH;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
THYMUS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
THYROID GLAND;				
Examined	(12)	(0)	(12)	(12)
Within Normal Limits	12	0	12	9
Hypertrophy; follicular cell	(0)	(0)	(0)	(2)
minimal	0	0	0	2
Adenoma; c-cell; incidental	0	0	0	1
TRACHEA;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
URINARY BLADDER;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
UTERUS;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12
VAGINA;				
Examined	(12)	(0)	(0)	(12)
Within Normal Limits	12	0	0	12

Table 63
Incidences and Lesion Grades of Microscopic Observations in Satellite Female Rats

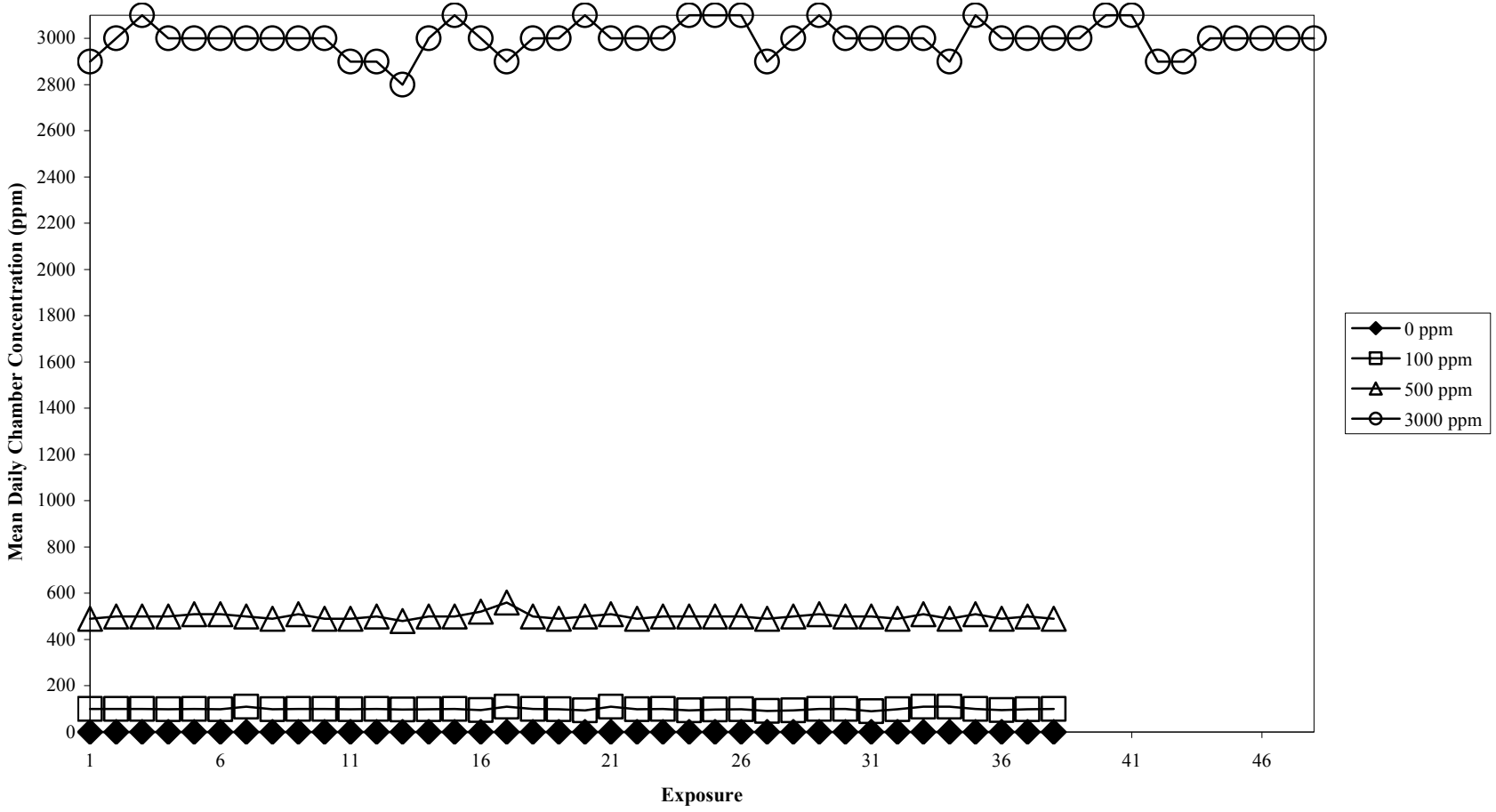
Group :	1	2	3	4
Concentration :	0 ppm	100 ppm	500 ppm	3000 ppm
Number of Animals on Study :	12	12	12	12
CERVIX;				
Examined	(0)	(0)	(0)	(1)
Within Normal Limits	0	0	0	1
OVARIES;				
Examined	(0)	(0)	(0)	(1)
Within Normal Limits	0	0	0	1
OVIDUCT;				
Examined	(0)	(0)	(0)	(1)
Within Normal Limits	0	0	0	1
UTERUS;				
Examined	(0)	(0)	(0)	(1)
Within Normal Limits	0	0	0	1
VAGINA;				
Examined	(0)	(0)	(0)	(1)
Within Normal Limits	0	0	0	1

FIGURES

Figure 1
Schematic Of Exposure System



Mean Daily Chamber Concentrations



APPENDICES

APPENDICES

EXPLANATORY NOTES

Notes

Due to rounding differences, values in tables may be slightly different than appendices.

Abbreviations

BW =		Body weight
BWG	=	Body weight gain
FC =		Food consumption
FE =		Food efficiency
G =		Gestation
GD =		Gestation day
Kg =		Kilogram
L =		Lactation
LD =		Lactation day
Mg =		Milligram
N/n	=	Number in group/Number of values used in calculation of mean
PND =		Postnatal day
Ppm	=	parts per million
Wt =		Weight
-/---/./…/Blank space	=	No data/Data could not be calculated

Appendix A
Sample Characterization of High Naphthenic Naphtha: Chemical Abstract Number Designation

Sample Characterization of High Naphthenic Naphtha: Chemical Abstract Number Designation

The test material used in studies to characterize mammalian toxicity and biodegradation of hydrocarbons in the Naphthenic (cycloparaffin) blending streams category of the HPV Gasoline Blending Stream Test Plan is a high naphthenic naphtha containing approximately 30% naphthenes. Results of studies with this test material can be used for read-across purposes for all CAS numbers identifying high naphthenic gasoline blending streams containing 19 to 30% or more naphthenic components.

This high naphthenic naphtha is derived from hydrogenation and hydrocracking process steps with removal of nitrogen and sulfur (sweetening) that convert low grade gas oils to higher quality components for direct blending of gasoline. Due to the multiple steps in generating this test material, the supplying refinery identified the sample under the broad CAS #64741-41-9, with the Chemical Abstract name of Naphtha, petroleum, heavy straight run, a CAS number which encompasses the more process-specific designations sweet naphtha and heavy crackate. The refinery further indicated that the sample underwent the hydrocracking HUX process that also makes applicable the more narrowly defined designation heavy hydrocrackate. Finally, the CAS #64741-78-2, with the Chemical Abstract name of Naphtha, petroleum, heavy hydrocracked can and has been used to identify this test material and is descriptive of the hydrocracking step employed.

This test sample identified as CAS #64741-41-9 for chain of custody purposes was collected as a single lot from one refinery and was chemically characterized prior to shipping in 3 drums to the sample repository. Contents of each drum were further analyzed to verify compositional uniformity between drums and distributed to the contract laboratories for testing. CAS #64741-41-9 and the name Naphtha, petroleum, heavy straight run will therefore be used officially to designate the test material.

Appendix B
Protocol and Protocol Amendments

Highly Naphthenic Naphtha: Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test in Rats (OECD 422)

Work Request Number 16123

Service Code 1422

Protocol

Performing Laboratory: E.I. du Pont de Nemours and Company
Haskell[SM] Laboratory for Health and Environmental Sciences
P.O. Box 50
Newark, Delaware 19714
U.S.A.

Haskell Animal Welfare
Committee Number: DGRT123-GP

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OBJECTIVE

The objective of this study is to evaluate the potential subchronic and reproductive toxicity of the test substance when administered via inhalation to male and female rats during premating, cohabitation, gestation (G), and to lactation day 4 (day 4L). Clinical pathology, neurobehavioral function, gross pathology, histopathology, and reproductive function will be evaluated.

SPONSOR

Sponsor: Petroleum HPV Testing Group
American Petroleum Institute (API)
1220 L. Street, NW
Washington, DC 20005
U.S.A.
[redacted]

Sponsor Approval: Will be indicated by sponsor's signature and date on the protocol

REGULATORY COMPLIANCE AND TEST GUIDELINES

This study will be conducted in compliance with the following good laboratory practice(s), which are compatible with current OECD and MAFF (Japan) Good Laboratory Practices:

- U. S. EPA TSCA (40 CFR Part 792) Good Laboratory Practice Standards,

except for the items documented below. None of the items listed impact the validity of the study.

- A sample of the test substance and the original containers will not be retained by the performing laboratory due to the flammability of the test substance and potential explosive hazards. Samples from the same lot in similar containers are retained by the sponsor at another location.
- A certificate of analysis conducted according to Good Laboratory Practice Standards will not be provided by the sponsor since the test substance is a mixture composed of approximately 225 substances. The sponsor is providing the composition and physical properties of the test substance.

This study will be conducted in compliance with the following testing guidelines:

- U. S. EPA, OPPTS 870.3650: Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test, *Health Effects Test Guidelines* (2000).
- OECD Section 4, (Part 422): Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test, *Guidelines for the Testing of Chemicals* (1996).

EXPERIMENTAL DESIGN

A. Treatment Groups and Exposure Concentrations

Study Groups		Identification[c]				
Subchronic[a] and Satellite (Female)[b]	Number/ Sex Group	Subchronic Male	Subchronic Female	Satellite Female	Targeted Atmospheric Concentration (ppm)[d]	
1	12	101-112	113-124	125-136	0	Control
2	12	201-212	213-224	225-236	100	Low
3	12	301-312	313-324	325-336	500	Intermediate
4	12	401-412	413-424	425-436	3000	High

a Subchronic rats (repeated-treatment, general toxicity, neurotoxicity, clinical pathology, and pathology endpoints).
b Satellite females (reproductive and developmental toxicity, neurotoxicity, clinical pathology, and pathology endpoints).
c The Identification Number will be included on the cage label. The pretest number assigned to each animal will be tattooed on the tail during the pretest period and included on the cage label.
d The test substance, administered by whole-body inhalation.

B. Treatment Schedule

All exposures will be 6 hours/day, 7 days/week. Lactating dams will not be exposed.

Animals/Study Phase	**Duration**
Premating[a]	14 Days (Approximate)
Subchronic Females	28 Days (Approximate)
Cohabitation[a]	Up to 14 days
Postcohabitation[a]	
Subchronic Males	30 Days (Approximate)
Females with no evidence of copulation	26 Days (Approximate)
Gestation	Day 0-19G

a Subchronic Males and Satellite Females.

C. Study Parameters
(See appropriate sections in protocol for details).

Clinical Observations	
Daily Animal Health Observations	Daily (a.m., pre-exposure).
Careful Clinical Observations	Daily (p.m., postexposure)
Detailed Clinical Observations	Once before first exposure and at least once per week thereafter
Clinical Observations During Inhalation Exposures	Daily, at least 3 times during exposure
Body Weights	
Quarantine/Pretest	At least twice/Weekly
During Study	Weekly
Gestation	Days 0, 7, 14, 21G
Lactation	Days 0, 4L
Food Consumption and Food Efficiency	
During Study	Weekly
Cohabitation/Postcohabitation (Subchronic Males and Satellite Females)	None
Gestation – Satellite Females	Days 0, 7, 14, 21G
Lactation – Satellite Females	Days 0, 4L
Neurobehavioral Evaluations	
Pretest	All animals
Subchronic Males and Females	Test day 28 (approximate)
Satellite Dams with Litters	Day 4L
Clinical Pathology Evaluations	
Coagulation	All animals at terminal sacrifice
Hematology and Clinical Chemistry	
Subchronic Males and Females	Test day 28 (approximate)
Satellite Dams with Litters	Day 4L
Necropsy	
Sacrifice Schedule	
Subchronic Males and Females	After approximately 28 days of exposure
Satellite nonpregnant Dams	After approximately 26 days postcohabitation
Satellite Dams with Litters	Day 4L
Gross Pathology	All animals Offspring – Day 4L Pups – External examination
Organ Weights	All animals
Histopathology	
Subchronic Males and Females	Control and high-dose groups (target organs and gross lesions in intermediate-dose groups, if necessary)
Satellite Females	Reproductive organs for rats with reproductive failure

D. Selection of Exposure Concentrations

In a previous range-finding study,[(1)] male and pregnant female rats were exposed to 0, 250, 1000, or 4000 ppm for 6 hours per day for 14 days (males) or gestation days 6-20 (females). Test substance-related decreases in body weight, weight gain, and food consumption occurred in

4000 ppm males and females. Decreased body weight and weight gain were also observed in 250 and 1000 ppm males. Males in the 4000 ppm group had slightly higher liver and testes weights and 4000 ppm females had slightly higher liver weights. There were no test substance-related effects on clinical signs of toxicity, in adults, number of litters, number of fetuses, number of live fetuses, number of implantations, resorptions, or external fetal observations. At 4000 ppm, fetal weights were slightly lower compared to control values.

Based on these data, exposure concentrations of 0, 100, 500, and 3000 ppm were selected for the current study.

F. Route of Administration

The test substance will be administered by inhalation since it is a potential route of exposure.

MATERIALS AND METHODS

A. Test Substance

Chemical Name:	Sweet Naphtha
Other Name Used in this Protocol:	Highly Naphthenic Naphtha
CAS Number:	64741-41-9
Haskell Sample Number:	H-27199
Purity:	The test substance is a mixture of approximately 225 volatile hydrocarbons.
Color:	Colorless
Form:	Liquid
Supplier:	EPL Archives, Inc., Sample #1203-005
Vehicle:	Nitrogen (purity > 99.9%) Filtered air.

1. Sample Characterization and Stability

The sponsor will provide the composition of the test substance, and a copy will be maintained in the study records. In addition, the sponsor will provide the analytical conditions that were used so the composition of the liquid test substance can be verified at Haskell Laboratory prior to the initial exposure and after the final exposure to establish stability of the liquid test substance.

B. Inhalation Exposure System

1. Exposure Chambers

Exposures to the test substance will be conducted in NYU type 1.4-m^3 chambers. The exposure chambers to be used for this study are constructed of stainless steel and glass, and are cubical with square-pyramidal chamber inlets and outlets with a tangential feed at the chamber inlet which promotes uniform chamber distribution of the test substance. The chamber volume has been chosen so that the total body volume of the test animals is not expected to exceed approximately 5% of the chamber volume.

2. Atmosphere Generation

The target exposure concentrations are 0, 100, 500, and 3000 ppm, with a range of ±10% of the overall target concentration.

The test substance will be vaporized by flash evaporation in a heated glass flask under flowing nitrogen. The resulting vapor will be mixed with conditioned, filtered air leading to the inhalation chambers. The concentration of test substance in each test chamber will be adjusted by varying the amount of the test substance delivered to each flask and/or by varying the amount of filtered air. Test atmospheres will be generated dynamically using airflows needed to achieve at least 10 air changes per hour in the exposure chamber.

All components of the vapor generation systems will be fabricated from stainless steel, glass, Neoprene® or Teflon.® The specific equipment used for atmosphere generation was determined during the method development study.(2)

3. Chamber Distribution of the Test Substance:

Uniform distribution of the main component of the test substance was determined during the method development study.(2)

4. Exposure Mode

Animals will be individually placed in stainless steel wire mesh modules (one/module) and exposed, whole-body, inside the exposure chamber, except during the cohabitation period, when animals will be housed as mating pairs in stainless steel wire mesh modules and exposed in the same manner. The chamber volume was chosen so that the total body volume of the test animals does not exceed 5% of the chamber volume. Animals will be rotated to a different level within the chamber approximately weekly, except during cohabitation.

C. Characterization of Chamber Atmosphere

1. Test Substance Sampling and Analysis

The atmospheric concentration of the test substance will be determined at least once per hour by gas chromatography (GC). Samples of chamber atmosphere will be drawn from the breathing zone of the animals and directly analyzed by a Hewlett Packard gas chromatograph equipped with a flame-ionization detector. Gas standards (ordinarily 3 working standards of different concentrations spanning the range of test substance concentrations) will be prepared prior to each exposure by the quantitative dilution of the test substance in known amounts of air. The samples collected from the chambers will be compared to the standard curve resulting from analyses of the gas standards. The control chamber will also be sampled at least once during the 6-hour exposure period. More frequent samples may be taken at the discretion of the Study Director. Nominal chamber concentrations will be calculated from the chamber air flow and the amount of test substance metered into each chamber.

Since the test substance is a mixture containing approximately 225 individual substances, 12 components of the mixture will be selected for quantification weekly. This analysis will be

conducted by cryogenic gas chromatography using samples collected from the 100, 500, and 3000 ppm chambers.

Details of the analytical method(s) used will be documented in the study records.

2. Environmental Monitoring

Chamber airflow will be set to achieve at least 10 air changes per hour and will be monitored continually with thermoanemometers. Chamber temperature and relative humidity will be targeted at 19-25°C and 30%-70%, respectively, and will be measured with dial-type hygrometer/thermometers. Airflow, temperature, and relative humidity will be monitored continually and recorded at least 3 times in each exposure chamber during each exposure. Chamber oxygen concentration will be targeted to be at least 19%, will be measured with a Biosystems model 3100R Oxygen Analyzer, and will be recorded at least once in each exposure chamber during each exposure.

D. Duration of Exposure

Animals will be exposed as described in the study design. The starting time of each exposure will be defined as the time when the generation system is turned on. The ending time of each exposure will be defined as the time when the generation system is turned off. Rats will be exposed to the test substance during both the time it takes for the chamber to reach concentration, and the time it takes for the test substance to be purged from the chamber. After each exposure, rats will be returned to their cages.

E. Test Species

Species:	Rat
Strain:	Crl:CD(SD)
Sex:	Male and female, nonsiblings, nulliparous
Source:	Charles River Laboratories, Inc Raleigh, North Carolina
Number of Rats Requested:	53 males; 105 females
Age at Arrival:	52 days
Age at Start of Study:	Approximately 66 days
Weight at Arrival:	Approximately 201-225 grams (males); Approximately 176-200 grams (females) The weight range at the time of arrival is not a factor for the purposes of this study since animals will be randomly distributed by weight at the time of assignment to groups. Therefore, deviations outside of this range are expected not to have any impact on the study. The body weight range will be documented in the study records and provided in the final report.
Identification:	Number assigned to each animal which will be tattooed on the tail during pretest period and included on cage label.
Selection Criteria:	Consistently acceptable health status and extensive experience with this strain at Haskell Laboratory.

F. Animal Husbandry

Housing Subchronic study males: All Phases:	Individually (except during cohabitation of mating pairs) in stainless steel, wire-mesh cages suspended above cage boards; sexes on separate racks.
Housing Subchronic study females: All Phases:	Individually in stainless steel, wire-mesh cages suspended above cage boards; sexes on separate racks.
Housing Satellite Females: Quarantine/Premating:	Individually in stainless steel, wire-mesh cages suspended above cage boards; sexes on separate racks.
Cohabitation:	Mating pairs (females placed in males' cages) on a 1:1 basis in stainless steel, wire-mesh cages suspended above cage boards
Days 0–19 of gestation:	Individually in stainless steel, wire-mesh cages suspended above cage boards; sexes on separate racks.
Day 19 of gestation - Day 4 of lactation:	After the last exposure on day 19 of gestation, females assumed pregnant will be housed individually in polycarbonate pans with bedding material. Females presumed nonpregnant will be housed in the same manner as pregnant females 7 days after the mating pairs are separated.
Cage Rack Positioning:	Cage racks will not be relocated within the animal room.
Climate:	Temperature of 18-26ºC Relative humidity of 30%-70%
Illumination:	Artificial (fluorescent light) on an approximate 12-hour light/dark cycle.
Water:	Tap water from United Water Delaware *ad libitum* provided by an automatic watering system except during exposure.
Feed:	PMI® Nutrition International, LLC Certified Rodent LabDiet® 5002 (pelleted) *ad libitum* except during exposure and when fasted.

G. Animal Health and Environmental Monitoring Program

As specified in the Haskell Laboratory animal health and environmental monitoring program, the following procedures are performed periodically to ensure that contaminant levels are below those that would be expected to impact the scientific integrity of the study:

Water Screening Tests:	Total bacterial counts, and the presence of coliforms, lead, and other contaminants. The water analysis reports will be appended to the main final report.
Cage and Cage Rack Screening Tests:	Analyzed for sentinel bacteria to ensure adequate sanitation by the cagewashers
Feed:	Certified animal feed is used, guaranteed by the manufacturer to meet specified nutritional requirements and not to exceed stated maximum concentrations of key contaminants, including specified heavy metals, aflatoxin, chlorinated hydrocarbons, and organophosphates. The feed analysis reports will be appended to the main final report.
Program Administration:	Laboratory animal veterinarian
Data:	Maintained separately from study records and may be included in the final report at the discretion of the study director

H. Pretest Period/Quarantine

Pretest Period:	Approximately 7-14 days (minimum of 5 days)
Quarantine:	Approximately 5 days (minimum of 3 days during the pretest period)
Quarantine Release:	Performed by the laboratory animal veterinarian or designee on the basis of adequate body weight gain and absence of clinical signs of disease or injury.

I. Assignment to Groups

Selection Criteria: Animals without adequate body weight gain and/or with clinical signs of disease or injury may be eliminated from consideration for use in the study; weight variation of individual rats will not exceed ± 20% of the mean weight for each sex.

Randomization: Computerized, stratified randomization so that no statistically significant group mean body weight differences occur within a sex.

Disposition of Remaining Animals: To be sent to Animal Resources or sacrificed by carbon dioxide asphyxiation at the discretion of the study director.

J. Clinical Observations

1. Daily Animal Health Observations

Frequency: All animals – At least once daily during quarantine and pretest, and once daily thereafter. On exposure days, the observations will be conducted at the time animals are placed in the exposure modules.

Scope: Cage-site examination to detect moribund or dead animals.

2. Careful Clinical Observations

Frequency: All animals – once daily after initiation of exposures. On exposure days, the observations will be conducted at the time the animals are returned to their home cages. On non-exposure days, observations will be conducted in the afternoon.

Scope: Acute/systemic toxicity, including but not limited to nervous system function. Clinical observations commonly observed following whole body inhalation exposure, such as alopecia and yellow stained or wet fur, will not be recorded.

3. Detailed Clinical Observations

Frequency: All animals - Once during pretest (baseline), and weekly thereafter

Scope: Animals individually handled and examined for abnormal behavior and appearance in a standardized arena; observations will include (but are not limited to) evaluation of fur, skin, eyes, mucous membranes, occurrence of secretions and excretions, autonomic nervous system activity (lacrimation, piloerection, and unusual respiratory pattern), changes in gait, posture, response to handling, presence of clonic, tonic, stereotypical, or bizarre behavior.

4. Clinical Observations During Inhalation Exposures

Frequency: All animals visible to the observer through the glass window of the chamber will be observed collectively as a group at least 3 times during each exposure.

Scope: Observations through the window of the chamber for abnormal behavior or appearance.

K. Body Weight

Quarantine:	At least twice.
Pretest:	Weekly.
Subchronic Males and Females:	Weekly
Satellite Females:	Premating – Weekly. Cohabitation – Weekly. Gestation – Days 0, 7, 14, 21G. Lactation – Days 0, 4L.
Satellite Females without evidence of copulation:[a]	Post-cohabitation - Weekly
Neurobehavioral Evaluations:	All animals evaluated will be weighed on the day of the FOB assessment.
Body Weight Collected at Terminal Sacrifice	All animals.

