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DuPont Haskell Laboratory
for Health and Environmental Sciences
Elkton Road, P.O. Box 50
Newark, DE 19714-0050

February 4, 2004

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Attention: 8(e) Coordinator
Office of Pollution Prevention and Toxics
U.S. Environmental Protection Agency
1201 Constitution Ave., NW
Washington, DC 20460

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Dear 8(e) Coordinator:

8EHQ-03-15405
2,3-Dichloro-1,3-butadiene

This letter is to follow-up on our correspondence with the Agency of November 3, 2003 concerning the main developmental toxicity study (OECD 414) with the above referenced test substance.

Groups of 22 time-mated Crl:CD®(SD)IGS BR rats were exposed to 2, 3-dichloro-1,3-butadiene (DCBD) at atmospheric concentrations of 1, 10, or 50 ppm for 6 hours per day during gestation days 6-20 (day 6-20G). Controls were exposed to conditioned air alone. During the in-life portion of the study, maternal body weights, food consumption, and clinical signs data were collected. On day 21G, dams were euthanized and subjected to a gross external and internal examination. Uterine contents were described; all fetuses were removed and individually weighed, sexed, and examined for external alterations. Approximately one-half of the fetuses were subjected to visceral and head evaluations; all fetuses were examined for skeletal alterations.

There was no test substance-related maternal mortality, nor were there any test substance-related maternal gross postmortem findings. Maternal toxicity was observed at 50 ppm which was characterized by statistically significant, test substance-related reductions in maternal body weight, weight gain, and food consumption. Clinical observations of gasping and labored breathing were observed in 50 ppm dams during the first and third exposure days; however, there were no test substance-related clinical signs of toxicity following the daily exposure periods.

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Fetuses in the 50 ppm group had a test substance-related reduction (8.6% lower than the control mean) in mean fetal weight. There were no test substance-related malformations or variations observed at any exposure concentration. Fetal viability, sex ratio, and litter size were comparable across all groups.

Enclosed please find a copy of the final report.

Sincerely,

A. Michael Kaplan

A. Michael Kaplan, Ph.D.
Director – Regulatory Affairs and Occupational Health

AMK/LAM:clp
(302) 366-5260

Enclosure (1): 2,3-Dichloro-1,3-butadiene (DCBD): Inhalation Developmental Toxicity Study in Rats; DuPont-13227

Study Title

2,3-Dichloro-1,3-butadiene (DCBD): Inhalation Developmental Toxicity Study in Rats

Laboratory Project ID: DuPont-13227

TEST GUIDELINES: Organisation for Economic Cooperation and Development (OECD/OCDE), Guidelines for Testing of Chemicals, 414 Prenatal Developmental Toxicity Study (22nd January 2001).

United States Environmental Protection Agency (EPA), Office of Prevention, Pesticides, and Toxic Substances (OPPTS) Health Effects Test Guidelines, OPPTS 870.3700 Prenatal Developmental Toxicity Study. (1998).

AUTHOR: Linda A. Malley, Ph.D.

STUDY COMPLETED ON: January 20, 2004

PERFORMING LABORATORY: E.I. du Pont de Nemours and Company
Haskell Laboratory for Health and Environmental Sciences
Elkton Road, P.O. Box 50
Newark, Delaware 19714-0050

SPONSOR: The International Institute of Synthetic Rubber Producers
2077 South Gessner Road, Suite 133
Houston, Texas 77063-1123
U.S.A.
through:
DuPont Dow Elastomers, L.L.C.
Wilmington, Delaware 19809
U.S.A.

WORK REQUEST NUMBER: 14652

SERVICE CODE NUMBER: 731

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 consistent with the OECD Principles of Good Laboratory Practice (as revised in 1997) published in ENV/MC/CHEM(98)17, except for the item documented below. The item listed does not impact the validity of the study.

- A retained sample of the test substance and the original container will not be archived due to the chemical reactivity of the test substance.

Applicant / Sponsor: The International Institute of Synthetic Rubber Producers
Houston, Texas 77063-1123
through
DuPont Dow Elastomers, L.L.C.
Wilmington, Delaware 19809
U.S.A.