L. Food Consumption and Food Efficiency

Subchronic Males:	Premating – weekly. Cohabitation and postcohabitation – none.
Subchronic Females:	Weekly
Satellite Females:	Premating – Weekly. Cohabitation – None. Gestation – Days 0, 7, 14, 21G. Lactation – Days 0, 4L.
Satellite Females without evidence of copulation:	Postcohabitation – None.
Calculation of Food Consumption:	Feeders will be weighed at the beginning and end of the interval. The final weight and amount of spillage from the feeder will be subtracted from initial weight.
Calculation of Mean Daily Food Efficiency:	From food consumption and body weight data.

M. Reproductive/Developmental Assessment

Subchronic Male Rats and Satellite Female Rats

1. Cohabitation[a]/Pairing

Frequency:	Once after approximately 2 weeks of exposure to the test substance.
Scope:	Each satellite female will be continually housed on a 1:1 basis with a randomly selected, nonsibling subchronic male of the same concentration level.
Duration:	Until evidence of copulation is observed or the cohabitation period has ended (Day 14 of cohabitation), at which time the mating pairs will be separated.
Evidence of Copulation:[b]	Daily examination of each female for an intravaginal copulation plug or sperm in the vaginal lavage sample.

a First day of cohousing = Day 0 of cohabitation; End of cohousing = Day 14 of cohabitation
b Evidence of copulation = Day 0 of gestation

N. Gestation

After being transferred into polycarbonate pans (on day 19 of gestation for mated females, or 7 days after the mating pairs have been separated for females without evidence of copulation), female rats will be observed at least twice daily for signs of delivery and offspring.

O. Lactation

On lactation days 0 and 4, offspring will be individually handled and examined for abnormal behavior and appearance; any dead or abnormal pups will be recorded.

Day 0:[a]	Live and dead pups in each litter will be counted by sex. Live pups will be individually weighed as soon as possible after delivery is completed. Dead pups will be sent to pathology. The lungs will be removed from the pups and placed in saline to determine if they float.
Day 4:[b]	Pups in each litter will be counted by sex and live pups will be individually weighed and a gross external examination will be performed.

a Day of delivery = Day 0 of lactation
b Litter Sacrifice

If litters die prior to Day 4 of lactation, the female will be sacrificed. If the female dies prior to Day 4 of lactation, the litter will be sacrificed. If individual pups die prior to Day 4 of lactation, the pups will be sent to pathology and the carcasses of the pups will be examined to the extent possible and discarded.

P. Neurobehavioral Evaluation

Pretest: All animals
During Study: Subchronic Males and Females –
Approximately test days 26, 27, 28, and 29 in the morning, prior to the daily exposure. For subchronic males and females, testing will be counterbalanced by sex and exposure concentration over time to minimize the influence of uncontrolled factors.
Satellite Dams with Litters – Day 4L.

Scope: Neurobehavioral test battery consisting of an abbreviated functional observational battery assessment (FOB) and motor activity (MA).

Animal Identification: Experimenter will be unaware of treatment group of the animals.

Acclimation: At least 10 minutes in the FOB laboratory prior to initiation of assessment.

Order of FOB and MA Assessments: The parameters will be evaluated in the order shown in the table below.

1. Parameters

Body weights will be collected on the day of neurobehavioral assessments and will be reported in the main final report.

Order	Phase	Procedure	Parameters or Methods	
1	FOB	Manipulations in Open Field	approach and touch response auditory response	tail pinch response
2	FOB	Fore- and hindlimb grip strength Strain gauge (Chatillion®)	forelimb grip strength	hindlimb grip strength
3	MA	Motor Activity	Duration of movement and number of movements will be evaluated in 6 consecutive blocks of 10 minutes each as well as for the total 60-minute session.	
4	MA	Assessments in MA monitor	diarrhea	polyuria
5	FOB	Pupillary Constriction or Response[a]	Light beam directed to each eye in the darkened MA room	

a Conducted at the conclusion of motor activity while the animals are still in the motor activity monitor.

2. Test Facility Positive Control Data

Procedures and data describing the effects of acrylamide, carbaryl, d-amphetamine, and trimethyltin are presented in 5 separate reports.[3,4,5,6,7] These positive control studies are the basis of training certification for the personnel making judgments in the neurobehavioral and

neuropathology tests. The data also document that the equipment and procedures are capable of detecting effects that maybe seen in studies of this type.

Q. Clinical Pathology Evaluation

Coagulation and additional saved serum:	All animals at terminal sacrifice.
Hematology/Clinical Chemistry:	Subchronic Males and Females – Test day 28 (Approximate) Satellite Lactating Females with Litters – Day 4L
Fasting:	On the day prior to blood collection, subchronic males and females will be allowed to eat upon return to their home cages following exposure. After approximately 2 hours, feeders will be removed from the cages for at least 15 hours prior to sample collection.
Anesthesia:	Carbon dioxide

1. Collection Sites and Samples
(all blood volumes are approximate)

Hematology:	Orbital sinus (0.5 mL into EDTA tube)
Coagulation:	Abdominal *vena cava* at sacrifice (1.8 mL into sodium citrate tube)
Clinical Chemistry:	Orbital sinus (0.75 mL into serum separator tube)
Additional Saved Serum:	Abdominal *vena cava* at sacrifice (all remaining blood into serum separator tube); processed to serum, and frozen at approximately -80°C. Serum may be used for additional testing as documented by protocol amendment, or will be discarded when the final report issues

2. Collection Parameters

All blood samples will be evaluated for quality by visual examination prior to analysis. Results will be maintained in the study records and reported only if the sample is analyzed. The following parameters will be evaluated.

	Hematology
√	red blood cell count
√	hemoglobin
√	hematocrit
√	mean corpuscular volume
√	mean corpuscular hemoglobin
√	mean corpuscular hemoglobin concentration
√	red cell distribution width
√	absolute reticulocyte count
√	platelet count
	mean platelet volume
√	white blood cell count
√	differential white blood cell count
	Heinz bodies
	methemoglobin
√	Wright's-stained, blood smear prepared[a]
√	red blood cell, white blood cell, and platelet morphology
√	new-methylene-blue-stained, blood smear prepared[a]

	Coagulation
√	prothrombin time
√	activated partial thromboplastin time
	thrombin clotting time
	fibrinogen

	Clinical Chemistry[b]
√	aspartate aminotransferase
√	alanine aminotransferase
√	sorbitol dehydrogenase
√	alkaline phosphatase
√	gamma glutamyltransferase
√	total bilirubin
√	urea nitrogen
√	creatinine
√	cholesterol
√	triglycerides
√	glucose
√	total protein
√	albumin

	Clinical Chemistry[b]
√	globulin
√	calcium
√	inorganic phosphorus
√	sodium
√	potassium
√	chloride
√	albumin/globulin ratio
	creatinine kinase
	bicarbonate
	high-density lipoprotein cholesterol
	low-density lipoprotein cholesterol
	serum osmolality
	total bile acids
	fluoride (EDTA plasma)

	Urinalysis
	quality
	color
	clarity
	volume
	osmolality
	specific gravity
	pH
	glucose
	ketone
	bilirubin
	blood
	urobilinogen
	protein
	fluoride
	microscopic urine sediment examination

	Other Determinations
√	Bone marrow smears[a]

a Examined if required to substantiate or clarify the results of hematology findings.
b All parameters will be analyzed on serum unless indicated.

R. Anatomic Pathology Evaluation

1. Quarantine/Pretest

Rats that are accidentally killed or removed from study during the quarantine/pretest period will be discarded without necropsy. Rats that are found dead or sacrificed *in extremis* during the pretest period will undergo a gross pathological examination to check for the presence of disease. Dependent upon these findings, further diagnostic procedures may be employed at the discretion of the study director, a pathologist, or the laboratory animal veterinarian. The results will not be reported in the final report unless considered significant to the evaluation of the study.

2. Subchronic Males and Females

All rats found dead, accidentally killed, sacrificed *in extremis*, or sacrificed by design will undergo a gross evaluation. Rats will be euthanized by carbon dioxide asphyxiation and exsanguination. The order of sacrifice for scheduled deaths will be random among all treatment groups within a sex.

Blood samples and bone marrow smears for terminal clinical pathology parameters as described in the Clinical Pathology Evaluation section will be collected from all rats at this time.

The following tissues will be collected:

Digestive System	Cardiovascular System	Musculoskeletal System
liver	heart	Femur
stomach		
duodenum	Hematopoietic System	Reproductive System
jejunum	spleen	Male
ileum	thymus	testes
cecum	mandibular lymph node	epididymides
colon	mesenteric lymph node	prostate
rectum	bone marrow[a]	seminal vesicles
	Peyer's patches[b]	coagulating glands
Urinary System	Endocrine System	Female[e]
kidneys	thyroid gland	ovaries
urinary bladder	adrenal glands	oviducts
		cervix
Respiratory System	Nervous System	uterus
lungs	brain (3 sections)[c]	vagina
trachea	spinal cord (3 levels)[d]	
	sciatic nerve	Miscellaneous
		gross observations[f]

a Bone marrow will be collected with the femur.
b Peyer's patches will be collected from sections of the digestive tract.
c Including cerebrum, midbrain, cerebellum, and brain stem.
d Including cervical, thoracic, and lumbar sections.
e All satellite females (including females that do not deliver a litter) will be examined for the presence and number of uterine implantation sites and ovarian *corpora lutea*.
f Gross observations made at necropsy for which histopathology is not appropriate (e.g., fluid, ruffled fur, and missing anatomic parts) will generally not be collected.

All tissues will be placed in the appropriate fixative. Testes and epididymides will be fixed in modified Davidson's solution. All other tissues will be fixed in 10% neutral buffered formalin.

Histologic examination of all the tissues collected will be conducted for all Subchronic animals in the control and high-concentration groups. Examination of tissues from the remaining groups will be limited to relevant gross lesions and those tissues that demonstrate treatment-related histologic effects in the high-treatment group. Tissues from rats found dead or sacrificed *in extremis* will be histologically examined in a similar manner in an attempt to determine cause of death or morbidity.

Paraffin-embedded tissues will be sectioned approximately 5-6 microns thick, stained with hematoxylin and eosin, and examined microscopically by a veterinary pathologist. Selected gross observations for which a microscopic diagnosis would not be additive (e.g., osteoarthritis, pododermatitis, tail chronic dermatitis, calculus, and deformities of the teeth, toe, tail, or ear pinna) will be saved, but will generally not be processed for microscopic evaluation.

Additional procedures to identify and/or clarify histologic features of lesions may be performed at the discretion of the pathologist and will be documented in the final report.

For all Subchronic rats sacrificed by design, the following organs will be trimmed of any adherent tissue, and weighed wet. Group mean and relative organ weights (percent of final body weight; percent of brain weight) will be calculated. Final body weights determined prior to necropsy will be used in the assessment of organ weight changes. Organs from rats found dead, sacrificed *in extremis*, or accidentally killed may be weighed at the discretion of the pathologist or study director.

Organ Weights from all Subchronic Rats Sacrificed by Design

Male	Female	Both Sexes
Testis[a]	Ovaries with oviducts	Liver
Epididymis[a]	Uterus with vagina	Kidneys
Prostate		Lungs
		Adrenal glands
		Thymus
		Spleen
		Brain
		Heart

a The right testis and epididymis will be placed in modified Davidson's solution. All other tissues will be fixed in 10% neutral buffered formalin.

3. Satellite Females

All rats found dead, accidentally killed, sacrificed *in extremis*, or sacrificed by design will undergo a gross evaluation. Rats will be euthanized by carbon dioxide asphyxiation and exsanguination. The order of sacrifice for scheduled deaths will be random among all treatment groups within a sex.

The following tissues will be collected and preserved from all Satellite females.

Digestive System	Cardiovascular System	Musculoskeletal System
liver	heart	Femur
stomach		
duodenum	Hematopoietic System	Reproductive System
jejunum	spleen	
ileum	thymus	Female[e]
cecum	mandibular lymph node	ovaries
colon	mesenteric lymph node	oviducts
rectum	bone marrow[a]	cervix
	Peyer's patches[b]	uterus
		vagina
Urinary System	Endocrine System	
kidneys	thyroid gland	Miscellaneous
urinary bladder	adrenal glands	gross observations[f]
Respiratory System	Nervous System	
lungs	brain (3 sections)[c]	
trachea	spinal cord (3 levels)[d]	
	sciatic nerve	

a Bone marrow will be collected with the femur.
b Peyer's patches will be collected from sections of the digestive tract.
c Including cerebrum, midbrain, cerebellum, and brain stem.
d Including cervical, thoracic, and lumbar sections.
e All satellite females (including females that do not deliver a litter) will be examined for the presence and number of uterine implantation sites and ovarian *corpora lutea*.
f Gross observations made at necropsy for which histopathology is not appropriate (e.g., fluid, ruffled fur, and missing anatomic parts) will generally not be collected.

The following tissues will be trimmed of any adherent tissue and weighed wet.

Tissues Collected from Satellite Female Rats Sacrificed by Design

Ovaries with oviducts
Uterus with vagina
Liver
Kidneys
Lungs

The uteri of all Satellite females (including females that do not deliver a litter) will be examined for the number of implantation sites and the ovaries will be examined for the number of *corpora lutea*. The uterus of each apparently "nonpregnant" female will be stained with ammonium sulfide[8] to detect very early resorptions; the number of implantation sites will be recorded.

Histologic examination of the reproductive tissues collected from Satellite females with reproductive failure will be conducted.

4. Pups

All pups found dead on lactation day 0 will be sent to pathology. The lungs will be removed from the pups and placed in saline to determine if they float.

All offspring surviving to postnatal day 4 will be evaluated for external alterations and euthanized by intraperitoneal (i.p.) injection of sodium pentobarbital. Pups found dead or sacrificed *in extremis* will be examined to the extent possible and discarded.

S. Reproductive Function Calculations

The following table lists the indices of reproductive function that will be calculated for the parental animals.

Mating Index (%)	=	$\frac{\text{Number copulated}^{a}}{\text{Number cohabited}}$	x 100
Fertility Index (%)	=	$\frac{\text{Number pregnant}^{b}}{\text{Number copulated}^{a}}$	x 100
Gestation Index (%)	=	$\frac{\text{Number of litters with at least one live pup}}{\text{Number of litters}}$	x 100
Implantation Efficiency (%)[c]	=	$\frac{\text{Number of pups born}}{\text{Number of implantation sites}}$	x 100
Pups Born Alive (%)[c]	=	$\frac{\text{Number of pups born alive}}{\text{Number of pups born}}$	x 100
0-4 Day Viability (%)[c,d]	=	$\frac{\text{Number of pups alive day 4}}{\text{Number of pups born alive}}$	x 100

a Evidence of copulation = intravaginal copulatory plug, sperm in vaginal lavage, uterine implantation sites, or delivery of a litter.
b Including delivery of a litter or uterine implantation sites.
c To be determined for each litter. Mean and standard deviation for each dose level will be calculated.
d Excluding litters sacrificed due to death of dam during lactation.

T. Statistical Methods

		Method of Statistical Analysis	
Parameter	Preliminary Test	If preliminary test is not significant	If preliminary test is significant
Body Weight Body Weight Gain Food Consumption Food Efficiency Gestation Length Implantation Site Numbers Implantation Efficiency *Corpora Lutea* Counts Mean Number of Pups Per Litter Percent Born Alive 0-4 Day Viability Clinical Pathology[a] Organ Weight	Levene's test for homogeneity[9] and Shapiro-Wilk test[10] for normality[b]	One-way analysis of variance[11] and Dunnett's test[12,13,14]	Kruskal-Wallis test[15] and Dunn's test[16]
Incidence of Clinical Observations Incidence of FOB Descriptive Parameters Mating Index Fertility Index Gestation Index	None	Cochran-Armitage test for trend[11][c]	
Sex Ratio (Covariate: litter size) Mean Pup Weights (Covariates: litter size, sex ratio)	Levene's test for homogeneity[9] and Shapiro-Wilk test[10] for normality[d]	Analysis of covariance[11] and Dunnett-Hsu[17]	Non-parametric analysis of covariance[18]
Motor Activity[e] Grip Strength	Levene's test for homogeneity[9] and Shapiro-Wilk test[10] for normality[d]	Repeated measures analysis of variance[19] followed by Linear contrasts[20]	Sequential application[21] of the Jonckheere-Terpstra trend test[22]

a When an individual observation is recorded as being less than a certain value, calculations are performed on half the recorded value. For example, if bilirubin is reported as <0.1, 0.05 is used for any calculations performed with that bilirubin data. When an individual observation is recorded as being greater than a certain value, calculations are performed on the recorded value. For example, if specific gravity is reported as >1.083, 1.083 is used for any calculations performed with that data.

b If the Shapiro-Wilk test is not significant but Levene's test is significant, a robust version of Dunnett's test will be used. If the Shapiro-Wilk test is significant, Kruskal-Wallis test is followed with Dunn's test.

c If the incidence is not significant, but a significant lack of fit occurs, then Fisher's Exact test[23] with a Bonferroni correction is used.

d A normalizing, variance stabilizing transformation may be used as needed.

e Test day and 10-minute interval will be used as repeated-measure factors.

Subchronic male, Subchronic female, and Satellite female data will be evaluated separately. For litter parameters, the proportion of affected pups per litter or the litter mean will be used as the experimental unit for statistical evaluation.[24] The level of significance selected is $p < 0.05$. Additional statistical tests will be used, and other parameters analyzed, if deemed necessary.

SAFETY AND HOUSEKEEPING

Procedures for handling the test substance will be in accordance with the Process Safety Review for this study.

Animal carcasses, feces, and unused food will be incinerated.

RECORDS AND SAMPLE STORAGE

Specimens (if applicable), all raw data, the protocol, amendments (if any), and the final report will be retained in the archives of Haskell Laboratory for ten years following the issuance of the final report. After that period, arrangements will be made to either return all materials to the Sponsor or archive them longer at Haskell Laboratory.

Laboratory-specific raw data such as personnel files, instrument, equipment, refrigerator and/or freezer raw data will be retained at the facility where the work was done.

STUDY DATES

Proposed Experimental Start:	May 9, 2006
In-life Completion Date:	June 30, 2006 (Approximate)
Proposed Experimental Termination:	February 20, 2007

REFERENCES

1. DuPont Haskell Laboratory. (2005). Highly Naphthenic Naphtha: Pilot Inhalation Developmental Toxicity Study in Rats. Unpublished Report. DuPont Haskell Laboratory DuPont-18330, DuPont Haskell Laboratory Work Request (WR) 16123, Service Code 730.
2. DuPont Haskell Laboratory. (2005). Highly Naphthenic Naphtha: Inhalation Methods Development. Unpublished Report. DuPont Haskell Laboratory DuPont-18332, DuPont Haskell Laboratory Work Request (WR) 16123, Service Code 707.
3. DuPont Haskell Laboratory (1995). Neurotoxicity Evaluation of Trimethyltin in Rats (Positive Control Study). Unpublished data, HLR 266-95.
4. DuPont Haskell Laboratory (1997). Neurotoxicity Evaluation of Amphetamine in Rats (Positive Control Study). Unpublished data, HL-1997-00686.
5. DuPont Haskell Laboratory (1997). Neurotoxicity Evaluation of Carbaryl in Rats (Positive Control Study). Unpublished data, HL-1997-00361.
6. DuPont Haskell Laboratory (1996). Neurotoxicity Evaluation of Acrylamide in Rats (Positive Control Study). Unpublished data, HLR 293-95.
7. DuPont Haskell Laboratory (2000). Neurotoxicity Evaluation of Carbaryl in Rats (Positive Control Study). Unpublished data, DuPont-3468.

8. Salewski, E. (1964). Farbemethode zum makroskopischen Nachweis von Implantationstellen am Uterus der Ratte. *Archiv. Path. Exp. Pharmakol.* 247, 367.

9. Levene, H. (1960). Robust test for equality of variances. *Contributions to Probability and Statistics* (J. Olkin, ed.), pp 278-292. Stanford University Press, Palo Alto.

10. Shapiro, S.S. and Wilk, M.B. (1965). An analysis of variance test for normality (complete samples). *Biometrika* **52**, 591-611.

11. Snedecor, G.W. and Cochran, W.G. (1967). *Statistical Methods*, 6th edition, pp 246-248 and 349-352. The Iowa State University Press, Iowa.

12. Dunnett, C.W. (1964). New tables for multiple comparisons with a control. *Biometrics* **20**, 482-491.

13. Dunnett, C.W. (1980). Pairwise multiple comparisons in the unequal variance case. *J. Amer. Statist. Assoc.* **75**, 796-800.

14. Tamhane, A.C. (1979). A comparison of procedures for multiple comparison of means with unequal variances. *J. Amer. Statist. Assoc.* **74**, 471-480.

15. Kruskal, W.H. and Wallis, W.A. (1952). Use of ranks in one-criterion analysis of variance. *J. Amer. Statist. Assoc.* **47**, 583-621.

16. Dunn, O.J. (1964). Multiple contrasts using rank sums. *Technometrics* **6**, 241-252.

17. Hsu, J.C. (1992). The Factor Analytic Approach to Simultaneous Inference in the General Linear Model. Journal of Computational and Graphical Statistics 1, 151-168.

18. Stephenson, W.R., Jacobson, D. (1988). A comparison of Nonparametric Analysis of Covariance Techniques, Communications in Statistics – Simulations 17. **17**(2), 451-461.

19. Milliken, G.A. and Johnson, D.A. (1984). *Analysis of Messy Data, Volume 1.: Designed Experiments.* Lifetime Learning Publications, Belmont.

20. Hocking, R.A. (1985). The Analysis of Linear Models. Brooks/Cole, Monterey.

21. Selwyn, M.R. (1995). The use of trend tests to determine a no-observable-effect level in animal safety studies. Journal of the American College of Toxicology 14(2), 158-168.

22. Jonckheere, A.R. (1954). A distribution-free K-sample test against ordered alternatives. Biometrika 41, 133-145.

23. Fisher, R.A. (1985). Statistical Methods for Research Workers, 13th edition. Haffner, New York.

24. Haseman, J.K. and Hogan, M.D. (1975). Selection of the experimental unit in teratology studies. Teratology, 12, 165-171.

SIGNATURES

Approved by: [redacted] May 8, 2006
Date

[redacted] May 5, 2006
Date

Highly Naphthenic Naphtha: Combined Repeated Dose Toxicity Study With the Reproduction/Developmental Toxicity Screening Test in Rats (OECD 422)

Work Request Number 16123

Service Code 1422

Protocol Amendment 1

The protocol is amended as follows:

Effective June 9, 2006

1. Page 19, Materials and Methods, Section R. Anatomic Pathology Evaluation, Subsection 2. Subchronic Males and Females, in the table entitled "Organ Weights from all Subchronic Rats Sacrificed by Design, change "Uterus with vagina" to Uterus with cervix".

Rationale: This change was made to correct a typographical error in the original protocol.

2. Page 20, Materials and Methods, Section R. Anatomic Pathology Evaluation, Subsection 3. Satellite Females, change the title of the table to: "Organ Weights for Satellite Females Sacrificed by Design"

Rationale: This change was made to correct a typographical error in the original protocol.

3. Page 20, Materials and Methods, Section R. Anatomic Pathology Evaluation, Subsection 3. Satellite Females, in the table now entitled Organ Weights for Satellite Females Sacrificed by Design, change "Uterus with vagina" to Uterus with cervix".

Rationale: This change was made to correct a typographical error in the original protocol.

Effective June 19, 2006

4. Page 4, Section B. Treatment Schedule, change the duration of exposure for Females with no evidence of copulation to 19 days after the cohoused male and female have been separated.

Rationale: If the female becomes pregnant on the last day the animals were cohoused, then they should only be exposed for 19 days after the male and female were separated in order to ensure that they receive the same number of exposures as the pregnant, gestating females.

Approved by: _[redacted]_ 17 July 2006
Date

[redacted]

6/25/06
Date

Naphtha, Petroleum, Heavy Straight-Run: Combined Repeated Dose Toxicity Study With the
Reproduction/Developmental Toxicity Screening Test in Rats (OECD 422) DuPont-18331

Naphtha, Petroleum, Heavy Straight-Run: Combined Repeated Study With the Reproduction/Developmental Toxicity Screening Test in Rats (OECD 422)

Work Request Number 16123

Service Code 1422

Protocol Amendment 2

The protocol and amendment #1 is amended as follows:

1. On the title page, change the name of the test substance to: Naphtha, Petroleum, Heavy Straight-Run

Rationale: The change was requested by the sponsor.

Approved by: [redacted] 17 July 2006 Date

6/23/06 Date

Naphtha, Petroleum, Heavy Straight-Run: Combined Repeated Dose Toxicity Study
With the Reproduction/Developmental Toxicity Screening Test in Rats DuPont-18331

Work Request Number 16123
Service Code 1422
Protocol Amendment 3

The protocol is amended as follows:

1. Page 15, Materials and Methods, P. Neurobehavioral Evaluation, Animal Identification, change to the following:

   Animal Identification: Experimenter will be unaware of treatment group of the animals for the evaluation of subchronic males and females.

Rationale: Since the order of the animals during the evaluation on lactation day 4 could not be randomized or counterbalanced, the identity of the treatment group on the cage label during the neurobehavioral evaluation will be present.

2. Page 20, Materials and Methods, R. Anatomic Pathology Evaluation, 3. Satellite Females, fourth paragraph, remove the second sentence.

Rationale: Staining of the uterus with ammonium sulfide to detect early resorptions is not used in reproduction studies due to the length of time elapsed between cohabitation and sacrifice.

3. Page 21, Materials and Methods, S. Reproductive Function Calculations, replace section with the following:

   S. Reproductive Function Calculations

The following table lists the indices of reproductive function that will be calculated for the parental animals.

Reproductive Function Calculations

$$\text{Mating index (\%)} = \frac{\text{number mated}^{a}}{\text{number paired}} \times 100$$

$$\text{Fertility index (\%)} = \frac{\text{number pregnant}^{b}}{\text{number mated}^{a}} \times 100$$

$$\text{Post-Implantation Loss (\%)}^{c} = \frac{\text{number of implantation sites - number of pups born}}{\text{number of implantation sites}} \times 100$$

$$\text{Live Born Index (\%)}^{c} = \frac{\text{number of pups born alive}}{\text{number of pups born}} \times 100$$

$$\text{Viability index (\%)}^{c,d} = \frac{\text{number of pups alive Postnatal Day (PND) 4}}{\text{number of pups born alive}} \times 100$$

a Mated = intravaginal copulatory plug, sperm in vaginal lavage, uterine implantation sites, or delivery of a litter.
b Including those found dead pregnant during gestation.
c To be determined for each litter.
d Excluding litters sacrificed due to death of dam during lactation.

Naphtha, Petroleum, Heavy Straight-Run: Combined Repeated Dose Toxicity Study
With the Reproduction/Developmental Toxicity Screening Test in Rats DuPont-18331

Work Request Number 16123
Service Code 1422
Protocol Amendment 3 (Continued)

Rationale: The wording and description of process for reproductive function calculations was updated to be consistent with the new computer data collection program.

4. Page 22, Materials and Methods, T. Statistical Methods, replace section with the following:

T. Statistical Methods

		Method of Statistical Analysis (see Appendix A for references)	
Parameter	Preliminary Test	If preliminary test is not significant	If preliminary test is significant
Body Weight Body Weight Gain Food Consumption Food Efficiency Precoital Interval Gestation Length *Corpora Lutea* Implantation Sites Post-Implantation Loss Number of Pups Per Litter Live Born Index Viability Index Clinical Pathology Parameters [a] Organ Weight Parameters	Levene's test for homogeneity[9] and Shapiro-Wilk test[10] for normality [b]	One-way analysis of variance[11] and Dunnett's test[12,13,14]	Kruskal-Wallis test[15] and Dunn's test[16]
FOB Descriptive Parameters Mating Index Fertility Index	None	Sequential application of Cochran-Armitage test for trend[11][c]	
Sex Ratio (Covariate: litter size) Pup Weights (Covariates: litter size, sex ratio)	Levene's test for homogeneity[9] and Shapiro-Wilk test[10] for normality [d]	Analysis of covariance[11] and Dunnett-Hsu[17]	Non-parametric analysis of covariance[18]
Motor Activity[e] Grip Strength	Levene's test for homogeneity[9] and Shapiro-Wilk test[10] for normality[d]	Repeated measures analysis of variance[19] followed by Linear contrasts[20]	Sequential application[21] of the Jonckheere-Terpstra trend test[22]

a When an individual observation is recorded as being less than a certain value, calculations are performed on half the recorded value. For example, if bilirubin is reported as < 0.1, 0.05 is used for any calculations performed with that bilirubin data. When an individual observation is recorded as being greater than a certain value, calculations are performed on the recorded value. For example, if specific gravity is reported as > 1.083, 1.083 is used for any calculations performed with that data.

b If the Shapiro-Wilk test is not significant but Levene's test is significant, a robust version of Dunnett's test will be used. If the Shapiro-Wilk test is significant, Kruskal-Wallis test is followed with Dunn's test.

c If the incidence is not significant, but a significant lack of fit occurs, then Fisher's Exact test[23] with a Bonferroni correction is used.

d A normalizing, variance stabilizing transformation may be used as needed.

e Test day and 10-minute interval will be used as repeated-measure factors.

Naphtha, Petroleum, Heavy Straight-Run: Combined Repeated Dose Toxicity Study
With the Reproduction/Developmental Toxicity Screening Test in Rats DuPont-18331

Work Request Number 16123
Service Code 1422
Protocol Amendment 3 (Continued)

Male and female data will be evaluated separately. For litter parameters, the proportion of affected pups per litter or the litter mean will be used as the experimental unit for statistical evaluation.[24] The level of significance selected is $p < 0.05$. Additional statistical tests will be used and other parameters analyzed, if deemed necessary.

Rationale: The statistical procedures were revised to be consistent with the new computer data collection program.

5. Protocol Amendment 1, Header, correct test substance name to: "Highly Naphthenic Naphtha."

Rationale: To correct typographical error.

6. The protocol and Amendments 1 and 2 are amended as follows:

The Sponsor Representative is changed to: Russell D. White, Ph.D., D.A.B.T.®

Rationale: At the Sponsor's request, the Sponsor Representative is changed.

Approved by: [redacted] Sept 12, 2008
Date

[redacted] 9/10/2008
Date

Appendix C
Sponsor-Supplied Compound List for Naphtha, Petroleum, Heavy Straight-Run

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File: C:\HPCHEM\1\DATA\PIANO2\SETUP054.D\SETUP054_FID1_A.CDF 14-Oct-04, 11:40:40
Sample: Hux Drum #1 Operator:
Parameter: C:\HPCHEM\HCE30\HUX TANK 31

Component List

Pk#	Time	Group		Component	%Wgt	%Vol	%Mol
1	27.926	I6	64	2,3-Dimethylbutane	0.007	0.008	0.010
2	28.974	I6	74	2-Methylpentane	0.064	0.074	0.084
3	31.607	I6	80	3-Methylpentane	0.085	0.095	0.110
4	35.331	P6	96	n-Hexane	0.181	0.205	0.236
5	40.127	N6	112	McyC5+2,2DMC5	0.669	0.667	0.893
6	41.743	I7	116	2,4-Dimethylpentane	0.140	0.156	0.157
7	42.310	I7	118	2,2,3-Trimethylbutane	0.007	0.008	0.008
8	45.102	A6	130	Benzene	0.108	0.092	0.156
9	46.708	I7	134	33DMC5+5m1C6ene	0.046	0.049	0.051
10	46.975	N6	136	Cyclohexane	0.496	0.476	0.662
11	50.221	I7	156	2-MethylC6 + C7-Olefin	4.090	4.500	4.585
12	52.055	I7	166	3-Methylhexane	3.230	3.517	3.621
13	52.832	N7	172	t-1,3-DimethylcyC5	1.464	1.450	1.674
14	53.403	N7	174	c-1,3-DMcyclopentane	1.327	1.323	1.518
15	54.023	N7	176	t-1,2-DimethylcycloC5	1.621	1.613	1.855
16	54.159	I7	180	3-Ethylpentane	0.226	0.241	0.253
17	54.613	I8	186	2,2,4-Trimethylpentane	0.039	0.042	0.039
18	54.990	O7	189	C7-Olefin	0.008	0.008	0.009
19	57.702	P7	200	n-Heptane	6.621	7.230	7.421
20	61.065	N7	222	Methylcyclohexane	6.962	6.762	7.964
21	61.883	N8	224	1,1,3-TrimethylcycloC5	0.477	0.477	0.478
22	62.325	I8	226	2,2-Dimethylhexane	0.060	0.065	0.059
23	63.722	N7	234	Ethylcyclopentane	1.200	1.170	1.372
24	64.393	I8	240	2,2,3-Trimethylpentane	0.013	0.013	0.013
25	64.642	I8	245	2,5-DMC6 + C8-olefin	0.495	0.530	0.487
26	64.980	I8	250	2,4-Dimethylhexane	0.582	0.622	0.573
27	65.790	N8	260	t,c-1,2,4-TriMcyC5	0.932	0.932	0.933
28	66.201	I8	265	3,3-DMC6 + C8-olefin	0.077	0.081	0.075
29	67.298	N8	278	t,c-1,2,3-TriMcycloC5	0.647	0.642	0.648
30	67.939	I8	292	2,3,4-Trimethylpentane	0.064	0.067	0.063
31	68.519	A7	300	Toluene	3.997	3.443	4.873
32	69.946	O8	312	C8-Olefin	0.196	0.205	0.196
33	70.285	I8	314	2,3-Dimethylhexane	0.393	0.413	0.387
34	70.428	I8	316	2-M-3-Epentane	0.163	0.170	0.161
35	71.674	I8	326	2-Methylheptane	3.039	3.253	2.989
36	71.885	I8	328	4-Methylheptane	1.003	1.039	0.986
37	72.056	O7	330	C7-Diolefin + C8-Olefin	0.189	0.199	0.189
38	72.190	O8	333	C8-Olefins	0.159	0.166	0.159
39	72.738	N8	335	t-1,4-DiMcycloC6	1.945	1.846	1.947

Recovery = 100.00

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File: C:\HPCHEM\1\DATA\PIANO2\SETUP054.D\SETUP054_FID1_A.CDF 14-Oct-04, 11:40:40
Sample: Hux Drum #1 Operator:
Parameter: C:\HPCHEM\HCE30\HUX TANK 31

Component List

Pk#	Time	Group		Component	%Wgt	%Vol	%Mol
40	72.937	I8	336	3-Methylheptane	2.493	2.638	2.452
41	73.079	I8	338	3-Ethylhexane	1.185	1.240	1.165
42	73.927	O8	348	C8-Olefin	0.248	0.260	0.248
43	74.748	N8	352	c1Ethyl-3-methylcyC5	0.800	0.776	0.801
44	75.104	N8	356	t-1-E-3-McyC5	0.737	0.716	0.738
45	75.322	N8	360	t-1-E-2-McyC5	0.703	0.680	0.704
46	75.583	N8	362	1-M-1-EcycloC5	0.075	0.072	0.075
47	76.008	N8	368	t-1,2-DiMcycloC6	0.859	0.827	0.860
48	76.942	N8	385	t-1,3-DiMcycloC6	0.069	0.066	0.069
49	77.244	N8	390	c-1,4-DiMcycloC6	1.303	1.250	1.305
#9—50	77.537	P8	400	n-Octane	5.463	5.805	5.372
51	78.327	O9	410	C9-Olefin	0.174	0.180	0.155
52	78.468	O9	412	C9-Olefin	0.116	0.120	0.103
53	79.056	I9	418	2,2,4-Trimethylhexane	0.025	0.026	0.021
54	79.382	I9	420	2,4,4-Trimethylhexane	0.052	0.054	0.046
55	79.982	I9	424	2,3,5-Trimethylhexane	0.302	0.313	0.265
56	80.451	I9	428	2,2,3,4-TetraMC5	0.056	0.058	0.049
57	80.825	N8	432	c-1,2-DiMcycloC6	0.334	0.311	0.334
58	81.064	I9	434	2,4-Dimethylheptane	0.412	0.431	0.361
59	81.343	O9	436	C9-Olefin	0.069	0.071	0.061
#10 60	81.663	N8	440	Ethylcyclohexane	2.059	1.952	2.061
61	81.863	I9	444	2-Methyl-4-Ethylhexane	0.055	0.057	0.048
62	82.029	I9	446	2,6-Dimethylheptane	0.811	0.841	0.710
63	82.188	O9	449	C9-Olefin	0.128	0.132	0.114
64	82.465	O9	452	C9-Olefins	0.923	0.950	0.822
65	82.797	O9	454	C9-Olefins	0.170	0.175	0.152
66	82.955	I9	458	2,5 & 3,5-DMheptane	0.701	0.722	0.614
67	83.116	O9	460	C9-Olefins	0.118	0.122	0.105
68	83.235	I9	462	3,3-Dimethylheptane	0.205	0.212	0.179
69	83.411	?		Unidentified	0.326	0.338	0.285
70	83.640	I9	466	C9-Isoparaffin	0.214	0.219	0.187
71	84.232	A8	475	Ethylbenzene	1.012	0.872	1.070
72	84.407	N9	480	t-1,2,4-TrimethylcyC6	0.347	0.332	0.309
73	84.639	I9	485	2,3,4-Trimethylhexane	0.616	0.623	0.539
74	84.892	O9	490	C9-Olefins	0.088	0.090	0.078
75	85.166	I9	495	3,3,4-Trimethylhexane?	0.153	0.153	0.134
#11 76	85.473	A8	500	m-Xylene	1.973	1.706	2.087
77	85.603	A8	502	p-Xylene	0.697	0.604	0.737
78	85.754	I9	503	2,3-Dimethylheptane	0.508	0.520	0.445

Recovery = 100.00

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File: C:\HPCHEM\1\DATA\PIANO2\SETUP054.D\SETUP054_FID1_A.CDF 14-Oct-04, 11:40:40
Sample: Hux Drum #1 Operator:
Parameter: C:\HPCHEM\HCE30\HUX TANK 31

Component List

Pk#	Time	Group	Component	%Wgt	%Vol	%Mol
79	86.000	I9 506	3,4-Dimethylheptane	0.064	0.066	0.056
80	86.191	O9 508	C9-Olefin	0.214	0.219	0.190
81	86.389	I9 510	3-Methyl-3-ethylhexane	0.242	0.244	0.212
82	86.553	I9 516	4-Ethylheptane	0.101	0.103	0.088
83	86.831	I9 518	4-MC8+C9-Olefin	0.872	0.904	0.763
84	86.978	I9 520	2-Methyloctane	1.187	1.247	1.039
85	87.320	I9 524	C9-Isoparaffin	0.170	0.176	0.149
86	87.652	I9 528	3-Ethylheptane	0.386	0.395	0.338
87	87.836	I9 530	3-Methyloctane	1.520	1.566	1.331
88	88.071	N9 540	c-1,2,4-TriMcyC6	0.088	0.084	0.079
89	88.289	N9 545	1,1,2-TriMcycloC6	0.138	0.135	0.123
90	88.426	A8 550	o-Xylene	1.175	0.997	1.243
91	88.543	O9 560	C9-Olefin	0.083	0.085	0.074
92	88.669	O9 562	C9-Olefin	0.149	0.152	0.133
93	88.873	O9 564	C9-Olefin	0.021	0.021	0.018
94	88.950	?	Unidentified	0.022	0.023	0.020
95	89.250	N9 568	t-1-E-4-M-cyC6?	0.527	0.493	0.468
96	89.404	N9 570	c-1-E-4-McyC6?	0.805	0.753	0.716
97	89.695	I9 572	C9-Isoparaffin	0.423	0.431	0.370
98	90.008	O9 575	1-Nonene	0.101	0.102	0.090
99	90.179	N9 580	Isobutylcyclopentane	0.145	0.138	0.129
100	90.262	?	Unidentified	0.091	0.087	0.081
101	90.967	O9 590	cis-3-Nonene	0.074	0.076	0.066
102	91.094	I9 595	C9-Isoparaffin	0.026	0.026	0.022
103	91.369	P9 600	n-Nonane	4.300	4.474	3.766
104	91.750	O9 604	trans-2-Nonene	0.523	0.529	0.465
105	92.096	N9 606	1-M-1-Ecyclohexane	0.179	0.166	0.159
106	92.302	O10 610	C10-Olefin	0.023	0.023	0.018
107	92.578	A9 616	Isopropylbenzene	0.134	0.116	0.125
108	92.774	O9 618	cis-2-Nonene	0.027	0.027	0.024
109	92.906	N9 620	tert-Butylcyclopentane	0.125	0.118	0.111
110	93.053	O9 622	C9-Olefins	0.317	0.321	0.282
111	93.293	O9 624	C9-Olefin	0.253	0.256	0.225
112	93.565	N9 626	Isopropylcyclohexane	0.233	0.217	0.207
113	93.821	I10 630	2,2-Dimethyloctane	0.134	0.138	0.106
114	93.975	?	Unidentified	0.025	0.025	0.019
115	94.068	?	Unidentified	0.021	0.021	0.016
116	94.373	N10 634	1-M-4-isopropylcyC6?	0.351	0.331	0.281
117	94.525	N9 636	sec-Butylcyclopentane	0.562	0.531	0.500

Recovery = 100.00

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File: C:\HPCHEM\1\DATA\PIANO2\SETUP054.D\SETUP054_FID1_A.CDF 14-Oct-04, 11:40:40
Sample: Hux Drum #1 Operator:
Parameter: C:\HPCHEM\HCE30\HUX TANK 31

Component List

Pk#	Time	Group		Component	%Wgt	%Vol	%Mol
118	94.697	I10	638	2,6-Dimethyloctane	0.103	0.105	0.081
119	94.850	I10	640	2,5-Dimethyloctane?	0.111	0.112	0.087
120	94.957	N9	642	Butylcyclopentane	0.312	0.296	0.277
121	95.143	N9	644	Propylcylohexane	0.105	0.098	0.093
122	95.409	I10	646	3,6-Dimethyloctane	0.726	0.734	0.573
123	95.547	N9	648	1-M-2-EcycloC6	0.105	0.097	0.093
124	95.694	?		Unidentified	0.058	0.059	0.047
125	95.826	O10	650	C10-Olefin	0.140	0.141	0.112
126	96.016	A9	651	Propylbenzene	0.469	0.407	0.439
127	96.241	I10	652	3,6-Dimethyloctane	0.450	0.457	0.356
128	96.473	I10	653	3-Methyl-5-ethylheptane	0.080	0.081	0.063
129	96.612	O10	654	C10-Olefin	0.104	0.105	0.083
130	96.735	?		Unidentified	0.040	0.040	0.032
131	96.870	A9	655	1-Ethyl-3-methylbenzene	0.696	0.601	0.650
132	97.099	A9	656	1-Ethyl-4-methylbenzene	0.419	0.363	0.391
133	97.276	?		Unidentified	0.019	0.018	0.015
134	97.366	N10	657	C10-Naphthene	0.016	0.015	0.013
135	97.707	A9	658	1,3,5-Trimethylbenzene	0.684	0.591	0.639
136	97.977	I10	659	2,3-Dimethyloctane	0.062	0.063	0.049
137	98.115	?		Unidentified	0.084	0.086	0.067
138	98.215	I10	660	5-Methylnonane	0.229	0.234	0.181
139	98.409	I10	661	4-Methylnonane	0.556	0.563	0.439
140	98.685	I10	662	2-Methylnonane	0.500	0.513	0.395
141	98.785	A9	663	1-Ethyl-2-methylbenzene	0.325	0.274	0.303
142	99.050	N10	666	C10-Naphthene	0.159	0.147	0.128
143	99.231	?		Unidentified	0.029	0.030	0.023
144	99.380	I10	668	3-Methylnonane	0.485	0.494	0.383
145	99.555	?		Unidentified	0.177	0.179	0.142
146	99.706	O10	670	C10-Olefin	0.048	0.048	0.038
147	99.853	I10	671	C10-Isoparaffin	0.131	0.134	0.104
148	100.159	I10	672	C10-Isoparaffin	0.064	0.066	0.051
149	100.415	A9	673	1,2,4-Trimethylbenzene	0.753	0.642	0.704
150	100.582	?		Unidentified	0.162	0.165	0.128
151	100.749	I10	674	C10-Isoparaffin	0.210	0.214	0.166
152	100.900	I10	675	C10-Isoparaffin	0.184	0.188	0.146
153	101.051	I10	676	Isobutylcyclohexane	0.089	0.083	0.070
154	101.241	?		Unidentified	0.025	0.026	0.020
155	101.341	N10	677	C10-Isoparaffin	0.082	0.084	0.066
156	101.493	I10	678	C10-Isoparaffin	0.043	0.044	0.034

Recovery = 100.00

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File: C:\HPCHEM\1\DATA\PIANO2\SETUP054.D\SETUP054_FID1_A.CDF 14-Oct-04, 11:40:40
Sample: Hux Drum #1 Operator:
Parameter: C:\HPCHEM\HCE30\HUX TANK 31

Component List

Pk#	Time	Group	Component	%Wgt	%Vol	%Mol
157	101.616	I10	682 C10-Isoparaffin	0.017	0.018	0.014
158	101.815	A10	690 Isobutylbenzene	0.064	0.056	0.054
159	102.017	I10	694 C10-Isoparaffin	0.093	0.094	0.073
160	102.329	P10	700 n-Decane	1.911	1.955	1.508
161	102.601	I11	702 C11-Isoparaffin	0.031	0.032	0.023
162	102.675	?	Unidentified	0.020	0.020	0.014
163	102.813	?	Unidentified	0.035	0.036	0.025
164	102.871	?	Unidentified	0.028	0.028	0.020
165	103.061	I11	704 C11-Isoparaffin	0.047	0.047	0.033
166	103.258	A9	705 1,2,3-Trimethylbenzene	0.309	0.258	0.289
167	103.453	?	Unidentified	0.032	0.028	0.027
168	103.529	A10	706 1-M-3-isopropylbenzene	0.029	0.026	0.025
169	103.686	A10	708 1-M-4-isopropylbenzene	0.059	0.052	0.050
170	103.869	I11	709 C11-Isoparaffin	0.110	0.111	0.079
171	104.087	I11	710 C11-Isoparaffin?	0.030	0.030	0.021
172	104.278	?	Unidentified	0.035	0.027	0.033
173	104.424	A9	712 2,3-Dihydroindene	0.167	0.130	0.159
174	104.540	?	Unidentified	0.030	0.023	0.028
175	104.724	N10	714 sec-Butylcyclohexane	0.300	0.274	0.240
176	104.989	?	Unidentified	0.019	0.016	0.016
177	105.092	I11	720 3-Ethylnonane	0.017	0.017	0.012
178	105.217	?	Unidentified	0.066	0.067	0.048
179	105.328	I11	721 C11-Isoparaffin	0.050	0.050	0.036
180	105.482	N10	722 C10-Naphthene	0.128	0.117	0.102
181	105.799	I11	723 C11-Isoparaffin	0.146	0.145	0.129
182	105.988	A10	724 1,3-Diethylbenzene	0.064	0.055	0.053
183	106.242	A10	725 1-M-3-propylbenzene	0.216	0.187	0.181
184	106.430	A10	726 1,4-Diethylbenzene	0.026	0.023	0.022
185	106.601	A10	727 1-M-4-propylbenzene	0.068	0.060	0.057
186	106.708	A10	728 Butylbenzene	0.068	0.059	0.057
187	106.833	A10	729 3,5-DM-1-Ebenzene	0.075	0.065	0.063
188	106.992	?	Unidentified	0.038	0.032	0.032
189	107.112	A10	730 1,2-Diethylbenzene?	0.038	0.032	0.032
190	107.367	I11	732 C11-Isoparaffin	0.042	0.042	0.030
191	107.556	A10	736 C10-Aromatic	0.042	0.036	0.035
192	107.668	A10	738 C10-Aromatic	0.092	0.079	0.077
193	107.819	A10	740 1-M-2-propyl benzene	0.071	0.060	0.059
194	107.974	?	Unidentified	0.010	0.009	0.007
195	108.087	I11	748 4-Methyldecane	0.071	0.066	0.051

Recovery = 100.00

11/16/2005 WED 16:28 FAX ☑008/008

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File: C:\HPCHEM\1\DATA\PIANO2\SETUP054.D\SETUP054_FID1_A.CDF 14-Oct-04, 11:40:40
Sample: Hux Drum #1 Operator:
Parameter: C:\HPCHEM\HCE30\HUX TANK 31

Component List

Pk#	Time	Group	Component	%Wgt	%Vol	%Mol
196	108.388	I11	754 C11-Isoparaffin	0.071	0.067	0.051
197	108.526	A10	756 1,4-DM-2-Ebenzene	0.064	0.054	0.053
198	108.688	A10	758 1,3-DM-4-Ebenzene	0.058	0.049	0.048
199	108.815	I11	762 3-Methyldecane	0.019	0.020	0.014
200	108.934	?	Unidentified	0.062	0.062	0.044
201	109.196	A10	764 1,2-DM-4-Ebenz+C1indan	0.075	0.064	0.063
202	109.387	I11	766 C11-Isoparaffin	0.015	0.014	0.011
203	109.656	?	Unidentified	0.023	0.019	0.019
204	109.744	A10	768 1,3-DM-2-Ebenzene	0.017	0.014	0.014
205	109.877	?	Unidentified	0.009	0.008	0.008
206	109.997	?	Unidentified	0.012	0.012	0.009
207	110.172	I11	770 C11-Isoparaffin	0.023	0.022	0.017
208	110.507	I11	775 C11-Isoparaffin	0.011	0.011	0.008
209	110.657	A11	780 1-M-4-tert-butylbenzene	0.011	0.009	0.008
210	110.728	?	Unidentified	0.016	0.014	0.012
211	110.852	A10	785 1,2-DM-3-ethylbenzene	0.030	0.025	0.025
212	111.187	P11	800 n-Undecane	0.156	0.157	0.112
213	111.367	A11	802 1-E-4-isopropylbenzene	0.018	0.015	0.013
214	111.618	I12	804 C12-Isoparaffin	0.011	0.011	0.008
215	111.796	A10	806 1,2,4,5-TetraMbenzene	0.014	0.012	0.012
216	112.057	A10	810 1,2,3,5-TetraMbenzene	0.020	0.017	0.017
217	112.400	A11	814 C11-Aromatic	0.009	0.007	0.007
218	112.631	A11	816 C11-Aromatic	0.013	0.011	0.010
219	113.371	A11	826 1-Ethyl-2-propylbenzene	0.015	0.013	0.011
220	113.913	A11	832 C11-Aromatic	0.008	0.007	0.006
221	114.123	A11	834 1-Methyl-3-butylbenzene	0.014	0.012	0.010
222	114.383	A11	836 1,2,3,4-TetraMbz+C11aro	0.013	0.011	0.011
223	114.891	A11	842 C11-Aromatic	0.013	0.011	0.010
224	129.405	A12	970 1,5-Dimethylnaphthalene	0.006	0.005	0.005
225	130.694	A12	976 1,2-Dimethylnaphthalene	0.011	0.008	0.008

Recovery = 100.00

Appendix D
Daily Chamber Concentrations

DAILY CHAMBER CONCENTRATIONS

EXPLANATORY NOTES

ABBREVIATIONS:

n - number of samples
ppm - parts per million
S.D. - standard deviation

FOOTNOTES:

a Value could not be calculated from number of observations.
b Chamber was not run during this exposure.