Study Director: Linda A. Malley 20 Jan 2004
Linda A. Malley, Ph.D. Date
Senior Research Toxicologist
E.I. du Pont de Nemours and Company

Applicant / Sponsor: _____ _____
Applicant/Sponsor Representative Date

QUALITY ASSURANCE STATEMENT

Haskell Sample Number(s):

25953

Dates of Inspections:

Conduct: July 30, 3002; August 6,12,13, 2003;

Records, Reports: September 16-18,22-25, 2003; October 24,27-30, 2003; November 3,19-21, 2003

Dates Findings Reported to:

Study Director: August 6,12,13, 2003; September 25, 2003; October 29, 2003; November 3,21, 2003; December 17-18, 2003

Management: August 6,12,13, 2003; September 25, 2003; October 29, 2003; November 3,21, 2003; December 17-18, 2003

Reported by: Wonda K. Kelly 20-Jan-2004

Wonda K. Kelly
Quality Assurance Auditor

Date

CERTIFICATION

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

Analytical Evaluations by: Thomas A. Kegelman — 16-Jan-2004
Thomas A. Kegelman, A.A.
Staff Toxicologist
Date

Inhalation Toxicology Evaluations by: — 20-JAN-2004
Arthur J. O'Neill, B.S.
Senior Staff Toxicologist
Date

Approved by: — 20-JAN-2004
Eve Mylchreest, Ph.D.
Senior Research Toxicologist and Manager
Date

Issued by Study Director: Linda A. Malley — 20-Jan-2004
Linda A. Malley, Ph.D.
Senior Research Toxicologist
Date

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STUDY INFORMATION

9th Collective Nomenclature:: 1,3-Butadiene, 2,3-dichloro-

Synonyms/Codes:
- 2,3-Dichloro-1,3-butadiene
- 2,3-Dichlorobutadiene
- 2,3-Dichlorobutadiene-1,3
- Dichlorobutadiene
- ACR
- DCD
- DCBD
- H-25953

Haskell Number: 25953

CAS Registry Number: 1653-19-6

Purity: 98.2%

Known Impurities:
- 2,4,4-trimethyl-1-pentene or DIB-1 (0.86%)
- 2,4,4-trimethyl-2-pentene or DIB-2 (0.20%)
- Toluene (0.58%)

Physical Characteristics: Clear to straw-yellow liquid

Stability: The test substance is inherently reactive and may spontaneously polymerize (unless inhibited) or dimerize. Storage conditions were chosen to minimize sample degradation. Based on purity analyses performed prior to and immediately after study conduct, no evidence for instability of the test substance was detected. Analysis of the liquid test substance however showed the concentrations of mixed dichlorobutadiene-based dimers had increased with time but were less than 1,000 ppm, the maximal level considered acceptable for this study.

Sponsor: The International Institute of Synthetic Rubber Producers
2077 South Gessner Road, Suite 133
Houston, Texas 77063-1123
U.S.A.
through:
DuPont Dow Elastomers, L.L.C.
Wilmington, Delaware 19809
U.S.A.

Study Initiated/Completed: July 24, 2003 / (see report cover page)

In-Life Initiated/Completed: July 27, 2003 / August 14, 2003

STUDY PERSONNEL

Study Director:	Linda A. Malley, Ph.D., D.A.B.T.
Management:	Jeannette M. Erhardt, Ph.D., C.I.H.
Development, Reproductive, and Neurobehavioral Toxicology Management:	Eve Mylchreest, Ph.D.
Primary Technician:	Patrick V. Staats
Management:	Arthur J. O'Neill, B.S.
Test Substance Characterization	Thomas A. Kegelman, A.A.
Management:	S. Mark Kennedy, Ph.D.
Mass Spectral Analysis:	Timothy A. Snow, Ph.D.
Management:	Gary W. Jepson, Ph.D.
Inhalation Toxicologist:	Arthur J. O'Neill, B.S.
Management:	Janice L. Connell, M.S., B.A.
Statistical Analysis:	Julia L. Reynolds, M.S.
Management:	John W. Green, Ph.D., Ph.D.
Toxicology Report Preparation:	Mary K. LaRoe
	Maryanne M. Wilford, B.A.
Management:	Kim D. Birkmeyer, M.S.
Laboratory Veterinarian:	Thomas W. Mayer, D.V.M., A.C.L.A.M.
Management:	Janice L. Connell, M.S., B.A., C.I.H.

SUMMARY

Groups of 22 time-mated pregnant female Crl:CD®(SD)IGS BR rats were exposed (whole body) to the test substance at atmospheric concentrations of 1, 10, or 50 ppm (whole body exposure) for 6 hours per day during gestation days 6-20 (days 6-20G). Control group females were exposed to conditioned air alone according to the same exposure regimen. During the in-life portion of the study, maternal body weights, food consumption, and clinical signs data were collected. On day 21G, dams were euthanized and subjected to a gross external and internal examination. Uterine contents were described; all fetuses were removed and individually weighed, sexed, and examined for external alterations. Approximately one-half of the fetuses were subjected to visceral and head evaluations; all fetuses were examined for skeletal alterations.