NOTES:

Values are reported to 2 significant figures.
Calculations were performed prior to rounding values.

Daily Chamber Concentrations (ppm)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
1	0	[a]	0	1	100	6.6	96 - 120	6	490	20	460 - 510	6	2900	300	2300 - 3200	6
2	0	[a]	0	1	100	1.8	98 - 100	6	500	14	490 - 520	6	3000	24	3000	6
3	0	[a]	0	1	100	4.5	97 - 110	6	500	19	480 - 530	6	3100	320	2900 - 3800	6
4	0	[a]	0	1	98	7.5	84 - 110	6	500	17	480 - 520	6	3000	120	2800 - 3100	6
5	0	[a]	0	1	100	3.6	97 - 110	6	510	7.4	500 - 520	6	3000	130	2800 - 3100	6
6	0	[a]	0	1	99	6.2	90 - 110	6	510	21	480 - 530	6	3000	96	2900 - 3200	6
7	0	[a]	0	1	110	16	93 - 130	6	500	14	480 - 520	6	3000	130	2800 - 3100	6
8	0	[a]	0	1	98	14	78 - 110	6	490	11	480 - 510	6	3000	80	2900 - 3100	6
9	0	[a]	0	1	100	4.7	92 - 110	6	510	11	490 - 520	6	3000	56	3000 - 3100	6
10	0	[a]	0	1	100	3.6	99 - 110	6	490	24	450 - 520	6	3000	31	2900 - 3000	6
11	0	[a]	0	1	99	8.9	85 - 110	6	490	24	470 - 530	6	2900	120	2800 - 3100	6
12	0	[a]	0	1	100	5.4	93 - 110	6	500	28	460 - 540	6	2900	190	2600 - 3100	6
13	0	[a]	0	1	97	7.0	85 - 100	6	480	39	410 - 510	6	2800	170	2600 - 3000	6
14	0	[a]	0	1	99	3.7	95 - 110	6	500	12	490 - 510	6	3000	67	2900 - 3100	6
15	0	[a]	0	1	100	2.2	99 - 110	6	500	14	480 - 520	6	3100	100	2800 - 3100	6
16	0	[a]	0	1	95	5.2	86 - 100	6	520	25	470 - 540	6	3000	56	2900 - 3100	6
17	0	[a]	0	1	110	15	87 - 130	6	560	190	350 - 820	6	2900	150	2600 - 3100	6
18	0	[a]	0	1	100	2.2	100 - 110	6	500	100	290 - 550	6	3000	110	2900 - 3100	6
19	0	[a]	0	1	99	2.4	96 - 100	6	490	21	450 - 510	6	3000	160	2700 - 3100	6
20	0	[a]	0	1	93	11	76 - 110	6	500	19	470 - 530	6	3100	150	2900 - 3300	6
21	0	[a]	0	1	110	6.7	100 - 120	6	510	22	490 - 540	6	3000	45	3000 - 3100	6
22	0	[a]	0	1	98	8.5	91 - 110	6	490	13	480 - 520	6	3000	35	3000	6
23	0	[a]	0	1	100	7.9	96 - 120	6	500	22	470 - 520	6	3000	96	2900 - 3100	6
24	0	[a]	0	1	93	10	77 - 100	6	500	7.3	490 - 510	6	3100	41	3000 - 3100	6
25	0	[a]	0	1	97	3.9	93 - 100	6	500	19	460 - 520	6	3100	62	3000 - 3100	6
26	0	[a]	0	1	98	0.47	98 - 99	4	500	10	490 - 510	3	3100	60	3000 - 3100	3
27	0	[a]	0	1	91	3.0	87 - 94	6	490	7.1	490 - 500	6	2900	68	2800 - 3000	6
28	0	[a]	0	1	94	5.8	85 - 100	6	500	24	460 - 520	6	3000	72	2900 - 3000	6
29	0	[a]	0	1	100	2.4	100 - 110	6	510	10	490 - 520	6	3100	66	3000 - 3100	6
30	0	[a]	0	1	100	7.2	90 - 110	6	500	12	480 - 510	6	3000	200	2600 - 3200	6
31	0	[a]	0	1	90	15	69 - 110	6	500	13	480 - 510	6	3000	180	2700 - 3200	6
32	0	[a]	0	1	98	6.3	90 - 110	6	490	18	470 - 510	6	3000	88	2900 - 3100	6
33	0	[a]	0	1	110	13	95 - 130	6	510	15	500 - 540	6	3000	77	2900 - 3200	6
34	0	[a]	0	1	110	5.4	100 - 110	6	490	54	420 - 550	6	2900	210	2500 - 3100	6
35	0	[a]	0	1	100	4.5	96 - 110	6	510	18	500 - 550	6	3100	110	3000 - 3300	6
36	0	[a]	0	1	95	3.5	89 - 100	6	490	14	470 - 510	6	3000	40	2900 - 3000	6
37	0	[a]	0	1	99	2.9	96 - 100	6	500	36	440 - 540	6	3000	70	2900 - 3100	6
38	0	[a]	0	1	100	2.2	97 - 100	6	490	10	490 - 510	6	3000	63	2900 - 3100	6
39	[b]				[b]				[b]				3000	78	2900 - 3100	6
40	[b]				[b]				[b]				3100	200	2900 - 3500	6

Daily Chamber Concentrations (ppm)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
41	[b]				[b]				[b]				3100	190	2900 - 3400	6
42	[b]				[b]				[b]				2900	82	2800 - 3100	6
43	[b]				[b]				[b]				2900	92	2800 - 3100	6
44	[b]				[b]				[b]				3000	89	2900 - 3100	6
45	[b]				[b]				[b]				3000	180	2700 - 3100	6
46	[b]				[b]				[b]				3000	72	3000 - 3100	6
47	[b]				[b]				[b]				3000	110	2900 - 3200	6
48	[b]				[b]				[b]				3000	45	3000 - 3100	6

Appendix E
Daily Nominal Concentration Calculations

DAILY NOMINAL CONCENTRATION CALCULATIONS

EXPLANATORY NOTES

FOOTNOTES:

a Chamber was not run during this exposure.

Daily Nominal Concentration Calculations for 100 ppm Chamber

Exposure	Average Air Flow (L/min)	Total Volume of Test Substance (mL)	Nominal Concentration (mg/L)	Nominal Concentration (ppm)	Analytical Concentration (ppm)
1	301	68	0.468	103	104
2	272	68	0.518	114	100
3	265	63	0.493	108	104
4	305	68	0.462	102	98
5	283	64	0.469	103	102
6	276	70	0.526	116	99
7	280	49	0.363	80	111
8	285	60	0.436	96	98
9	298	62	0.431	95	100
10	285	60	0.436	96	104
11	266	56	0.436	96	99
12	274	50	0.378	83	101
13	304	65	0.443	97	97
14	307	70	0.472	104	99
15	290	68	0.486	107	102
16	297	70	0.488	107	95
17	319	51	0.331	73	108
18	276	47	0.353	78	105
19	278	50	0.373	82	99
20	291	69	0.491	108	93
21	273	65	0.493	108	107
22	288	66	0.475	104	98
23	292	54	0.383	84	105
24	284	63	0.460	101	93
25	277	64	0.479	105	97
26	268	60	0.464	102	98
27	278	65	0.485	106	91
28	294	70	0.493	108	94
29	300	69	0.477	105	103
30	277	70	0.524	115	104
31	288	81	0.583	128	90
32	305	88	0.598	131	98
33	284	66	0.482	106	106
34	391	60	0.318	70	105
35	294	60	0.423	93	102
36	288	64	0.460	101	95
37	280	71	0.525	115	99
38	295	68	0.478	105	100
39	[a]				
40	[a]				
41	[a]				
42	[a]				
43	[a]				
44	[a]				
45	[a]				
46	[a]				
47	[a]				
48	[a]				

Daily Nominal Concentration Calculations for 500 ppm Chamber

Exposure	Average Air Flow (L/min)	Total Volume of Test Substance (mL)	Nominal Concentration (mg/L)	Nominal Concentration (ppm)	Analytical Concentration (ppm)
1	283	301	2.20	484	491
2	289	318	2.28	501	504
3	260	278	2.22	487	501
4	299	302	2.09	460	501
5	271	295	2.26	496	506
6	278	295	2.20	483	506
7	267	258	2.00	440	497
8	281	283	2.09	459	491
9	290	284	2.03	446	506
10	268	309	2.39	525	495
11	275	335	2.52	555	491
12	278	333	2.48	546	499
13	313	386	2.56	562	477
14	273	407	3.09	679	502
15	299	409	2.83	623	495
16	272	437	3.33	732	518
17	332	374	2.33	513	558
18	306	381	2.58	567	498
19	310	403	2.69	592	489
20	276	408	3.06	673	502
21	294	381	2.69	590	507
22	283	371	2.72	597	492
23	288	386	2.78	610	501
24	272	376	2.86	630	496
25	291	382	2.72	598	497
26	288	392	2.82	620	502
27	289	413	2.96	651	491
28	281	424	3.13	687	499
29	277	406	3.04	667	509
30	287	412	2.97	654	504
31	275	408	3.07	676	495
32	293	422	2.98	656	491
33	301	420	2.89	635	510
34	371	472	2.64	579	491
35	296	411	2.88	632	514
36	293	399	2.82	620	489
37	275	409	3.08	677	499
38	297	388	2.71	595	495
39	[a]				
40	[a]				
41	[a]				
42	[a]				
43	[a]				
44	[a]				
45	[a]				
46	[a]				
47	[a]				
48	[a]				

Daily Nominal Concentration Calculations for 3000 ppm Chamber

Exposure	Average Air Flow (L/min)	Total Volume of Test Substance (mL)	Nominal Concentration (mg/L)	Nominal Concentration (ppm)	Analytical Concentration (ppm)
1	261	1963	15.59	3425	2927
2	279	2315	17.19	3779	3016
3	264	1781	13.98	3072	3115
4	309	1895	12.71	2793	2977
5	275	1865	14.05	3089	2959
6	258	1764	14.17	3114	3014
7	258	1665	13.37	2939	2953
8	270	1778	13.65	2999	2985
9	278	1820	13.57	2981	3038
10	265	1811	14.16	3112	2971
11	261	1865	14.81	3254	2946
12	264	1823	14.31	3145	2941
13	280	2186	16.18	3555	2841
14	268	2340	18.09	3976	3044
15	293	2355	16.66	3660	3057
16	265	2413	18.87	4147	3012
17	289	2656	19.04	4185	2919
18	296	2437	17.06	3749	3002
19	293	2448	17.31	3805	2995
20	255	2127	17.28	3799	3063
21	258	2076	16.67	3664	3028
22	263	2056	16.20	3560	3009
23	258	2186	17.56	3859	2975
24	266	2165	16.87	3707	3076
25	276	2191	16.45	3615	3064
26	284	2140	15.61	3432	3080
27	289	2200	15.77	3467	2911
28	303	2329	15.93	3501	2975
29	294	2292	16.15	3550	3073
30	289	2328	16.69	3669	2968
31	284	2273	16.59	3645	3028
32	299	2275	15.77	3465	3015
33	318	2197	14.32	3146	3041
34	390	2651	14.09	3096	2890
35	297	2282	15.92	3499	3078
36	302	2238	15.36	3375	3000
37	289	2162	15.50	3407	2998
38	290	2118	15.13	3326	2977
39	300	2355	16.27	3575	3015
40	306	2133	14.44	3174	3065
41	280	1950	14.43	3172	3108
42	288	2001	14.40	3164	2920
43	286	1997	14.47	3180	2940
44	287	1998	14.43	3170	2972
45	275	1866	14.06	3090	2968
46	284	2054	14.99	3294	3033
47	274	1922	14.54	3195	3012
48	274	1880	14.22	3125	3008

Appendix F
Daily Chamber Environmental Conditions

DAILY CHAMBER ENVIRONMENTAL CONDITIONS

EXPLANATORY NOTES

ABBREVIATIONS:

S.D. - standard deviation
n - number of observations

FOOTNOTES:

a Chamber was not run during this exposure.
b Value could not be calculated from number of observations.

NOTES:

Values are reported to 2 significant figures.
Calculations were performed prior to rounding values.

Daily Chamber Environmental Conditions - Temperature (°C)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
1	22	0.58	21 - 22	3	22	0.58	21 - 22	3	22	0.58	21 - 22	3	23	1.0	22 - 24	3
2	22	1.0	21 - 23	3	22	1.0	21 - 23	3	22	1.0	21 - 23	3	23	0.58	22 - 23	3
3	22	0.58	22 - 23	3	22	0	22	3	22	0.58	22 - 23	3	23	0.58	22 - 23	3
4	23	0.58	22 - 23	3	22	0.58	22 - 23	3	22	0.58	22 - 23	3	23	1.0	22 - 24	3
5	23	0.58	22 - 23	3	23	0.58	22 - 23	3	22	0.58	22 - 23	3	23	1.0	22 - 24	3
6	22	0.58	22 - 23	3	22	0.58	22 - 23	3	22	0	22	3	23	1.0	22 - 24	3
7	22	0.58	22 - 23	3	22	0.58	22 - 23	3	22	1.0	21 - 23	3	23	0.58	22 - 23	3
8	23	1.0	22 - 24	3	22	0	22	3	22	0.58	22 - 23	3	23	0.58	22 - 23	3
9	23	0.58	22 - 23	3	22	0.58	22 - 23	3	22	0.58	22 - 23	3	23	0	23	3
10	23	1.0	22 - 24	3	23	0.58	22 - 23	3	23	0.58	22 - 23	3	24	0.58	23 - 24	3
11	23	0.58	22 - 23	3	22	0.58	22 - 23	3	22	0.58	22 - 23	3	23	0.58	22 - 23	3
12	22	0	22	3	22	0.58	22 - 23	3	22	0.58	22 - 23	3	22	0.58	22 - 23	3
13	23	0	23	3	23	0	23	3	23	0	23	3	23	0	23	3
14	23	0.58	22 - 23	3	22	0	22	3	22	0	22	3	23	1.0	22 - 24	3
15	23	0.58	23 - 24	3	22	0.58	22 - 23	3	22	0.58	22 - 23	3	23	0.58	23 - 24	3
16	23	0.58	22 - 23	3	22	0	22	3	22	0	22	3	23	1.0	22 - 24	3
17	24	0.58	23 - 24	3	23	0.58	22 - 23	3	23	0.58	22 - 23	3	23	0.58	23 - 24	3
18	24	0	24	3	23	0.58	23 - 24	3	23	0.58	23 - 24	3	24	0.58	23 - 24	3
19	24	0.58	23 - 24	3	23	0.58	22 - 23	3	23	0.58	23 - 24	3	24	0.58	24 - 25	3
20	24	1.0	23 - 25	3	23	0.58	22 - 23	3	23	1.0	22 - 24	3	24	1.0	23 - 25	3
21	24	0.58	24 - 25	3	24	0	24	3	24	0	24	3	24	0.58	24 - 25	3
22	24	0.58	24 - 25	3	24	0.58	23 - 24	3	24	0.58	23 - 24	3	25	0.58	24 - 25	3
23	24	0.58	23 - 24	3	23	0.58	22 - 23	3	23	1.0	22 - 24	3	24	1.0	23 - 25	3
24	24	1.0	23 - 25	3	23	1.0	22 - 24	3	23	0.58	23 - 24	3	24	1.2	23 - 25	3
25	24	0.58	23 - 24	3	23	0.58	22 - 23	3	23	0.58	22 - 23	3	24	0.58	23 - 24	3
26	23	0.58	23 - 24	3	23	0.58	23 - 24	3	23	0.58	23 - 24	3	23	0.58	23 - 24	3
27	23	0.58	22 - 23	3	23	0.58	22 - 23	3	23	0.58	22 - 23	3	23	0.58	22 - 23	3
28	23	0	23	3	22	0	22	3	22	0	22	3	23	0	23	3
29	23	0	23	3	22	0.58	22 - 23	3	22	0.58	22 - 23	3	23	0.58	23 - 24	3
30	23	0.58	22 - 23	3	22	0.58	21 - 22	3	22	0.58	21 - 22	3	23	0.58	22 - 23	3
31	22	0.58	22 - 23	3	21	0.58	21 - 22	3	21	0.58	21 - 22	3	22	1.0	21 - 23	3
32	22	0.58	22 - 23	3	21	0.58	21 - 22	3	21	1.0	20 - 22	3	22	1.0	21 - 23	3
33	21	0.58	21 - 22	3	21	0.58	20 - 21	3	20	0.58	20 - 21	3	21	0.58	21 - 22	3
34	20	0.58	20 - 21	3	19	0.58	19 - 20	3	19	0.58	19 - 20	3	20	1.0	19 - 21	3
35	21	0.58	21 - 22	3	20	0.58	20 - 21	3	20	0.58	20 - 21	3	21	1.0	20 - 22	3
36	21	0.58	21 - 22	3	21	0.58	20 - 21	3	20	0.58	20 - 21	3	21	1.0	20 - 22	3
37	21	0.58	21 - 22	3	21	0.58	20 - 21	3	20	0.58	20 - 21	3	21	1.0	20 - 22	3
38	21	0.58	20 - 21	3	20	0.58	19 - 20	3	20	0.58	19 - 20	3	20	0.58	20 - 21	3
39	[a]				[a]				[a]				20	1.0	19 - 21	3
40	[a]				[a]				[a]				20	1.2	19 - 21	3

Daily Chamber Environmental Conditions - Temperature (°C)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
41	[a]				[a]				[a]				21	1.5	19 - 22	3
42	[a]				[a]				[a]				21	1.0	20 - 22	3
43	[a]				[a]				[a]				21	1.2	20 - 22	3
44	[a]				[a]				[a]				20	1.5	19 - 22	3
45	[a]				[a]				[a]				21	1.2	20 - 22	3
46	[a]				[a]				[a]				21	1.0	20 - 22	3
47	[a]				[a]				[a]				21	0.58	20 - 21	3
48	[a]				[a]				[a]				20	0.58	20 - 21	3

Daily Chamber Environmental Conditions - Relative Humidity (%)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
1	41	5.0	36 - 46	3	46	1.5	45 - 48	3	46	2.5	43 - 48	3	46	4.6	42 - 51	3
2	46	0.58	46 - 47	3	48	2.3	47 - 51	3	48	2.1	46 - 50	3	47	3.5	45 - 51	3
3	49	3.1	46 - 52	3	55	1.0	54 - 56	3	54	1.0	53 - 55	3	54	2.6	52 - 57	3
4	49	1.0	48 - 50	3	54	3.5	50 - 57	3	53	4.0	49 - 57	3	52	4.0	48 - 56	3
5	50	2.0	48 - 52	3	56	1.5	54 - 57	3	56	1.5	54 - 57	3	55	4.4	52 - 60	3
6	50	1.5	49 - 52	3	56	1.0	55 - 57	3	56	2.1	54 - 58	3	55	3.8	52 - 59	3
7	49	0	49	3	58	1.2	57 - 59	3	58	1.0	57 - 59	3	57	1.2	56 - 58	3
8	46	3.6	43 - 50	3	53	3.2	51 - 57	3	53	3.2	51 - 57	3	53	4.4	50 - 58	3
9	46	2.6	44 - 49	3	55	2.1	53 - 57	3	53	1.5	52 - 55	3	53	4.2	50 - 58	3
10	54	2.1	52 - 56	3	55	2.0	53 - 57	3	54	3.1	51 - 57	3	55	6.2	50 - 62	3
11	52	2.1	50 - 54	3	54	1.5	53 - 56	3	54	1.2	53 - 55	3	56	5.0	51 - 61	3
12	53	2.1	51 - 55	3	53	2.9	50 - 55	3	54	2.6	51 - 56	3	53	2.6	50 - 55	3
13	50	1.0	49 - 51	3	50	0.58	50 - 51	3	50	1.0	49 - 51	3	50	1.0	49 - 51	3
14	45	0.58	45 - 46	3	46	0.58	46 - 47	3	46	0.58	46 - 47	3	47	2.1	45 - 49	3
15	43	0.58	42 - 43	3	45	0.58	44 - 45	3	43	0.58	42 - 43	3	43	1.5	42 - 45	3
16	47	2.1	45 - 49	3	47	1.5	46 - 49	3	46	1.0	45 - 47	3	47	3.6	44 - 51	3
17	53	1.0	52 - 54	3	54	1.5	53 - 56	3	53	1.5	52 - 55	3	53	3.2	51 - 57	3
18	56	2.5	54 - 59	3	58	1.0	57 - 59	3	57	2.0	55 - 59	3	57	3.0	54 - 60	3
19	53	1.0	52 - 54	3	54	1.5	53 - 56	3	54	1.5	52 - 55	3	54	2.1	52 - 56	3
20	54	1.5	52 - 55	3	56	2.3	53 - 57	3	54	2.3	51 - 55	3	57	6.0	51 - 63	3
21	54	2.5	51 - 56	3	54	2.5	52 - 57	3	54	3.0	51 - 57	3	54	2.0	52 - 56	3
22	52	1.5	51 - 54	3	52	1.5	51 - 54	3	52	2.6	50 - 55	3	53	4.9	50 - 59	3
23	51	1.2	50 - 52	3	51	1.0	50 - 52	3	51	1.0	50 - 52	3	53	4.2	50 - 58	3
24	51	1.2	50 - 52	3	52	1.2	51 - 53	3	51	1.5	49 - 52	3	54	3.6	51 - 58	3
25	53	2.1	51 - 55	3	53	2.5	51 - 56	3	53	2.0	51 - 55	3	56	5.3	52 - 62	3
26	52	1.5	51 - 54	3	53	2.0	51 - 55	3	53	1.7	52 - 55	3	54	2.0	52 - 56	3
27	52	2.5	50 - 55	3	53	2.5	51 - 56	3	53	2.6	51 - 56	3	55	4.0	51 - 59	3
28	53	0.58	52 - 53	3	53	0	53	3	52	0	52	3	54	2.6	52 - 57	3
29	52	1.7	51 - 54	3	54	2.9	52 - 57	3	53	2.6	51 - 56	3	54	4.7	50 - 59	3
30	55	1.0	54 - 56	3	57	0.58	56 - 57	3	57	1.0	56 - 58	3	58	3.2	56 - 62	3
31	57	0.58	56 - 57	3	58	0.58	57 - 58	3	59	0	59	3	59	2.9	57 - 62	3
32	55	4.4	52 - 60	3	55	3.5	52 - 59	3	54	4.2	51 - 59	3	56	4.7	52 - 61	3
33	52	1.0	51 - 53	3	53	1.5	52 - 55	3	52	1.2	51 - 53	3	53	2.6	51 - 56	3
34	50	0	50	3	50	0.58	50 - 51	3	50	1.0	49 - 51	3	51	2.1	49 - 53	3
35	53	0.58	53 - 54	3	55	0.58	55 - 56	3	54	0.58	54 - 55	3	56	2.1	54 - 58	3
36	54	2.1	52 - 56	3	56	2.3	53 - 57	3	55	2.6	52 - 57	3	56	3.6	52 - 59	3
37	53	1.5	52 - 55	3	56	1.5	54 - 57	3	55	1.5	54 - 57	3	55	2.0	53 - 57	3
38	54	2.5	52 - 57	3	56	2.0	54 - 58	3	56	3.1	53 - 59	3	55	3.1	52 - 58	3
39	[a]				[a]				[a]				54	2.5	52 - 57	3
40	[a]				[a]				[a]				55	1.5	53 - 56	3

Daily Chamber Environmental Conditions - Relative Humidity (%)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
41	[a]				[a]				[a]				55	2.1	53 - 57	3
42	[a]				[a]				[a]				54	2.5	52 - 57	3
43	[a]				[a]				[a]				56	2.3	53 - 57	3
44	[a]				[a]				[a]				54	2.5	52 - 57	3
45	[a]				[a]				[a]				56	1.5	55 - 58	3
46	[a]				[a]				[a]				54	2.0	52 - 56	3
47	[a]				[a]				[a]				56	1.5	54 - 57	3
48	[a]				[a]				[a]				57	0.58	56 - 57	3

Daily Chamber Environmental Conditions - Airflow (L/min)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
1	300	6.1	300 - 310	3	300	14	290 - 320	3	280	28	260 - 310	3	260	20	250 - 280	3
2	290	34	260 - 320	3	270	26	250 - 300	3	290	19	270 - 310	3	280	15	260 - 290	3
3	290	7.4	280 - 300	3	270	6	260 - 270	3	260	13	250 - 280	3	260	19	240 - 280	3
4	330	38	310 - 380	3	310	49	270 - 360	3	300	36	270 - 340	3	310	93	250 - 420	3
5	280	19	260 - 300	3	280	20	260 - 300	3	270	23	250 - 300	3	270	19	250 - 290	3
6	280	7.6	270 - 290	3	280	12	260 - 290	3	280	4	270 - 280	3	260	15	250 - 280	3
7	280	19	260 - 290	3	280	7	270 - 290	3	270	6	260 - 270	3	260	17	250 - 280	3
8	300	26	270 - 320	3	280	31	250 - 310	3	280	19	260 - 290	3	270	20	260 - 290	3
9	300	9.2	300 - 310	3	300	4	300	3	290	11	280 - 300	3	280	30	250 - 310	3
10	290	6.1	280 - 290	3	290	1.2	280 - 290	3	270	12	250 - 280	3	260	8.1	260 - 270	3
11	280	22	260 - 310	3	270	17	260 - 290	3	280	33	250 - 310	3	260	19	240 - 280	3
12	300	17	290 - 320	3	270	30	250 - 310	3	280	30	240 - 300	3	260	32	240 - 300	3
13	310	20	290 - 330	3	300	6.5	300 - 310	3	310	16	300 - 330	3	280	37	240 - 310	3
14	300	10	280 - 300	3	310	23	280 - 330	3	270	18	260 - 290	3	270	5.0	260 - 270	3
15	310	8.5	300 - 320	3	290	17	270 - 310	3	300	2.6	300	3	290	10	280 - 300	3
16	300	7.8	290 - 300	3	300	13	280 - 310	3	270	16	250 - 290	3	260	18	250 - 290	3
17	310	14	290 - 320	3	320	20	300 - 340	3	330	12	320 - 340	3	290	14	280 - 310	3
18	290	8.7	280 - 290	3	280	3.8	270 - 280	3	310	4.7	300 - 310	3	300	12	290 - 310	3
19	300	9.5	290 - 310	3	280	13	270 - 290	3	310	10	300 - 320	3	290	21	270 - 310	3
20	310	14	300 - 320	3	290	7.5	280 - 300	3	280	19	260 - 290	3	250	7.8	250 - 260	3
21	310	15	300 - 330	3	270	16	260 - 280	3	290	9.0	290 - 300	3	260	4.4	260	3
22	310	2.5	300 - 310	3	290	12	270 - 300	3	280	12	270 - 300	3	260	10	260 - 270	3
23	300	17	280 - 310	3	290	10	280 - 300	3	290	6.0	280 - 290	3	260	2.5	260	3
24	290	10	280 - 300	3	280	5.3	280 - 290	3	270	16	260 - 290	3	270	7.6	260 - 280	3
25	320	11	300 - 320	3	280	13	270 - 290	3	290	4.5	290 - 300	3	280	20	250 - 290	3
26	310	5.0	300 - 310	3	270	10	260 - 280	3	290	16	270 - 300	3	280	5.2	280 - 290	3
27	260	19	250 - 290	3	280	4.9	280	3	290	11	280 - 300	3	290	6.2	280 - 300	3
28	300	5.3	300 - 310	3	290	16	280 - 310	3	280	8.1	270 - 290	3	300	1.2	300	3
29	310	3.1	310 - 320	3	300	7.0	290 - 310	3	280	16	260 - 290	3	290	9.5	290 - 310	3
30	290	11	280 - 300	3	280	6.8	270 - 290	3	290	14	270 - 300	3	290	17	270 - 300	3
31	290	7.5	280 - 300	3	290	15	270 - 300	3	270	11	260 - 280	3	280	8.5	270 - 290	3
32	300	12	290 - 310	3	300	9.1	300 - 320	3	290	9.1	290 - 300	3	300	17	280 - 310	3
33	310	11	300 - 320	3	280	14	270 - 300	3	300	16	290 - 320	3	320	9.3	310 - 330	3
34	400	11	390 - 410	3	390	4.4	390 - 400	3	370	14	360 - 380	3	390	11	380 - 400	3
35	300	3.0	300	3	290	17	270 - 310	3	300	18	280 - 310	3	300	15	280 - 310	3
36	310	18	290 - 330	3	290	7.0	280 - 300	3	290	5.5	290 - 300	3	300	13	290 - 320	3
37	280	5.7	280 - 290	3	280	5.3	270 - 280	3	280	7.0	270 - 280	3	290	10	280 - 300	3
38	300	16	280 - 310	3	300	10	290 - 310	3	300	22	280 - 320	3	290	3.5	290	3
39	[a]				[a]				[a]				300	15	280 - 310	3
40	[a]				[a]				[a]				310	10	300 - 320	3

Daily Chamber Environmental Conditions - Airflow (L/min)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
41	[a]				[a]				[a]				280	12	270 - 290	3
42	[a]				[a]				[a]				290	18	270 - 300	3
43	[a]				[a]				[a]				290	5.6	280 - 290	3
44	[a]				[a]				[a]				290	4.7	280 - 290	3
45	[a]				[a]				[a]				280	3.5	270 - 280	3
46	[a]				[a]				[a]				280	5.0	280 - 290	3
47	[a]				[a]				[a]				270	4.0	270 - 280	3
48	[a]				[a]				[a]				270	2.5	270 - 280	3

Daily Chamber Environmental Conditions - Oxygen (%)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
2	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
3	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
4	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
5	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
6	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
7	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
8	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
9	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
10	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
11	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
12	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
13	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
14	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
15	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
16	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
17	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
18	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
19	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
20	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
21	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
22	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
23	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
24	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
25	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
26	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
27	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
28	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
29	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
30	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
31	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
32	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
33	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
34	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
35	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
36	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
37	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
38	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1	20	[b]	20	1
39	[a]				[a]								20	[b]	20	1
40	[a]				[a]								20	[b]	20	1

Daily Chamber Environmental Conditions - Oxygen (%)

	0 ppm				100 ppm				500 ppm				3000 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
41	[a]				[a]				[a]				20	[b]	20	1
42	[a]				[a]				[a]				20	[b]	20	1
43	[a]				[a]				[a]				20	[b]	20	1
44	[a]				[a]				[a]				20	[b]	20	1
45	[a]				[a]				[a]				20	[b]	20	1
46	[a]				[a]				[a]				20	[b]	20	1
47	[a]				[a]				[a]				20	[b]	20	1
48	[a]				[a]				[a]				20	[b]	20	1

Appendix G
Twelve-Component Analysis

TWELVE-COMPONENT ANALYSIS

EXPLANATORY NOTES

FOOTNOTES:

a Supplied by sponsor.
b Calculated concentration (ppm) of the components listed based on the actual chamber concentration of total components at the time of sample collection and on the sponsor-supplied volume percent.
c Actual measured concentration (ppm) of the component listed.

Twelve Component Analysis - 100 ppm Chamber

Peak	Peak ID	Volume (%)[a]	Theoretical Concentration (ppm)[b] Date of Analysis (2006):	May 11	May 18	May 26	May 30	June 9	June 15
			Concentration:	101 ppm	105 ppm	107 ppm	95 ppm	109 ppm	99 ppm
1	2-MethylC6+C7-Olefin	4.50		4.55	4.73	4.82	4.28	4.91	4.46
2	3-Methylhexane	3.52		3.55	3.69	3.76	3.34	3.83	3.48
3	t-1,3-DimethylcyC5	1.45		1.46	1.52	1.55	1.38	1.58	1.44
4	t-1,2-DimethylcycloC5	1.61		1.63	1.69	1.73	1.53	1.76	1.60
5	n-Heptane	7.23		7.30	7.59	7.74	6.87	7.88	7.16
6	Methylcyclohexane	6.76		6.83	7.10	7.24	6.42	7.37	6.69
7	Toluene	3.44		3.48	3.62	3.68	3.27	3.75	3.41
8	2-Methylheptane	3.25		3.29	3.42	3.48	3.09	3.55	3.22
9	n-Octane	5.81		5.86	6.10	6.21	5.51	6.33	5.75
10	Ethylcyclohexane	1.95		1.97	2.05	2.09	1.85	2.13	1.93
11	m-Xylene	1.71		1.72	1.79	1.83	1.62	1.86	1.69
12	n-Nonane	4.47		4.52	4.70	4.79	4.25	4.88	4.43

Peak	Peak ID	Volume (%)[a]	Results (ppm)[c]					
1	2-MethylC6+C7-Olefin	4.50	5.10	4.19	5.35	4.05	5.07	4.38
2	3-Methylhexane	3.52	3.75	3.31	4.04	3.08	3.95	3.42
3	t-1,3-DimethylcyC5	1.45	1.65	1.44	1.71	1.06	1.73	1.41
4	t-1,2-DimethylcycloC5	1.61	1.75	1.58	1.88	1.46	1.86	1.66
5	n-Heptane	7.23	7.54	6.71	8.00	5.95	8.26	7.38
6	Methylcyclohexane	6.76	6.96	6.29	7.48	5.50	7.84	6.96
7	Toluene	3.44	3.58	3.19	3.76	2.76	3.92	3.54
8	2-Methylheptane	3.25	3.22	3.05	3.52	2.64	3.72	3.36
9	n-Octane	5.81	5.60	5.28	6.33	4.77	6.53	5.94
10	Ethylcyclohexane	1.95	1.91	1.78	2.06	1.72	2.33	2.01
11	m-Xylene	1.71	1.73	1.64	1.92	1.37	2.05	1.89
12	n-Nonane	4.47	4.26	4.01	4.85	3.63	5.46	4.67

Twelve Component Analysis - 500 ppm Chamber

			Theoretical Concentration (ppm)[b]					
Peak	Peak ID	Volume (%)[a]	Date of Analysis (2006): May 12	May 17	May 27	May 31	June 7	June 13
			Concentration: 475 ppm	494 ppm	484 ppm	466 ppm	508 ppm	493 ppm
1	2-MethylC6+C7-Olefin	4.50	21.4	22.2	21.8	21.0	22.9	22.2
2	3-Methylhexane	3.52	16.7	17.4	17.0	16.4	17.9	17.3
3	t-1,3-DimethylcyC5	1.45	6.89	7.2	7.0	6.8	7.4	7.1
4	t-1,2-DimethylcycloC5	1.61	7.66	8.0	7.8	7.5	8.2	8.0
5	n-Heptane	7.23	34.3	35.7	35.0	33.7	36.7	35.6
6	Methylcyclohexane	6.76	32.1	33.4	32.7	31.5	34.4	33.3
7	Toluene	3.44	16.4	17.0	16.7	16.0	17.5	17.0
8	2-Methylheptane	3.25	15.5	16.1	15.7	15.2	16.5	16.0
9	n-Octane	5.81	27.6	28.7	28.1	27.1	29.5	28.6
10	Ethylcyclohexane	1.95	9.27	9.6	9.4	9.1	9.9	9.6
11	m-Xylene	1.71	8.10	8.4	8.3	7.9	8.7	8.4
12	n-Nonane	4.47	21.3	22.1	21.7	20.8	22.7	22.1

			Results (ppm)[c]					
Peak	Peak ID	Volume (%)[a]						
1	2-MethylC6+C7-Olefin	4.50	21.62	21.96	22.36	23.06	22.07	22.34
2	3-Methylhexane	3.52	16.65	17.03	17.20	17.76	17.21	17.27
3	t-1,3-DimethylcyC5	1.45	6.78	6.99	7.31	7.15	7.05	7.06
4	t-1,2-DimethylcycloC5	1.61	7.66	7.72	8.13	8.43	7.68	7.88
5	n-Heptane	7.23	33.71	33.51	35.10	35.43	33.75	34.79
6	Methylcyclohexane	6.76	31.19	31.26	32.90	32.94	31.36	32.18
7	Toluene	3.44	15.78	15.62	16.53	16.24	15.47	15.98
8	2-Methylheptane	3.25	14.37	14.15	15.44	14.79	14.34	15.40
9	n-Octane	5.81	25.12	24.57	27.23	25.67	24.94	27.11
10	Ethylcyclohexane	1.95	8.54	8.30	9.15	8.70	8.34	8.93
11	m-Xylene	1.71	7.33	7.21	8.04	7.36	7.10	7.56
12	n-Nonane	4.47	18.81	18.22	20.95	18.32	18.04	20.43

Twelve Component Analysis - 3000 ppm Chamber

			Theoretical Concentration (ppm)[b]						
Peak	Peak ID	Volume (%)[a]	Date of Analysis (2006): May 12	May 17	May 24	June 1	June 8	June 16	June 21
			Concentration: 3052 ppm	3062 ppm	2905 ppm	3071 ppm	2989 ppm	2902 ppm	2989 ppm
1	2-MethylC6+C7-Olefin	4.50	137.3	137.8	130.7	138.2	134.5	130.6	134.5
2	3-Methylhexane	3.52	107.3	107.7	102.2	108.0	105.1	102.1	105.1
3	t-1,3-DimethylcyC5	1.45	44.3	44.4	42.1	44.5	43.3	42.1	43.3
4	t-1,2-DimethylcycloC5	1.61	49.2	49.4	46.9	49.5	48.2	46.8	48.2
5	n-Heptane	7.23	220.7	221.4	210.0	222.0	216.1	209.8	216.1
6	Methylcyclohexane	6.76	206.4	207.1	196.4	207.7	202.1	196.2	202.1
7	Toluene	3.44	105.1	105.4	100.0	105.7	102.9	99.9	102.9
8	2-Methylheptane	3.25	99.3	99.6	94.5	99.9	97.2	94.4	97.2
9	n-Octane	5.81	177.2	177.7	168.6	178.3	173.5	168.5	173.5
10	Ethylcyclohexane	1.95	59.6	59.8	56.7	59.9	58.3	56.6	58.3
11	m-Xylene	1.71	52.1	52.2	49.6	52.4	51.0	49.5	51.0
12	n-Nonane	4.47	136.5	137.0	130.0	137.4	133.7	129.8	133.7

			Results (ppm)[c]						
Peak	Peak ID	Volume (%)[a]							
1	2-MethylC6+C7-Olefin	4.50	110.6	111.1	141.1	140.6	130.8	132.9	131.0
2	3-Methylhexane	3.52	86.6	87.5	109.5	111.1	102.4	102.3	102.1
3	t-1,3-DimethylcyC5	1.45	35.8	36.0	45.4	45.7	42.4	42.5	41.9
4	t-1,2-DimethylcycloC5	1.61	39.8	40.1	50.0	50.4	46.5	47.4	46.9
5	n-Heptane	7.23	178.1	178.0	219.5	224.1	206.8	210.6	205.6
6	Methylcyclohexane	6.76	166.2	166.0	205.9	208.9	193.6	197.3	192.7
7	Toluene	3.44	85.2	83.6	103.3	104.6	96.6	101.0	96.7
8	2-Methylheptane	3.25	78.9	78.6	95.2	99.0	90.9	94.2	89.8
9	n-Octane	5.81	141.0	138.4	168.6	174.0	159.8	168.7	159.0
10	Ethylcyclohexane	1.95	47.6	46.6	56.4	57.7	53.5	57.4	53.1
11	m-Xylene	1.71	41.3	39.9	48.9	49.5	45.1	50.2	44.9
12	n-Nonane	4.47	107.4	104.9	126.1	127.6	116.3	130.6	114.9

Appendix H
Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
1m	101	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	102	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	103	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	104	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	105	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wound - superficial	Forelimb left	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	106	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	107	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	108	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	109	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	110	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	111	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	112	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 AM
1m	101	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	102	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	103	No Abnormalities Detected		X	X	X	X	X	.	.	.	.	X	X	X	X	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	X	X	X	X	.	.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	104	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	105	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Wound - superficial	Forelimb left	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	106	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	107	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	108	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	109	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	110	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	111	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	112	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
2m	201	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	202	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	203	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	204	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	205	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	206	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	207	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	208	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	209	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	210	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	211	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	212	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 AM
2m	201	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	202	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	203	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	204	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	205	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	206	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	207	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	208	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	209	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	210	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	211	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	212	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
3m	301	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	302	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	303	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	304	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	305	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	306	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	307	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	308	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	309	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	310	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	311	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	312	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 AM
3m	301	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	302	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	303	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	304	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	305	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	306	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	307	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	308	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	309	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	310	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	311	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	312	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
4m	401	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	402	No Abnormalities Detected		X	X	X	X	X	X	X	.	X	X	X	.	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	.
	403	No Abnormalities Detected		X	X	X	X	X	X	.	.	X	X	X	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	X	X	.	.	.	.	.	.	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	404	No Abnormalities Detected		X	X	X	X	X	X	.	.	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	X	X	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	405	No Abnormalities Detected		X	X	X	X	X	X	.	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	406	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	407	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 AM
4m	401	No Abnormalities Detected		X	X	.	.	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Wet fur	Face	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.
	402	No Abnormalities Detected		X	X	X	X	X	X	.	.	.	.	.	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	X	X	X	X	X	.	.	.	.
	403	No Abnormalities Detected		.	.	.	.	X	X	X	X	.	.	.	.	.	.	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	X	X	X	X	X	.
		Wet fur	Face	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
	404	No Abnormalities Detected		X	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Wet fur	Face	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.
	405	No Abnormalities Detected		X	X	X	.	X	X	X	X	.	.	.	.	.	.	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	X	X	X	X	X	X	.
		Wet fur	Face	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
	406	No Abnormalities Detected		X	X	.	.	X	X	X	X	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	X	X	X	X	X	X	X
		Wet fur	Perineum	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.
	407	No Abnormalities Detected		X	.	.	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
4m	408	No Abnormalities Detected		X	X	.	X	X	X	X	.	X	.	.	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	.	.	.	.	X	.	X	X	.	.	.	X	X
	409	No Abnormalities Detected		X	X	X	X	X	X	X	.	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	410	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	411	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	.	.	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	X	X	.	.	.	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	412	No Abnormalities Detected		X	X	X	X	X	X	X	.	.	.	.	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	X	X	X	X	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 AM
4m	408	No Abnormalities Detected		.	.	.	.	X	X	X	X	.	.	.	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	.	.	.	.	X	X	X	.	.	.	.
	409	No Abnormalities Detected		X	X	X	.	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chest	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
	410	No Abnormalities Detected		X	X	X	X	X	X	X	X	.	.	.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	X	X	X	X	.	.	.
	411	No Abnormalities Detected		.	.	.	.	X	X	X	X	.	.	.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	X	X	X	.	.	.
		Wet fur	Face	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
	412	No Abnormalities Detected		X	X	X	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix I
Individual Detailed Clinical Observations in Subchronic Male Rats

Individual Detailed Clinical Observations in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM
1m	101	No Abnormalities Detected		X	X	X	X	X
	102	No Abnormalities Detected		X	X	X	X	X
	103	No Abnormalities Detected		X	X	X	.	.
		Hair loss	Forelimb bilateral	.	.	.	X	X
	104	No Abnormalities Detected		X	X	X	X	X
	105	No Abnormalities Detected		X	X	X	X	.
		Wound - superficial	Forelimb left	.	.	.	.	X
	106	No Abnormalities Detected		X	X	X	X	X
	107	No Abnormalities Detected		X	X	X	X	X
	108	No Abnormalities Detected		X	X	X	X	X
	109	No Abnormalities Detected		X	X	X	X	X
	110	No Abnormalities Detected		X	X	X	X	X
	111	No Abnormalities Detected		X	X	X	X	X
	112	No Abnormalities Detected		X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Detailed Clinical Observations in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM
2m	201	No Abnormalities Detected		X	X	X	X	X
	202	No Abnormalities Detected		X	X	X	X	X
	203	No Abnormalities Detected		X	X	X	X	X
	204	No Abnormalities Detected		X	X	X	X	.
		Hair loss	Forelimb bilateral	.	.	.	.	X
	205	No Abnormalities Detected		X	X	X	X	X
	206	No Abnormalities Detected		X	X	X	X	X
	207	No Abnormalities Detected		X	X	X	X	X
	208	No Abnormalities Detected		X	X	X	X	X
	209	No Abnormalities Detected		X	X	X	X	X
	210	No Abnormalities Detected		X	X	X	X	X
	211	No Abnormalities Detected		X	X	X	X	X
	212	No Abnormalities Detected		X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Detailed Clinical Observations in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM
3m	301	No Abnormalities Detected		X	X	X	X	X
	302	No Abnormalities Detected		X	X	X	X	X
	303	No Abnormalities Detected		X	X	X	X	X
	304	No Abnormalities Detected		X	X	X	X	X
	305	No Abnormalities Detected		X	X	X	X	X
	306	No Abnormalities Detected		X	X	X	X	X
	307	No Abnormalities Detected		X	X	X	X	X
	308	No Abnormalities Detected		X	X	X	X	X
	309	No Abnormalities Detected		X	X	X	X	X
	310	No Abnormalities Detected		X	X	X	X	X
	311	No Abnormalities Detected		X	X	X	X	.
		Hair loss	Forelimb bilateral	.	.	.	.	X
	312	No Abnormalities Detected		X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Detailed Clinical Observations in Subchronic Male Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM
4m	401	No Abnormalities Detected		X	X	X	X	X
	402	No Abnormalities Detected		X	X	X	X	X
	403	No Abnormalities Detected		X	X	X	X	X
	404	No Abnormalities Detected		X	X	X	X	X
	405	No Abnormalities Detected		X	X	X	X	X
	406	No Abnormalities Detected		X	X	X	X	X
	407	No Abnormalities Detected		X	X	X	X	X
	408	No Abnormalities Detected		X	X	X	X	X
	409	No Abnormalities Detected		X	X	X	X	X
	410	No Abnormalities Detected		X	X	X	X	X
	411	No Abnormalities Detected		X	X	X	X	X
	412	No Abnormalities Detected		X	X	X	.	X
		Stained skin/fur - red	Face	.	.	.	X	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix J
Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
1f	113	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	114	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	115	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	116	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	117	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	118	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	119	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	120	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scab	Tail	.	.	X	X	X	X	X	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wound - deep	End of tail	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wound - superficial	Tail	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X
	121	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X	X
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
1f	113	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	114	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	115	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	116	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	117	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	118	No Abnormalities Detected		X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	119	No Abnormalities Detected		.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	120	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scab	Tail	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	.	.	.	.	X
		Wound - deep	End of tail	.	.	X	X	X	X	X	X	X	X	X	X	.	.	.	.
		Wound - superficial	Tail	X	X	.	.	.	.	.	.	.	.	.	.	X	X	X	X
	121	No Abnormalities Detected		X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
1f	122	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.
	123	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	124	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
1f	122	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	123	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	124	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
2f	213	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	214	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	215	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	216	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	217	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	218	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	219	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	220	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	221	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	.	X	X	.	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	X	.	.	X	.	.
	222	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
2f	213	No Abnormalities Detected		X	X	X	X	X	X	X	.	.	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	X	X	.	.	.	.	.	.	.
	214	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	215	No Abnormalities Detected		X	X	X	X	X	X	X	.	.	.	.	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	X	X	X	X	.	.	.	.	.
	216	No Abnormalities Detected		X	X	X	.	.	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.
	217	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	218	No Abnormalities Detected		X	X	X	.	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
	219	No Abnormalities Detected		.	.	X	X	X	X	X	X	.	.	.	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	X	X	.	.	.	.	.
	220	No Abnormalities Detected		X	.	X	X	X	X	X	X	.	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.
	221	No Abnormalities Detected		.	.	X	X	X	X	.	.	.	.	.	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	X	X	X	X	X	.	.	.	.	.
	222	No Abnormalities Detected		.	.	X	X	X	X	.	.	.	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	X	X	X	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
2f	223	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	224	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
2f	223	No Abnormalities Detected		.	.	X	X	X	X	X	X	.	.	.	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	X	X	.	.	.	.	.
	224	No Abnormalities Detected		.	.	X	X	X	X	X	X	.	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	.	.	.	.	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
3f	313	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	314	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	315	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	316	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	317	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	318	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	319	No Abnormalities Detected		X	X	X	X	.	X	X	X	X	X	X	.	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	X	.	.	.	.	.	.	X	.	X	X	X
	320	No Abnormalities Detected		X	X	X	X	.	X	X	X	X	X	X	.	X	.	.	.
		Discharge - black	Eye right	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Discharge - red	Eye right	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	X	.	.	.	.	.	.	X	.	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
3f	313	No Abnormalities Detected		.	.	X	X	X	X	X	X	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	X	X	X	X	X	X	X
	314	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	.	.	.	.	.
	315	No Abnormalities Detected		.	.	X	X	X	X	X	X	.	.	.	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	X	X	.	.	.	X	X
	316	No Abnormalities Detected		X	.	X	X	X	X	X	X	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	X	.	.	.	.	.	.	X	X	X	X	X	X	X	X
	317	No Abnormalities Detected		.	.	X	X	X	X	X	X	.	.	.	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	X	X	.	.	.	.	.
	318	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	319	No Abnormalities Detected		.	.	X	X	X	X	X	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	X	X	X	X	X	X	X	X	X
	320	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Discharge - black	Eye right	.	.	X	X	X	X	X	X	.	.	.	.	.	.	.	.
		Discharge - red	Eye right	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
3f	321	No Abnormalities Detected		X	X	X	X	X	X	X	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	X	X	X	X	X	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	X	X	X	X	X
	322	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	323	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	324	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
3f	321	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	322	No Abnormalities Detected		.	.	X	X	X	X	X	.	.	.	.	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	X	X	X	X	.	.	.	.	.
	323	No Abnormalities Detected		.	X	X	X	X	X	X	.	.	.	.	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	.	.	.	.	.	.	X	X	X	X	.	.	X	X	X
	324	No Abnormalities Detected		.	X	X	X	X	X	X	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
4f	413	No Abnormalities Detected		X	X	.	.	.	.	.	.	X	X	X	X	X	X	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	414	No Abnormalities Detected		X	X	.	.	X	X	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	.	.	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	415	No Abnormalities Detected		X	X	.	.	X	X	X	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	.	.	.	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	416	No Abnormalities Detected		X	X	.	.	X	X	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	.	.	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	417	No Abnormalities Detected		X	X	.	.	X	X	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	.	.	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
4f	413	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chin	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		Wet fur	Perineum	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	.
	414	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chin	X	.	.	.	.	.	X	X	X	X	X	X	X	X	X	.
		Wet fur	Perineum	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	.
	415	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	.
		Wet fur	Chin	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	.
		Wet fur	Perineum	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	.
	416	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chin	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.
	417	No Abnormalities Detected		.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	.	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	.
		Wet fur	Chin	.	X	.	.	.	X	X	X	X	X	X	X	X	X	X	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
4f	418	No Abnormalities Detected		X	X	.	.	X	X	X	X	X	X	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	.	.	.	.	.	.	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	419	No Abnormalities Detected		X	.	.	.	.	.	.	.	.	.	X	X	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	X	X	X	X	X	X	X	X	X	.	.	.	.	.	.
		Stained skin/fur - tan	Face	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	420	No Abnormalities Detected		X	.	.	.	.	.	.	X	X	X	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	X	X	X	X	X	X	.	.	.	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	421	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	X	X	X	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	.	.	.	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
4f	418	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	X	.	X	X	X	X	X	X	X	X	X	X	X	X	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.
	419	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Stained skin/fur - tan	Face	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chest	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	.
	420	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		Wet fur	Perineum	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	.
	421	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	.	.	.	X	X	X	X	X	X	X	X	X	X	.
		Wet fur	Chin	X	X	.	.	.	X	X	.	.	.	.	.	X	X	X	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM
4f	422	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	X	X	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	.	.	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	423	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	424	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	X	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	.	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 17 PM	18 PM	19 PM	20 PM	21 PM	22 PM	23 PM	24 PM	25 PM	26 PM	27 PM	28 PM	29 PM	30 PM	31 PM	32 AM
4f	422	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	.	X	X	X	X	X	X	X	X	X	X	X	X	.
		Wet fur	Chin	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	.
		Wet fur	Perineum	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	.
	423	No Abnormalities Detected		.	.	X	.	X	X	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	X	.	.	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	X	.	.	.	X	X	X	X	X	X	X	X	.
		Wet fur	Perineum	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.
	424	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Scheduled sacrifice		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	X	X	X	X	X	X	X	X	.
		Wet fur	Perineum	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix K
Individual Detailed Clinical Observations in Subchronic Female Rats

Individual Detailed Clinical Observations in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM
1f	113	No Abnormalities Detected		X	X	X	X	X
	114	No Abnormalities Detected		X	X	X	X	X
	115	No Abnormalities Detected		X	X	X	X	X
	116	No Abnormalities Detected		X	X	X	X	X
	117	No Abnormalities Detected		X	X	X	X	X
	118	No Abnormalities Detected		X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	X	X	X
	119	No Abnormalities Detected		X	X	X	X	X
	120	No Abnormalities Detected		X	.	.	.	.
		Wound - superficial	Tail	.	X	X	X	X
	121	No Abnormalities Detected		X	X	X	.	.
		Hair loss	Forelimb bilateral	.	.	.	X	X
	122	No Abnormalities Detected		X	X	X	X	X
	123	No Abnormalities Detected		X	X	X	X	X
	124	No Abnormalities Detected		X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Detailed Clinical Observations in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM
2f	213	No Abnormalities Detected		X	X	X	X	X
	214	No Abnormalities Detected		X	X	X	X	X
	215	No Abnormalities Detected		X	X	X	X	X
	216	No Abnormalities Detected		X	X	X	X	X
	217	No Abnormalities Detected		X	X	X	X	X
	218	No Abnormalities Detected		X	X	X	X	X
	219	No Abnormalities Detected		X	X	X	X	X
	220	No Abnormalities Detected		X	X	X	X	X
	221	No Abnormalities Detected		X	X	X	X	X
	222	No Abnormalities Detected		X	X	.	X	X
		Stained skin/fur - red	Face	.	.	X	.	.
	223	No Abnormalities Detected		X	X	X	X	X
	224	No Abnormalities Detected		X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Detailed Clinical Observations in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM
3f	313	No Abnormalities Detected		X	X	X	X	X
	314	No Abnormalities Detected		X	X	X	X	X
	315	No Abnormalities Detected		X	X	X	X	X
	316	No Abnormalities Detected		X	X	X	X	X
	317	No Abnormalities Detected		X	X	X	X	X
	318	No Abnormalities Detected		X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	X	X
	319	No Abnormalities Detected		X	X	X	X	X
	320	No Abnormalities Detected		X	X	X	X	X
	321	No Abnormalities Detected		X	.	.	.	.
		Hair loss	Forelimb bilateral	.	X	X	X	X
	322	No Abnormalities Detected		X	X	X	X	X
	323	No Abnormalities Detected		X	X	X	X	X
	324	No Abnormalities Detected		X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Detailed Clinical Observations in Subchronic Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM
4f	413	No Abnormalities Detected		X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	X	X
	414	No Abnormalities Detected		X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	X	X
	415	No Abnormalities Detected		X	.	.	.	.
		Stained skin/fur - red	Face	.	X	X	X	X
	416	No Abnormalities Detected		X	.	X	.	.
		Stained skin/fur - red	Face	.	X	.	X	X
	417	No Abnormalities Detected		X	X	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X
	418	No Abnormalities Detected		X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	X	X
	419	No Abnormalities Detected		X	X	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X
	420	No Abnormalities Detected		X	X	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X
	421	No Abnormalities Detected		X	X	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X
	422	No Abnormalities Detected		X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	X	X
	423	No Abnormalities Detected		X	X	X	X	X
	424	No Abnormalities Detected		X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix L
Individual Clinical Observations in Satellite Female Rats During Premating

Individual Clinical Observations in Satellite Female Rats During Premating

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM
1f	125	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	126	No Abnormalities Detected		X	X	X	X	X	X	X	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	X	X	X	X	X	X	X	X
	127	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	128	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	129	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	130	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	131	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	132	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	133	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	134	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	135	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	136	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Premating

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM
2f	225	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	226	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	227	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	228	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	.	.	.
		Stained skin/fur - tan	Face	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X
	229	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	230	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	231	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	232	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	233	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	234	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	235	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	236	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Premating

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM
3f	325	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	326	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	327	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	328	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	329	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	330	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
	331	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	332	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	333	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	334	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	335	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	336	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Premating

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM
4f	425	No Abnormalities Detected		X	X	.	.	.	.	.	X	X	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	.	.	X	X	X	X	X	X
	426	No Abnormalities Detected		X	X	.	.	.	.	.	.	X	X	X	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	.	.	.	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	427	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	X	X	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	.	.	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	X	X	X	.	.	.	X	X
	428	No Abnormalities Detected		X	X	.	.	.	.	.	.	X	X	X	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	.	.	.	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
	429	No Abnormalities Detected		X	X	.	.	.	.	.	.	X	.	X	X	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	.	X	.	.	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
	430	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	X	X	.	.	X	X
	431	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	.	.	.	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	432	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Face	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Premating

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	13 PM	14 PM	15 PM
4f	433	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	434	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	435	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	X	X	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	.	.	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
	436	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	X	.	.	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	X	X	X	X	X	.	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix M
Individual Clinical Observations in Satellite Female Rats During Gestation

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 0 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
1f	125	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.
	126	Hair loss	Forelimb bilateral	X	X	X	X	X	X	X	X	X	X
	127	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	128	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	129	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	130	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	131	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	132	No Abnormalities Detected		X	X	X	X	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	X	X	X	X	X	X
	133	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	134	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
		Hair loss	Hind quarters left	.	.	.	.	.	.	.	.	.	.
	135	No Abnormalities Detected		X	X	X	X	X	X	X	.	X	X
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	X	.	.
	136	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM	17 PM	18 PM	19 PM	20 PM	21 PM
1f	125	No Abnormalities Detected		X	X	X	X	X	X	X	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	X	X	X	X	X
	126	Hair loss	Forelimb bilateral	X	X	X	X	X	X	X	X	X	X	X	X
	127	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	128	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	129	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	130	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	131	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	132	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	X	X	X	X	X	X	X	X	X	X	X	X
	133	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	134	No Abnormalities Detected		X	X	X	X	X	X	X	X	.	.	.	.
		Hair loss	Hind quarters left	.	.	.	.	.	.	.	.	X	X	X	X
	135	No Abnormalities Detected		X	X	X	X	X	X	X	X	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	X	X	X	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.
	136	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 0 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
2f	225	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	226	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.
	227	No Abnormalities Detected		.	.	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	.	.
	228	No Abnormalities Detected		.	X	X	X	X	X	X	X	X	X
		Stained skin/fur - tan	Face	X	.	.	.	.	.	.	.	.	.
	229	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	230	No Abnormalities Detected		X	X	X	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	X	X	X	X	X	X	X
	231	No Abnormalities Detected		.	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	.	.	.	.	.	.	.	.	.
	232	No Abnormalities Detected		.	.	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	.	.
	233	No Abnormalities Detected		.	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	.	.	.	.	.	.	.	.	.
	234	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	235	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
	236	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM	17 PM	18 PM	19 PM	20 PM	21 PM
2f	225	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	226	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	X	X	X
	227	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.
	228	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		Stained skin/fur - tan	Face	.	.	.	.	.	.	.	.	.	.	.	.
	229	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	230	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	X	X	X	X	X	X	X	X	X	X	X	X
	231	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.
	232	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.
	233	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.
	234	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	235	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
	236	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 0 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
3f	325	No Abnormalities Detected		X	X	X	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	X	X	X	X	X	X	X
	326	No Abnormalities Detected		X	X	X	X	X	X	X	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	X	X	X
	327	No Abnormalities Detected		.	X	X	X	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	.	.	.	X	X	X	X	X	X
	328	No Abnormalities Detected		.	X	X	X	X	X	X	.	.	.
		Stained skin/fur - red	Face	X	.	.	.	.	.	.	X	X	X
	329	No Abnormalities Detected		.	X	X	X	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	.	.	.	X	X	X	X	X	X
	330	No Abnormalities Detected		X	X	X	X	.	.	.	.	.	X
		Stained skin/fur - red	Face	.	.	.	.	X	X	X	X	X	.
	331	No Abnormalities Detected		X	X	X	X	X	X	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	X	X	X	X
	332	No Abnormalities Detected		X	X	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	X	X
	333	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.
		Missing	Tip of tail	.	X	X	X	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X
	334	No Abnormalities Detected		X	X	X	X	X	X	.	.	.	.
		Stained skin/fur - red	Face	.	.	.	.	.	.	X	X	X	X
	335	No Abnormalities Detected		.	.	X	X	X	X	X	X	.	.
		Stained skin/fur - red	Face	X	X	.	.	.	.	.	.	X	X
	336	No Abnormalities Detected		.	.	.	.	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	X	X	X	.	.	.	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM	17 PM	18 PM	19 PM	20 PM	21 PM
3f	325	No Abnormalities Detected		.	.	.	.	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	.	.	.	.	.	.	.	.
	326	No Abnormalities Detected		.	.	.	.	.	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	X	.	.	.	.	.	.	.
	327	No Abnormalities Detected		X	.	.	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	X	X	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	.	X	X	X	X	X	.	.	X	.	.	.
	328	No Abnormalities Detected		.	.	.	.	.	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	X	.	.	.	.	.	.	.
	329	No Abnormalities Detected		.	.	.	.	.	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	X	.	.	.	.	.	.	.
	330	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.
	331	No Abnormalities Detected		.	.	.	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	.	.	.	.	.	.	.	.	.
	332	No Abnormalities Detected		.	.	.	.	.	.	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	.	.	.	.	.	.
	333	No Abnormalities Detected		X	X	X	X	X	X	X	X	.	.	.	.
		Missing	Tip of tail	.	.	.	.	.	.	.	.	X	X	X	X
		Stained skin/fur - red	Face	.	.	.	.	.	.	.	.	.	.	.	.
	334	No Abnormalities Detected		.	.	.	.	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	.	.	.	.	.	.	.	.
	335	No Abnormalities Detected		.	.	.	.	.	.	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	.	.	.	.	.	.
	336	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 0 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
4f	425	Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	X	X	X	X	X	X	X	X	X
	427	No Abnormalities Detected		.	.	.	.	X	X	.	.	.	.
		Stained skin/fur - red	Face	X	X	X	.	.	.	X	X	X	X
		Wet fur	Chest	X	X	X	X	.	.	.	X	X	X
		Wet fur	Chin	X	X	X	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	X	X	X
	428	Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	X	X	X	X	X	X	X	X
		Wet fur	Face	.	.	X	X	X	X	X	X	X	X
	429	No Abnormalities Detected		.	.	.	X	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	X	X	.	X	X	X	X	X	X
		Wet fur	Chest	.	.	X	.	.	.	.	.	.	.
		Wet fur	Chin	.	.	X	.	.	.	.	.	.	.
		Wet fur	Face	.	.	.	.	.	.	.	.	X	X
	431	Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	X	X	X	X	X	X	X	X	X
		Wet fur	Chin	.	X	X	X	X	X	X	X	X	X
	432	No Abnormalities Detected		X	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	.	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	X	X	X	X	X	X	X	X	X
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	.	X	X	X	X	X	X	X	X	X
		Wet fur	Perineum	.	X	X	X	X	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM	17 PM	18 PM	19 PM	20 PM	21 PM
4f	425	Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	X	X	X	X	X	X	X	X	.	.	.
		Wet fur	Face	X	X	X	X	X	X	X	X	X	.	.	.
	427	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	X	X	X	X	X	X	X	X	.	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	X	X	X	X	X	X	X	X	X	X	.	.
	428	Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	X	X	X	X	X	.	.	.	.	.
		Wet fur	Face	X	X	X	X	X	X	X	.	X	.	.	.
	429	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	X	X	X	X	X	X	X	X	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	.	.	.
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	X	X	X	X	X	X	X	X	X	.	.	.
	431	Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	X	X	X	X	X	X	X	X	.	.
		Wet fur	Chin	X	X	X	X	X	X	X	X	X	.	.	.
	432	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	X	X	X	X	X	X	X	.	.	.	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	X	.	.
		Wet fur	Face	X	X	X	X	X	X	X	X	.	.	.	.
		Wet fur	Perineum	X	X	X	.	.	.	.	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 0 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
4f	433	Stained skin/fur - red	Face	X	X	.	.	.	.	X	X	X	X
		Wet fur	Chest	X	X	.	.	.	.	.	.	.	.
		Wet fur	Chin	X	X	.	.	.	.	.	.	.	.
		Wet fur	Face	.	.	X	X	X	X	X	X	X	X
	435	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	.	.	.	.	.	X	X	X	X
		Wet fur	Chin	X	.	.	.	.	.	X	X	X	X
	436	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	X	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	X	.	.	.	.	X	X	X	X	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations in Satellite Female Rats During Gestation

Group Sex	Animal Number	Clinical Sign	Site	Gestation Day 10 PM	11 PM	12 PM	13 PM	14 PM	15 PM	16 PM	17 PM	18 PM	19 PM	20 PM	21 PM
4f	433	Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	X
		Wet fur	Chest	.	.	.	.	.	X	X	X	X	X	.	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Face	X	X	X	X	X	X	X	X	X	X	.	.
	435	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	.	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	X	.
		Wet fur	Chest	X	X	X	X	X	X	X	X	X	.	.	.
		Wet fur	Chin	.	.	.	.	.	.	.	.	.	.	.	.
	436	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.	X	X
		Stained skin/fur - red	Face	X	X	X	X	X	X	X	X	X	X	.	.
		Wet fur	Chest	.	.	.	.	.	.	.	.	.	.	.	.
		Wet fur	Chin	X	X	X	X	X	X	X	X	X	X	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix N
Individual Clinical Observations and Mortality Data in Satellite Female Rats During Lactation

Individual Clinical Observations and Mortality Data in Satellite Female Rats During Lactation

Group Sex	Animal Number	Clinical Sign	Site	Lactation Day 0 PM	1 PM	2 PM	3 PM	4 AM
1f	125	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	126	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	127	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	128	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	129	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	130	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	131	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	132	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	133	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	134	Hair loss	Hind quarters left	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	135	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	136	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Satellite Female Rats During Lactation

Group Sex	Animal Number	Clinical Sign	Site	Lactation Day 0 PM	1 PM	2 PM	3 PM	4 AM
2f	225	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	226	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	227	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	228	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	229	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	230	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	231	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	232	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	233	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	234	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	235	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	236	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Satellite Female Rats During Lactation

Group Sex	Animal Number	Clinical Sign	Site	Lactation Day 0 PM	1 PM	2 PM	3 PM	4 AM
3f	325	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	326	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	327	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	328	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	329	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	330	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	331	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	332	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	333	Hair loss	Forelimb bilateral	.	.	.	.	X
		Missing	Tip of tail	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	334	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	335	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	336	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Clinical Observations and Mortality Data in Satellite Female Rats During Lactation

Group Sex	Animal Number	Clinical Sign	Site	Lactation Day 0 PM	1 PM	2 PM	3 PM	4 AM
4f	425	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	426	No Abnormalities Detected		.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.
	427	No Abnormalities Detected		.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.
	428	No Abnormalities Detected		.	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
		Stained skin/fur - red	Face	X	.	.	.	.
	429	Hair loss	Forelimb bilateral	X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	431	No Abnormalities Detected		.	.	X	X	X
		Scheduled sacrifice		.	.	.	.	X
		Stained skin/fur - red	Face	X	X	.	.	.
	432	No Abnormalities Detected		.	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
		Stained skin/fur - red	Face	X	.	.	.	.
	433	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	434	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	435	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X
	436	No Abnormalities Detected		X	X	X	X	X
		Scheduled sacrifice		.	.	.	.	X

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix O
Individual Weekly Detailed Clinical Observations in Satellite Female Rats

Individual Weekly Detailed Clinical Observations in Satellite Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM	36 AM	43 AM	50 AM
1f	125	No Abnormalities Detected		X	X	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	X	X	.
	126	No Abnormalities Detected		X	.	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	X	X	X	X	X	X	.
	127	No Abnormalities Detected		X	X	X	X	X	X	X	.
	128	No Abnormalities Detected		X	X	X	X	X	X	X	.
	129	No Abnormalities Detected		X	X	X	X	X	X	X	.
	130	No Abnormalities Detected		X	X	X	X	X	X	X	.
	131	No Abnormalities Detected		X	X	X	X	X	X	.	.
	132	No Abnormalities Detected		X	X	X	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	X	X	X	X	.
	133	No Abnormalities Detected		X	X	X	X	X	X	X	.
	134	No Abnormalities Detected		X	X	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	X	.	.
		Hair loss	Hind quarters left	.	.	.	.	.	X	X	.
	135	No Abnormalities Detected		X	X	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	X	X	.
	136	No Abnormalities Detected		X	X	X	X	X	X	X	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Weekly Detailed Clinical Observations in Satellite Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM	36 AM	43 AM	50 AM
2f	225	No Abnormalities Detected		X	X	X	X	X	X	X	.
	226	No Abnormalities Detected		X	X	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	X	X	.
	227	No Abnormalities Detected		X	X	X	X	X	X	X	.
	228	No Abnormalities Detected		X	X	X	X	X	X	X	.
	229	No Abnormalities Detected		X	X	X	X	X	X	X	.
	230	No Abnormalities Detected		X	X	X	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	X	X	X	X	.
	231	No Abnormalities Detected		X	X	X	X	X	X	X	.
	232	No Abnormalities Detected		X	X	X	X	X	X	X	.
	233	No Abnormalities Detected		X	X	X	X	X	X	X	.
	234	No Abnormalities Detected		X	X	X	X	X	X	X	.
	235	No Abnormalities Detected		X	X	X	X	X	X	X	.
	236	No Abnormalities Detected		X	X	X	X	X	X	X	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Weekly Detailed Clinical Observations in Satellite Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM	36 AM	43 AM	50 AM
3f	325	No Abnormalities Detected		X	X	X	X	X	X	X	.
	326	No Abnormalities Detected		X	X	X	X	X	X	X	.
	327	No Abnormalities Detected		X	X	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	X	X	X	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	.	.
	328	No Abnormalities Detected		X	X	X	X	X	X	X	.
	329	No Abnormalities Detected		X	X	X	X	X	X	X	.
	330	No Abnormalities Detected		X	X	X	X	X	X	X	.
	331	No Abnormalities Detected		X	X	X	X	X	X	X	.
	332	No Abnormalities Detected		X	X	X	X	X	X	X	.
	333	No Abnormalities Detected		X	X	X	X	X	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	.	.	X	.
		Missing	Tip of tail	.	.	.	.	.	X	X	.
	334	No Abnormalities Detected		X	X	X	X	X	X	X	.
	335	No Abnormalities Detected		X	X	X	X	X	X	X	.
	336	No Abnormalities Detected		X	X	.	X	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	X	X	.	.
		Stained skin/fur - red	Face	.	.	X	.	.	.	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Weekly Detailed Clinical Observations in Satellite Female Rats

Group Sex	Animal Number	Clinical Sign	Site	Test Day 1 AM	8 AM	15 AM	22 AM	29 AM	36 AM	43 AM	50 AM
4f	425	No Abnormalities Detected		X	X	X	.	X	X	X	.
		Stained skin/fur - red	Face	.	.	.	X	.	.	.	.
	426	No Abnormalities Detected		X	X	.	.	X	X	.	.
		Stained skin/fur - red	Face	.	.	X	X	.	.	.	.
	427	No Abnormalities Detected		X	X	.	.	X	X	X	.
		Stained skin/fur - red	Face	.	.	X	X	.	.	.	.
	428	No Abnormalities Detected		X	.	.	.	X	X	X	.
		Stained skin/fur - red	Face	.	X	X	X	.	.	.	.
	429	No Abnormalities Detected		X	X	.	.	.	.	.	.
		Hair loss	Forelimb bilateral	.	.	.	.	X	X	.	.
		Stained skin/fur - red	Face	.	.	X	X	.	.	.	.
	430	No Abnormalities Detected		X	X	.	X	X	X	X	X
		Stained skin/fur - red	Face	.	.	X	.	.	.	.	.
	431	No Abnormalities Detected		X	X	X	X	X	X	.	.
	432	No Abnormalities Detected		X	X	X	X	X	X	X	.
	433	No Abnormalities Detected		X	X	.	.	.	.	X	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	.	.
	434	No Abnormalities Detected		X	X	X	X	X	X	X	.
	435	No Abnormalities Detected		X	X	.	.	.	.	X	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	.	.
	436	No Abnormalities Detected		X	X	.	.	.	.	X	.
		Stained skin/fur - red	Face	.	.	X	X	X	X	.	.

X = Present

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix P
Individual Body Weights of Subchronic Male Rats

Individual Body Weights (grams) of Subchronic Male Rats

Group Sex	Animal Number	Test Day 1	8	15	22	29	31
1m	101	296.6	354.0	397.6	427.9	463.5	440.8
	102	290.7	340.0	381.4	398.7	443.2	410.8
	103	313.7	358.7	403.8	409.5	442.4	416.0
	104	312.5	372.3	426.3	469.6	512.3	476.1
	105	284.4	324.6	356.4	366.8	382.3	356.4
	106	309.8	373.7	421.6	447.5	475.6	450.0
	107	304.9	328.7	348.3	382.0	389.2	376.1
	108	300.6	348.3	400.6	433.4	447.6	433.0
	109	298.6	329.9	343.2	364.2	394.1	370.0
	110	312.4	353.8	387.9	403.8	427.1	398.8
	111	267.5	292.1	315.8	341.0	369.2	341.7
	112	320.2	364.3	391.4	423.4	458.1	427.5
	Mean	300.99	345.03	381.19	405.65	433.72	408.10
	S.D.	14.81	23.42	33.56	37.48	42.82	40.63
	N	12	12	12	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Subchronic Male Rats

Group Sex	Animal Number	Test Day 1	8	15	22	29	31
2m	201	289.2	325.5	355.5	386.9	411.3	381.0
	202	308.2	354.1	384.6	415.3	431.4	403.3
	203	326.2	383.2	425.1	453.8	475.4	439.5
	204	294.6	340.2	367.1	388.3	421.5	393.2
	205	296.0	355.3	398.7	431.3	470.0	439.9
	206	290.7	344.5	368.7	393.5	420.6	392.9
	207	288.3	323.2	333.7	357.7	374.4	359.0
	208	288.5	341.2	361.6	394.1	409.2	389.7
	209	283.0	334.9	367.8	387.8	420.1	391.1
	210	294.3	333.4	356.4	389.4	424.9	391.5
	211	277.1	295.1	316.9	338.4	360.0	336.2
	212	310.4	361.7	399.6	426.6	451.7	422.2
	Mean	295.54	341.03	369.64	396.93	422.54	394.96
	S.D.	13.44	22.07	29.49	31.53	33.74	29.87
	N	12	12	12	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Subchronic Male Rats

Group Sex	Animal Number	Test Day 1	8	15	22	29	31
3m	301	265.4	297.1	336.5	362.5	407.8	372.1
	302	303.4	327.7	361.7	368.9	408.9	380.5
	303	292.0	333.2	360.9	389.8	421.1	393.4
	304	297.2	350.6	393.2	416.0	450.6	409.6
	305	300.9	271.4	291.3	310.9	323.4	297.1
	306	301.3	329.2	359.7	381.0	417.9	385.5
	307	295.3	338.3	373.0	399.8	441.1	410.1
	308	291.9	327.2	349.5	384.7	400.8	381.2
	309	317.9	386.1	418.8	448.1	474.8	445.2
	310	313.3	370.5	416.2	427.6	469.7	434.0
	311	288.1	319.4	355.6	385.9	416.6	397.7
	312	256.7	264.9	282.5	304.5	330.1	309.2
	Mean	293.62	326.30	358.24	381.64	413.57	384.63
	S.D.	17.57	35.68	41.85	42.23	47.13	43.86
	N	12	12	12	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Subchronic Male Rats

Group Sex	Animal Number	Test Day 1	8	15	22	29	31
4m	401	277.7	298.9	326.3	350.6	371.4	343.0
	402	293.5	333.8	364.5	385.0	403.6	393.7
	403	293.2	325.8	360.5	384.8	399.9	375.0
	404	302.2	333.2	374.1	400.3	434.6	395.3
	405	280.6	305.3	331.2	341.0	361.7	331.3
	406	299.8	328.8	354.2	379.5	409.8	369.6
	407	309.5	339.0	368.3	387.9	405.6	383.1
	408	333.3	362.0	393.6	422.5	460.9	429.1
	409	311.7	357.0	387.6	407.7	445.2	411.2
	410	306.9	344.3	386.0	416.7	438.0	409.0
	411	295.6	340.5	359.9	376.3	407.3	381.2
	412	308.3	327.1	354.6	394.5	426.0	391.3
	Mean	301.03	332.98	363.40	387.23	413.67	384.40
	S.D.	14.85	18.27	20.77	24.17	29.09	27.68
	N	12	12	12	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix Q
Individual Body Weight Gains of Subchronic Male Rats

Individual Body Weight Gains (grams) of Subchronic Male Rats

				Test Day						
Group Sex	Animal Number	Base Weight Day 1	From: To:	1 8	8 15	15 22	22 29	29 31	Abs Gain 1 31	% Gain 1 31
1m	101	296.6		57.4	43.6	30.3	35.6	-22.7	144.2	48.618
	102	290.7		49.3	41.4	17.3	44.5	-32.4	120.1	41.314
	103	313.7		45.0	45.1	5.7	32.9	-26.4	102.3	32.611
	104	312.5		59.8	54.0	43.3	42.7	-36.2	163.6	52.352
	105	284.4		40.2	31.8	10.4	15.5	-25.9	72.0	25.316
	106	309.8		63.9	47.9	25.9	28.1	-25.6	140.2	45.255
	107	304.9		23.8	19.6	33.7	7.2	-13.1	71.2	23.352
	108	300.6		47.7	52.3	32.8	14.2	-14.6	132.4	44.045
	109	298.6		31.3	13.3	21.0	29.9	-24.1	71.4	23.912
	110	312.4		41.4	34.1	15.9	23.3	-28.3	86.4	27.657
	111	267.5		24.6	23.7	25.2	28.2	-27.5	74.2	27.738
	112	320.2		44.1	27.1	32.0	34.7	-30.6	107.3	33.510
	Mean	300.99		44.04	36.16	24.46	28.07	-25.62	107.11	35.473
	S.D.	14.81		12.92	13.27	10.83	11.36	6.63	32.76	10.347
	N	12		12	12	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Subchronic Male Rats

				Test Day						
Group Sex	Animal Number	Base Weight Day 1	From: To:	1 8	8 15	15 22	22 29	29 31	Abs Gain 1 31	% Gain 1 31
2m	201	289.2		36.3	30.0	31.4	24.4	-30.3	91.8	31.743
	202	308.2		45.9	30.5	30.7	16.1	-28.1	95.1	30.857
	203	326.2		57.0	41.9	28.7	21.6	-35.9	113.3	34.733
	204	294.6		45.6	26.9	21.2	33.2	-28.3	98.6	33.469
	205	296.0		59.3	43.4	32.6	38.7	-30.1	143.9	48.615
	206	290.7		53.8	24.2	24.8	27.1	-27.7	102.2	35.157
	207	288.3		34.9	10.5	24.0	16.7	-15.4	70.7	24.523
	208	288.5		52.7	20.4	32.5	15.1	-19.5	101.2	35.078
	209	283.0		51.9	32.9	20.0	32.3	-29.0	108.1	38.198
	210	294.3		39.1	23.0	33.0	35.5	-33.4	97.2	33.028
	211	277.1		18.0	21.8	21.5	21.6	-23.8	59.1	21.328
	212	310.4		51.3	37.9	27.0	25.1	-29.5	111.8	36.018
	Mean	295.54		45.48	28.62	27.28	25.62	-27.58	99.42	33.562
	S.D.	13.44		11.73	9.54	4.86	7.91	5.65	21.20	6.760
	N	12		12	12	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Subchronic Male Rats

				Test Day						
Group Sex	Animal Number	Base Weight Day 1	From: To:	1 8	8 15	15 22	22 29	29 31	Abs Gain 1 31	% Gain 1 31
3m	301	265.4		31.7	39.4	26.0	45.3	-35.7	106.7	40.203
	302	303.4		24.3	34.0	7.2	40.0	-28.4	77.1	25.412
	303	292.0		41.2	27.7	28.9	31.3	-27.7	101.4	34.726
	304	297.2		53.4	42.6	22.8	34.6	-41.0	112.4	37.820
	305	300.9		-29.5	19.9	19.6	12.5	-26.3	-3.8	-1.263
	306	301.3		27.9	30.5	21.3	36.9	-32.4	84.2	27.946
	307	295.3		43.0	34.7	26.8	41.3	-31.0	114.8	38.876
	308	291.9		35.3	22.3	35.2	16.1	-19.6	89.3	30.593
	309	317.9		68.2	32.7	29.3	26.7	-29.6	127.3	40.044
	310	313.3		57.2	45.7	11.4	42.1	-35.7	120.7	38.525
	311	288.1		31.3	36.2	30.3	30.7	-18.9	109.6	38.042
	312	256.7		8.2	17.6	22.0	25.6	-20.9	52.5	20.452
	Mean	293.62		32.68	31.94	23.40	31.93	-28.93	91.02	30.948
	S.D.	17.57		25.30	8.80	7.96	10.29	6.84	36.48	12.015
	N	12		12	12	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Subchronic Male Rats

				Test Day						
Group Sex	Animal Number	Base Weight Day 1	From: To:	1 8	8 15	15 22	22 29	29 31	Abs Gain 1 31	% Gain 1 31
4m	401	277.7		21.2	27.4	24.3	20.8	-28.4	65.3	23.515
	402	293.5		40.3	30.7	20.5	18.6	-9.9	100.2	34.140
	403	293.2		32.6	34.7	24.3	15.1	-24.9	81.8	27.899
	404	302.2		31.0	40.9	26.2	34.3	-39.3	93.1	30.807
	405	280.6		24.7	25.9	9.8	20.7	-30.4	50.7	18.068
	406	299.8		29.0	25.4	25.3	30.3	-40.2	69.8	23.282
	407	309.5		29.5	29.3	19.6	17.7	-22.5	73.6	23.780
	408	333.3		28.7	31.6	28.9	38.4	-31.8	95.8	28.743
	409	311.7		45.3	30.6	20.1	37.5	-34.0	99.5	31.922
	410	306.9		37.4	41.7	30.7	21.3	-29.0	102.1	33.268
	411	295.6		44.9	19.4	16.4	31.0	-26.1	85.6	28.958
	412	308.3		18.8	27.5	39.9	31.5	-34.7	83.0	26.922
	Mean	301.02		31.95	30.43	23.83	26.43	-29.27	83.38	27.609
	S.D.	14.85		8.60	6.35	7.59	8.24	8.15	16.02	4.751
	N	12		12	12	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix R
Individual Body Weights of Subchronic Female Rats

Individual Body Weights (grams) of Subchronic Female Rats

Group Sex	Animal Number	Test Day 1	8	15	22	29	32
1f	113	218.0	227.1	236.9	245.0	255.8	239.9
	114	240.9	257.3	276.6	285.4	307.0	280.3
	115	202.7	215.2	224.8	233.9	249.0	229.4
	116	190.9	195.8	208.5	222.6	227.9	211.7
	117	220.7	245.3	250.6	278.0	280.5	267.0
	118	207.0	223.8	222.6	229.2	238.4	219.6
	119	223.4	245.6	256.4	274.2	278.7	264.9
	120	221.1	244.5	250.3	270.8	281.7	265.2
	121	217.4	233.9	240.9	251.9	264.5	246.2
	122	225.2	246.3	247.6	259.2	273.6	250.2
	123	225.4	253.8	255.0	280.7	288.5	274.6
	124	229.0	242.6	248.8	266.2	288.7	265.5
	Mean	218.48	235.93	243.25	258.09	269.53	251.21
	S.D.	13.09	17.72	18.08	21.39	23.04	22.20
	N	12	12	12	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Subchronic Female Rats

Group Sex	Animal Number	Test Day 1	8	15	22	29	32
2f	213	213.0	217.4	217.0	217.9	228.5	212.9
	214	211.0	222.1	239.6	254.9	271.6	250.0
	215	207.7	228.0	231.1	227.6	247.3	226.9
	216	224.3	238.1	240.5	259.9	276.5	257.2
	217	221.6	236.4	246.4	259.2	263.9	247.8
	218	223.2	237.5	250.9	271.0	278.0	255.7
	219	203.1	218.9	228.5	233.7	243.5	226.1
	220	228.2	250.3	277.4	286.1	292.8	279.7
	221	218.1	230.1	233.5	250.0	263.8	243.4
	222	221.1	240.2	254.7	254.1	274.5	255.7
	223	220.0	235.1	225.4	276.1	276.8	271.1
	224	210.3	225.1	255.7	232.1	247.4	232.3
	Mean	216.80	231.60	241.73	251.88	263.72	246.57
	S.D.	7.64	9.75	16.46	20.72	18.46	19.41
	N	12	12	12	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Subchronic Female Rats

Group Sex	Animal Number	Test Day 1	8	15	22	29	32
3f	313	210.5	232.9	235.1	249.1	257.0	242.3
	314	213.9	226.0	229.3	228.2	237.1	218.3
	315	212.2	221.1	237.0	240.5	247.6	234.4
	316	211.4	224.0	232.5	238.8	248.8	233.1
	317	201.2	216.1	218.3	227.4	221.4	205.7
	318	220.3	239.1	248.4	271.1	281.1	263.4
	319	208.3	223.7	225.7	239.5	251.8	233.2
	320	224.5	258.4	272.8	288.7	307.9	293.0
	321	218.1	242.0	243.0	260.6	273.4	255.0
	322	229.7	240.5	247.2	261.9	274.7	249.7
	323	233.3	248.7	276.2	281.2	301.5	275.5
	324	232.6	259.9	272.8	274.1	297.6	274.4
	Mean	218.00	236.03	244.86	255.09	266.66	248.17
	S.D.	10.26	14.53	19.52	20.79	27.15	25.40
	N	12	12	12	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Subchronic Female Rats

Group Sex	Animal Number	Test Day 1	8	15	22	29	32
4f	413	207.6	210.5	220.2	227.2	234.7	219.1
	414	212.6	218.7	233.9	247.3	268.3	247.5
	415	215.9	216.2	223.4	276.1	248.4	223.3
	416	239.9	257.0	268.0	242.5	281.5	258.8
	417	221.4	220.6	232.7	236.9	243.2	228.7
	418	216.2	240.4	246.1	256.9	271.2	255.8
	419	204.7	205.0	212.5	216.9	213.2	196.1
	420	207.7	205.9	209.6	223.1	222.3	206.6
	421	211.7	207.6	214.6	229.1	234.0	215.5
	422	205.1	217.4	236.3	243.6	248.7	255.6
	423	207.9	208.2	224.6	232.1	231.7	213.8
	424	227.8	235.6	237.6	265.2	280.5	233.4
	Mean	214.88	220.26	229.96	241.41	248.14	229.52
	S.D.	10.47	16.12	16.38	17.70	22.69	20.89
	N	12	12	12	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix S
Individual Body Weight Gains of Subchronic Female Rats

Individual Body Weight Gains (grams) of Subchronic Female Rats

Group Sex	Animal Number	Base Weight Day 1		Test Day 1	8	15	22	29	Abs Gain 1	% Gain 1
			From:	8	15	22	29	32	32	32
1f	113	218.0		9.1	9.8	8.1	10.8	-15.9	21.9	10.046
	114	240.9		16.4	19.3	8.8	21.6	-26.7	39.4	16.355
	115	202.7		12.5	9.6	9.1	15.1	-19.6	26.7	13.172
	116	190.9		4.9	12.7	14.1	5.3	-16.2	20.8	10.896
	117	220.7		24.6	5.3	27.4	2.5	-13.5	46.3	20.979
	118	207.0		16.8	-1.2	6.6	9.2	-18.8	12.6	6.087
	119	223.4		22.2	10.8	17.8	4.5	-13.8	41.5	18.577
	120	221.1		23.4	5.8	20.5	10.9	-16.5	44.1	19.946
	121	217.4		16.5	7.0	11.0	12.6	-18.3	28.8	13.247
	122	225.2		21.1	1.3	11.6	14.4	-23.4	25.0	11.101
	123	225.4		28.4	1.2	25.7	7.8	-13.9	49.2	21.828
	124	229.0		13.6	6.2	17.4	22.5	-23.2	36.5	15.939
	Mean	218.47		17.46	7.32	14.84	11.43	-18.32	32.73	14.848
	S.D.	13.09		6.82	5.64	6.95	6.28	4.25	11.66	4.904
	N	12		12	12	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Subchronic Female Rats

Group Sex	Animal Number	Base Weight Day 1		Test Day From: 1	8	15	22	29	Abs Gain 1	% Gain 1
			To:	8	15	22	29	32	32	32
2f	213	213.0		4.4	-0.4	0.9	10.6	-15.6	-0.1	-0.047
	214	211.0		11.1	17.5	15.3	16.7	-21.6	39.0	18.483
	215	207.7		20.3	3.1	-3.5	19.7	-20.4	19.2	9.244
	216	224.3		13.8	2.4	19.4	16.6	-19.3	32.9	14.668
	217	221.6		14.8	10.0	12.8	4.7	-16.1	26.2	11.823
	218	223.2		14.3	13.4	20.1	7.0	-22.3	32.5	14.561
	219	203.1		15.8	9.6	5.2	9.8	-17.4	23.0	11.324
	220	228.2		22.1	27.1	8.7	6.7	-13.1	51.5	22.568
	221	218.1		12.0	3.4	16.5	13.8	-20.4	25.3	11.600
	222	221.1		19.1	14.5	-0.6	20.4	-18.8	34.6	15.649
	223	220.0		15.1	-9.7	50.7	0.7	-5.7	51.1	23.227
	224	210.3		14.8	30.6	-23.6	15.3	-15.1	22.0	10.461
	Mean	216.80		14.80	10.13	10.16	11.83	-17.15	29.77	13.630
	S.D.	7.64		4.61	11.48	17.72	6.24	4.57	14.13	6.257
	N	12		12	12	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Subchronic Female Rats

Group Sex	Animal Number	Base Weight Day 1		Test Day 1	8	15	22	29	Abs Gain 1	% Gain 1
			From:	8	15	22	29	32	32	32
3f	313	210.5		22.4	2.2	14.0	7.9	-14.7	31.8	15.107
	314	213.9		12.1	3.3	-1.1	8.9	-18.8	4.4	2.057
	315	212.2		8.9	15.9	3.5	7.1	-13.2	22.2	10.462
	316	211.4		12.6	8.5	6.3	10.0	-15.7	21.7	10.265
	317	201.2		14.9	2.2	9.1	-6.0	-15.7	4.5	2.237
	318	220.3		18.8	9.3	22.7	10.0	-17.7	43.1	19.564
	319	208.3		15.4	2.0	13.8	12.3	-18.6	24.9	11.954
	320	224.5		33.9	14.4	15.9	19.2	-14.9	68.5	30.512
	321	218.1		23.9	1.0	17.6	12.8	-18.4	36.9	16.919
	322	229.7		10.8	6.7	14.7	12.8	-25.0	20.0	8.707
	323	233.3		15.4	27.5	5.0	20.3	-26.0	42.2	18.088
	324	232.6		27.3	12.9	1.3	23.5	-23.2	41.8	17.971
	Mean	218.00		18.03	8.83	10.23	11.57	-18.49	30.17	13.654
	S.D.	10.26		7.48	7.85	7.30	7.60	4.18	17.97	7.886
	N	12		12	12	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Subchronic Female Rats

Group Sex	Animal Number	Base Weight Day 1		Test Day From: 1	8	15	22	29	Abs Gain 1	% Gain 1
			To:	8	15	22	29	32	32	32
4f	413	207.6		2.9	9.7	7.0	7.5	-15.6	11.5	5.539
	414	212.6		6.1	15.2	13.4	21.0	-20.8	34.9	16.416
	415	215.9		0.3	7.2	52.7	-27.7	-25.1	7.4	3.428
	416	239.9		17.1	11.0	-25.5	39.0	-22.7	18.9	7.878
	417	221.4		-0.8	12.1	4.2	6.3	-14.5	7.3	3.297
	418	216.2		24.2	5.7	10.8	14.3	-15.4	39.6	18.316
	419	204.7		0.3	7.5	4.4	-3.7	-17.1	-8.6	-4.201
	420	207.7		-1.8	3.7	13.5	-0.8	-15.7	-1.1	-0.530
	421	211.7		-4.1	7.0	14.5	4.9	-18.5	3.8	1.795
	422	205.1		12.3	18.9	7.3	5.1	6.9	50.5	24.622
	423	207.9		0.3	16.4	7.5	-0.4	-17.9	5.9	2.838
	424	227.8		7.8	2.0	27.6	15.3	-47.1	5.6	2.458
	Mean	214.87		5.38	9.70	11.45	6.73	-18.63	14.64	6.821
	S.D.	10.47		8.58	5.20	17.84	15.91	11.96	17.88	8.546
	N	12		12	12	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix T
Individual Body Weights of Satellite Female Rats During Premating

Individual Body Weights (grams) of Satellite Female Rats During Premating

Group Sex	Animal Number	Test Day 1	8	15
1f	125	227.0	248.3	257.7
	126	215.2	239.1	245.6
	127	207.7	220.0	229.4
	128	233.5	250.0	261.2
	129	233.6	252.8	256.8
	130	216.7	226.9	234.9
	131	204.9	217.4	221.8
	132	220.9	241.3	255.7
	133	219.5	247.4	258.2
	134	206.5	208.9	232.5
	135	217.1	234.7	229.9
	136	226.1	245.4	258.0
	Mean	219.06	236.02	245.14
	S.D.	9.76	14.48	14.42
	N	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Premating

Group Sex	Animal Number	Test Day 1	8	15
2f	225	215.3	232.4	247.7
	226	205.2	221.0	215.2
	227	240.3	260.5	270.2
	228	212.1	234.6	245.3
	229	240.4	252.4	267.3
	230	225.4	242.1	254.7
	231	242.6	264.1	281.3
	232	205.2	237.0	254.6
	233	212.3	222.3	229.1
	234	196.8	211.9	221.3
	235	214.5	240.9	258.8
	236	215.7	224.6	241.8
	Mean	218.82	236.98	248.94
	S.D.	15.14	16.09	19.91
	N	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Premating

Group Sex	Animal Number	Test Day 1	8	15
3f	325	199.8	215.9	218.5
	326	236.9	255.5	255.8
	327	225.8	241.2	254.4
	328	203.6	231.9	246.3
	329	220.3	246.5	255.0
	330	226.3	252.7	257.5
	331	221.2	220.7	232.8
	332	207.9	224.2	235.1
	333	213.9	236.3	253.4
	334	190.3	214.6	209.4
	335	224.8	249.2	262.0
	336	214.5	224.0	234.5
	Mean	215.44	234.39	242.89
	S.D.	13.17	14.57	16.78
	N	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Premating

Group Sex	Animal Number	Test Day 1	8	15
4f	425	228.4	239.7	240.6
	426	225.9	242.6	242.0
	427	215.4	234.2	252.0
	428	216.6	232.1	240.6
	429	216.8	237.3	238.0
	430	204.6	219.7	232.4
	431	202.8	216.0	227.3
	432	247.9	251.3	251.4
	433	204.7	210.2	213.0
	434	187.0	200.8	210.8
	435	233.6	239.9	239.3
	436	228.8	239.9	247.1
	Mean	217.71	230.31	236.21
	S.D.	16.47	15.15	13.35
	N	12	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix U
Individual Body Weight Gains of Satellite Female Rats During Premating

Individual Body Weight Gains (grams) of Satellite Female Rats During Premating

			Test Day			
Group Sex	Animal Number	Base Weight Day 1	From: 1 To: 8	8 15	Abs Gain 1 15	% Gain 1 15
1f	125	227.0	21.3	9.4	30.7	13.524
	126	215.2	23.9	6.5	30.4	14.126
	127	207.7	12.3	9.4	21.7	10.448
	128	233.5	16.5	11.2	27.7	11.863
	129	233.6	19.2	4.0	23.2	9.932
	130	216.7	10.2	8.0	18.2	8.399
	131	204.9	12.5	4.4	16.9	8.248
	132	220.9	20.4	14.4	34.8	15.754
	133	219.5	27.9	10.8	38.7	17.631
	134	206.5	2.4	23.6	26.0	12.591
	135	217.1	17.6	-4.8	12.8	5.896
	136	226.1	19.3	12.6	31.9	14.109
	Mean	219.06	16.96	9.13	26.08	11.877
	S.D.	9.76	6.80	6.79	7.76	3.415
	N	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Premating

			Test Day			
Group Sex	Animal Number	Base Weight Day 1	From: 1 To: 8	8 15	Abs Gain 1 15	% Gain 1 15
2f	225	215.3	17.1	15.3	32.4	15.049
	226	205.2	15.8	-5.8	10.0	4.873
	227	240.3	20.2	9.7	29.9	12.443
	228	212.1	22.5	10.7	33.2	15.653
	229	240.4	12.0	14.9	26.9	11.190
	230	225.4	16.7	12.6	29.3	12.999
	231	242.6	21.5	17.2	38.7	15.952
	232	205.2	31.8	17.6	49.4	24.074
	233	212.3	10.0	6.8	16.8	7.913
	234	196.8	15.1	9.4	24.5	12.449
	235	214.5	26.4	17.9	44.3	20.653
	236	215.7	8.9	17.2	26.1	12.100
	Mean	218.82	18.17	11.96	30.13	13.779
	S.D.	15.14	6.72	6.73	10.88	5.139
	N	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Premating

			Test Day			
Group Sex	Animal Number	Base Weight Day 1	From: 1 To: 8	8 15	Abs Gain 1 15	% Gain 1 15
3f	325	199.8	16.1	2.6	18.7	9.359
	326	236.9	18.6	0.3	18.9	7.978
	327	225.8	15.4	13.2	28.6	12.666
	328	203.6	28.3	14.4	42.7	20.972
	329	220.3	26.2	8.5	34.7	15.751
	330	226.3	26.4	4.8	31.2	13.787
	331	221.2	-0.5	12.1	11.6	5.244
	332	207.9	16.3	10.9	27.2	13.083
	333	213.9	22.4	17.1	39.5	18.467
	334	190.3	24.3	-5.2	19.1	10.037
	335	224.8	24.4	12.8	37.2	16.548
	336	214.5	9.5	10.5	20.0	9.324
	Mean	215.44	18.95	8.50	27.45	12.768
	S.D.	13.17	8.32	6.57	9.85	4.618
	N	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Premating

			Test Day			
Group Sex	Animal Number	Base Weight Day 1	From: 1 To: 8	8 15	Abs Gain 1 15	% Gain 1 15
4f	425	228.4	11.3	0.9	12.2	5.342
	426	225.9	16.7	-0.6	16.1	7.127
	427	215.4	18.8	17.8	36.6	16.992
	428	216.6	15.5	8.5	24.0	11.080
	429	216.8	20.5	0.7	21.2	9.779
	430	204.6	15.1	12.7	27.8	13.587
	431	202.8	13.2	11.3	24.5	12.081
	432	247.9	3.4	0.1	3.5	1.412
	433	204.7	5.5	2.8	8.3	4.055
	434	187.0	13.8	10.0	23.8	12.727
	435	233.6	6.3	-0.6	5.7	2.440
	436	228.8	11.1	7.2	18.3	7.998
	Mean	217.71	12.60	5.90	18.50	8.718
	S.D.	16.47	5.33	6.19	9.79	4.817
	N	12	12	12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix V
Individual Body Weights of Satellite Female Rats During Gestation

Note: This appendix contains data from animals with confirmed mating.

Individual Body Weights (grams) of Satellite Female Rats During Gestation

Group Sex	Animal Number	Pregnancy Outcome	Gestation Day 0	7	14	21
1f	125	PL	268.0	307.0	368.4	474.4
	126	PL	258.6	299.2	333.6	409.4
	127	PL	240.4	269.3	313.1	423.1
	128	PL	272.1	301.5	333.2	443.6
	129	PL	265.1	291.4	330.0	423.7
	130	PL	245.5	285.9	314.0	402.4
	131	PL	225.0	252.8	279.7	362.2
	132	PL	255.5	296.0	346.0	448.1
	133	PL	268.3	304.1	352.7	454.8
	134	PL	226.2	262.9	300.2	405.3
	135	PL	236.0	266.2	294.9	391.9
	136	PL	273.9	311.8	352.0	449.9
	Mean		252.88	287.34	326.48	424.07
	S.D.		17.71	19.69	26.62	31.63
	N		12	12	12	12

* = Result to left has an associated comment or marker

# = Animal not pregnant and has been excluded from statistics
PC = Pregnant Caesarian, PL = Pregnant Littered, NP = Not Pregnant, ND = Not Determined

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Gestation

Group Sex	Animal Number	Pregnancy Outcome	Gestation Day 0	7	14	21
2f	225	PL	252.4	282.6	328.0	337.4a
	226	PL	226.0	248.5	276.5	357.0
	227	PL	261.4	320.1	358.5	477.8
	228	PL	251.1	291.6	336.9	450.6
	229	PL	268.2	304.7	339.9	434.0
	230	PL	283.8	322.7	358.9	440.5
	231	PL	266.9	318.5	359.0	449.5
	232	PL	256.8	305.5	344.7	439.3
	233	PL	236.9	263.5	306.8	402.6
	234	PL	225.3	259.7	299.0	383.1
	235	PL	263.5	304.6	334.0	434.4
	236	PL	241.0	266.1	314.2	419.8
	Mean		252.78	290.68	329.70	426.24
	S.D.		17.76	25.98	26.08	33.98
	N		12	12	12	11

a Delivery occurred on GD21 before GD 21 data could be collected; excluded from statistics.

* = Result to left has an associated comment or marker

# = Animal not pregnant and has been excluded from statistics
PC = Pregnant Caesarian, PL = Pregnant Littered, NP = Not Pregnant, ND = Not Determined

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Gestation

Group Sex	Animal Number	Pregnancy Outcome	Gestation Day 0	7	14	21
3f	325	PL	239.0	273.4	311.8	406.9
	326	PL	256.4	319.0	379.5	480.1
	327	PL	263.6	306.2	342.4	452.1
	328	PL	246.5	281.0	333.4	439.3
	329	PL	255.2	292.8	336.2	425.2
	330	PL	268.2	305.8	343.6	438.8
	331	PL	242.3	281.6	317.3	403.0
	332	PL	238.8	250.3	299.0	382.7
	333	PL	253.4	299.8	340.4	326.2a
	334	PL	229.6	263.3	290.1	367.4
	335	PL	264.9	302.1	344.5	436.4
	336	PL	240.7	275.9	309.9	401.2
	Mean		249.88	287.60	329.01	421.19
	S.D.		12.20	20.11	24.49	32.59
	N		12	12	12	11

a Delivery occurred on GD21 before GD 21 data could be collected; excluded from statistics.

* = Result to left has an associated comment or marker

# = Animal not pregnant and has been excluded from statistics
PC = Pregnant Caesarian, PL = Pregnant Littered, NP = Not Pregnant, ND = Not Determined

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Gestation

Group Sex	Animal Number	Pregnancy Outcome	Gestation Day 0	7	14	21
4f	425	PL	267.2	300.5	343.6	417.4
	427	PL	248.5	280.9	311.4	403.1
	428	PL	244.9	279.3	312.0	407.7
	429	PL	236.9	275.5	306.9	400.5
	431	PL	236.0	255.4	295.5	375.6
	432	PL	272.7	301.8	336.6	405.7
	433	PL	223.2	235.7	262.2	323.5
	435	PL	249.6	279.4	312.2	394.6
	436	PL	246.3	277.8	310.5	418.1
	Mean		247.26	276.26	310.10	394.02
	S.D.		15.29	20.51	23.32	29.34
	N		9	9	9	9

* = Result to left has an associated comment or marker

# = Animal not pregnant and has been excluded from statistics
PC = Pregnant Caesarian, PL = Pregnant Littered, NP = Not Pregnant, ND = Not Determined

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix W
Individual Body Weight Gains of Satellite Female Rats During Gestation

Note: This appendix contains data from animals with confirmed mating.

Individual Body Weight Gains (grams) of Satellite Female Rats During Gestation

Group Sex	Animal Number	Pregnancy Outcome	Base Weight Day 0	Gestation Day From: 0	7	14	Abs Gain 0	% Gain 0
				To: 7	14	21	21	21
1f	125	PL	268.0	39.0	61.4	106.0	206.4	77.015
	126	PL	258.6	40.6	34.4	75.8	150.8	58.314
	127	PL	240.4	28.9	43.8	110.0	182.7	75.998
	128	PL	272.1	29.4	31.7	110.4	171.5	63.028
	129	PL	265.1	26.3	38.6	93.7	158.6	59.826
	130	PL	245.5	40.4	28.1	88.4	156.9	63.910
	131	PL	225.0	27.8	26.9	82.5	137.2	60.978
	132	PL	255.5	40.5	50.0	102.1	192.6	75.382
	133	PL	268.3	35.8	48.6	102.1	186.5	69.512
	134	PL	226.2	36.7	37.3	105.1	179.1	79.178
	135	PL	236.0	30.2	28.7	97.0	155.9	66.059
	136	PL	273.9	37.9	40.2	97.9	176.0	64.257
	Mean		252.88	34.46	39.14	97.58	171.18	67.788
	S.D.		17.71	5.51	10.39	10.82	19.81	7.358
	N		12	12	12	12	12	12

# = Animal not pregnant and has been excluded from statistics
PC = Pregnant Caesarian, PL = Pregnant Littered, NP = Not Pregnant, ND = Not Determined
* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Gestation

Group Sex	Animal Number	Pregnancy Outcome	Base Weight Day 0	Gestation Day From: 0 To: 7	7 14	14 21	Abs Gain 0 21	% Gain 0 21
2f	225	PL	252.4	30.2	45.4	9.4a	.	.
	226	PL	226.0	22.5	28.0	80.5	131.0	57.965
	227	PL	261.4	58.7	38.4	119.3	216.4	82.785
	228	PL	251.1	40.5	45.3	113.7	199.5	79.450
	229	PL	268.2	36.5	35.2	94.1	165.8	61.820
	230	PL	283.8	38.9	36.2	81.6	156.7	55.215
	231	PL	266.9	51.6	40.5	90.5	182.6	68.415
	232	PL	256.8	48.7	39.2	94.6	182.5	71.067
	233	PL	236.9	26.6	43.3	95.8	165.7	69.945
	234	PL	225.3	34.4	39.3	84.1	157.8	70.040
	235	PL	263.5	41.1	29.4	100.4	170.9	64.858
	236	PL	241.0	25.1	48.1	105.6	178.8	74.191
	Mean		252.77	37.90	39.03	96.38	173.43	68.705
	S.D.		17.76	11.11	6.18	12.61	22.74	8.440
	N		12	12	12	11	11	11

a Delivery occurred on GD21 before GD 21 data could be collected; excluded from statistics.

# = Animal not pregnant and has been excluded from statistics
PC = Pregnant Caesarian, PL = Pregnant Littered, NP = Not Pregnant, ND = Not Determined
* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Gestation

Group Sex	Animal Number	Pregnancy Outcome	Base Weight Day 0	Gestation Day From:	0	7	14	Abs Gain 0	% Gain 0
				To:	7	14	21	21	21
3f	325	PL	239.0		34.4	38.4	95.1	167.9	70.251
	326	PL	256.4		62.6	60.5	100.6	223.7	87.246
	327	PL	263.6		42.6	36.2	109.7	188.5	71.510
	328	PL	246.5		34.5	52.4	105.9	192.8	78.215
	329	PL	255.2		37.6	43.4	89.0	170.0	66.614
	330	PL	268.2		37.6	37.8	95.2	170.6	63.609
	331	PL	242.3		39.3	35.7	85.7	160.7	66.323
	332	PL	238.8		11.5	48.7	83.7	143.9	60.260
	333	PL	253.4		46.4	40.6	-14.2a	.	.
	334	PL	229.6		33.7	26.8	77.3	137.8	60.017
	335	PL	264.9		37.2	42.4	91.9	171.5	64.741
	336	PL	240.7		35.2	34.0	91.3	160.5	66.681
	Mean		249.88		37.72	41.41	93.22	171.63	68.679
	S.D.		12.20		11.49	9.02	9.58	23.70	8.044
	N		12		12	12	11	11	11

a Delivery occurred on GD21 before GD 21 data could be collected; excluded from statistics.

# = Animal not pregnant and has been excluded from statistics
PC = Pregnant Caesarian, PL = Pregnant Littered, NP = Not Pregnant, ND = Not Determined
* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Gestation

Group Sex	Animal Number	Pregnancy Outcome	Base Weight Day 0	Gestation Day From:	0	7	14	Abs Gain 0	% Gain 0
				To:	7	14	21	21	21
4f	425	PL	267.2		33.3	43.1	73.8	150.2	56.213
	427	PL	248.5		32.4	30.5	91.7	154.6	62.213
	428	PL	244.9		34.4	32.7	95.7	162.8	66.476
	429	PL	236.9		38.6	31.4	93.6	163.6	69.059
	431	PL	236.0		19.4	40.1	80.1	139.6	59.153
	432	PL	272.7		29.1	34.8	69.1	133.0	48.772
	433	PL	223.2		12.5	26.5	61.3	100.3	44.937
	435	PL	249.6		29.8	32.8	82.4	145.0	58.093
	436	PL	246.3		31.5	32.7	107.6	171.8	69.752
	Mean		247.26		29.00	33.84	83.92	146.77	59.407
	S.D.		15.29		8.08	5.01	14.60	21.34	8.606
	N		9		9	9	9	9	9

# = Animal not pregnant and has been excluded from statistics
PC = Pregnant Caesarian, PL = Pregnant Littered, NP = Not Pregnant, ND = Not Determined
* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix X
Individual Body Weights of Satellite Female Rats During Lactation

Individual Body Weights (grams) of Satellite Female Rats During Lactation

Group Sex	Animal Number	Lactation Day 0	4
1f	125	340.7	344.5
	126	317.4	333.0
	127	298.6	317.6
	128	311.6	332.4
	129	329.7	321.0
	130	295.6	307.7
	131	272.1	283.7
	132	322.0	334.1
	133	315.7	336.3
	134	286.6	286.3
	135	274.2	276.3
	136	323.7	351.9
	Mean	307.32	318.73
	S.D.	21.89	25.06
	N	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Lactation

Group Sex	Animal Number	Lactation Day 0	4
2f	225	337.4	328.8
	226	281.7	271.0
	227	333.6	348.9
	228	329.4	333.8
	229	326.8	328.4
	230	325.2	343.5
	231	329.6	344.9
	232	321.7	336.4
	233	288.5	281.1
	234	276.0	297.9
	235	322.0	309.9
	236	291.4	303.4
	Mean	313.61	319.00
	S.D.	22.30	25.91
	N	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Lactation

Group Sex	Animal Number	Lactation Day 0	4
3f	325	304.2	307.4
	326	342.1	358.6
	327	297.8	332.2
	328	320.6	315.0
	329	317.6	317.8
	330	304.9	333.5
	331	287.8	320.8
	332	296.2	310.2
	333	326.2	322.3
	334	260.7	289.8
	335	327.0	323.2
	336	286.0	302.0
	Mean	305.93	319.40
	S.D.	22.26	17.46
	N	12	12

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weights (grams) of Satellite Female Rats During Lactation

Group Sex	Animal Number	Lactation Day 0	Lactation Day 4
4f	425	299.1	298.2
	426	276.6	301.0
	427	281.7	314.1
	428	297.5	309.3
	429	299.4	304.4
	431	285.9	288.6
	432	300.3	319.3
	433	259.8	260.6
	434	271.0	268.1
	435	292.2	296.4
	436	277.6	301.2
	Mean	285.55	296.47
	S.D.	13.46	18.05
	N	11	11

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Appendix Y
Individual Body Weight Gains of Satellite Female Rats During Lactation

Individual Body Weight Gains (grams) of Satellite Female Rats During Lactation

				Lactation Day		
Group Sex	Animal Number	Base Weight Day 0	From: To:	0 4	Abs Gain 0 4	% Gain 0 4
1f	125	340.7		3.8	3.8	1.115
	126	317.4		15.6	15.6	4.915
	127	298.6		19.0	19.0	6.363
	128	311.6		20.8	20.8	6.675
	129	329.7		-8.7	-8.7	-2.639
	130	295.6		12.1	12.1	4.093
	131	272.1		11.6	11.6	4.263
	132	322.0		12.1	12.1	3.758
	133	315.7		20.6	20.6	6.525
	134	286.6		-0.3	-0.3	-0.105
	135	274.2		2.1	2.1	0.766
	136	323.7		28.2	28.2	8.712
	Mean	307.32		11.41	11.41	3.704
	S.D.	21.89		10.52	10.52	3.316
	N	12		12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Lactation

				Lactation Day		
Group Sex	Animal Number	Base Weight Day 0	From: To:	0 4	Abs Gain 0 4	% Gain 0 4
2f	225	337.4		-8.6	-8.6	-2.549
	226	281.7		-10.7	-10.7	-3.798
	227	333.6		15.3	15.3	4.586
	228	329.4		4.4	4.4	1.336
	229	326.8		1.6	1.6	0.490
	230	325.2		18.3	18.3	5.627
	231	329.6		15.3	15.3	4.642
	232	321.7		14.7	14.7	4.569
	233	288.5		-7.4	-7.4	-2.565
	234	276.0		21.9	21.9	7.935
	235	322.0		-12.1	-12.1	-3.758
	236	291.4		12.0	12.0	4.118
	Mean	313.61		5.39	5.39	1.719
	S.D.	22.30		12.45	12.45	4.081
	N	12		12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Lactation

				Lactation Day		
Group Sex	Animal Number	Base Weight Day 0	From: To:	0 4	Abs Gain 0 4	% Gain 0 4
3f	325	304.2		3.2	3.2	1.052
	326	342.1		16.5	16.5	4.823
	327	297.8		34.4	34.4	11.551
	328	320.6		-5.6	-5.6	-1.747
	329	317.6		0.2	0.2	0.063
	330	304.9		28.6	28.6	9.380
	331	287.8		33.0	33.0	11.466
	332	296.2		14.0	14.0	4.727
	333	326.2		-3.9	-3.9	-1.196
	334	260.7		29.1	29.1	11.162
	335	327.0		-3.8	-3.8	-1.162
	336	286.0		16.0	16.0	5.594
	Mean	305.92		13.48	13.48	4.643
	S.D.	22.26		15.24	15.24	5.245
	N	12		12	12	12

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm

Individual Body Weight Gains (grams) of Satellite Female Rats During Lactation

				Lactation Day		
Group Sex	Animal Number	Base Weight Day 0	From: To:	0 4	Abs Gain 0 4	% Gain 0 4
4f	425	299.1		-0.9	-0.9	-0.301
	426	276.6		24.4	24.4	8.821
	427	281.7		32.4	32.4	11.502
	428	297.5		11.8	11.8	3.966
	429	299.4		5.0	5.0	1.670
	431	285.9		2.7	2.7	0.944
	432	300.3		19.0	19.0	6.327
	433	259.8		0.8	0.8	0.308
	434	271.0		-2.9	-2.9	-1.070
	435	292.2		4.2	4.2	1.437
	436	277.6		23.6	23.6	8.501
	Mean	285.55		10.92	10.92	3.828
	S.D.	13.46		12.05	12.05	4.290
	N	11		11	11	11

* = result to left has an associated comment or marker
Abs Gain = absolute bodyweight gain between base period and end of the analysis period
% Gain = percentage bodyweight gain between base period and end of the analysis period

Nominal Dose: Group 1 - 0 ppm Group 2 - 100 ppm Group 3 - 500 ppm Group 4 - 3000 ppm