There was no test substance-related maternal mortality, nor were there any test substance-related maternal gross postmortem findings. Maternal toxicity was observed at 50 ppm which was characterized by statistically significant, test substance-related reductions in maternal body weight, weight gain, and food consumption. Gasping was observed during the first exposure period in 50 ppm females, and labored breathing was observed during the third exposure period for 50 ppm females. Subsequently, there were no test substance-related clinical signs of toxicity either during exposure or following the daily exposure periods.

Fetuses in the 50 ppm group had a test substance-related reduction (6.2% lower than the control mean) in mean fetal weight. There were no test substance-related malformations or variations observed at any exposure concentration. Fetal viability, resorptions, sex ratio, and litter size were comparable across all groups.

Under the conditions of the study, maternal toxicity occurred at an exposure concentration of 50 ppm based on decreased maternal body weight, weight gain, food consumption, and clinical signs of toxicity during exposure. Developmental toxicity occurred at 50 ppm, evident as decreased fetal weight. Therefore, the maternal and fetal no-observed-effect levels (NOEL)[a] were both considered to be 10 ppm.

[a] The NOEL for this study is defined as the highest dose at which toxicologically important effects attributable to the test substance were not detected. Thus, for this study, the NOEL is equivalent to the NOEL as defined by the United States Environmental Protection Agency (1985) and to the no-observed-adverse-effect level (NOAEL) as defined by the European Union (1994).

INTRODUCTION AND OBJECTIVE

The objective of this study was to evaluate the potential maternal and developmental toxicity of the test substance in rats. The test substance was administered by inhalation (whole body) to pregnant rats for approximately 6 hours per day from around the time of implantation to the end of gestation, i.e., days 6-20 of gestation (days 6-20G). The inhalation route was selected because it is a potential route of exposure in humans.

MATERIALS AND METHODS

A. Sponsor and Test Facility

This study was sponsored by

The International Institute of Synthetic Rubber Producers
2077 South Gessner Road
Suite 133
Houston, Texas 77063-1123
U.S.A.

through:

DuPont Dow Elastomers, L.L.C.
Wilmington, Delaware 19809
U.S.A.

The study was conducted at DuPont Haskell Laboratory for Health and Environmental Sciences, E.I. du Pont de Nemours and Company, Newark, Delaware, U.S.A.

B. Regulatory Compliance

The study design complies with the following test guidelines:

- Organisation for Economic Cooperation and Development (OECD/OCDE). Guidelines for Testing of Chemicals, 414 Prenatal Developmental Toxicity Study (22nd January 2001).
- United States (U.S.) Environmental Protection Agency (EPA), Office of Prevention, Pesticides, and Toxic Substances (OPPTS) Health Effects Test Guidelines, OPPTS 870.3700 Prenatal Developmental Toxicity Study. (1998).

C. Experimental Design

Treatment Groups and Atmospheric Concentration

Group	Number of Time-Mated Females	Targeted Atmospheric Concentration (ppm)[a]
I	22	0
II	22	1
III	22	10
IV	22	50

a The test substance was administered by inhalation (whole-body exposures) for 6 hours per day on days 6 through 20 of gestation.

D. Selection of Exposure Levels

An inhalation pilot developmental study with DCBD was conducted in time-mated pregnant female rats at targeted exposure concentrations of 0, 10, 25, and 50 ppm for 6 hours per day during gestation days 6-20.[(1)] Initial exposure levels on gestation day 6 were 0, 50, 100, and 150 ppm. However, due to clinical signs of toxicity during exposure (lethargy, partially closed eyes, salivation) and weight loss at every exposure concentration on gestation day 6, the exposure concentrations for the remaining exposures in the 100 and 150 ppm groups were adjusted to 10 and 25 ppm for the groups formerly exposed to 100 and 150 ppm, respectively, beginning on gestation day 7. No clinical signs of toxicity were observed subsequently. Mean daily body weight gain and food consumption for maternal rats over the interval of gestation days 6-21 were significantly reduced at all exposure concentrations. Although some evidence of recovery was observed in the animals exposed to 10 and 25 ppm, their body weight and body weight gain values continued to be less than the control values by gestation day 21. No mortality or test substance-related gross postmortem changes were observed in the maternal rats for any exposure concentration. Fetal body weight values for the 10, 25, and 50 ppm groups were significantly reduced (13%, 7%, and 7% respectively). There were no test substance-related effects on resorptions or live fetuses, nor were there any test substance-related external alterations observed in fetuses from any exposure concentration. Based on these data, 50 ppm was selected as the high concentration for this main study since maternal and fetal toxicity were expected to be observed. The intermediate exposure concentration selected for the main study was 10 ppm. Although effects observed at 10 ppm in the pilot study may have been related to the first exposure day when they were exposed to 100 ppm, it was expected that an exposure concentration of 10 ppm for the main study would produce minimal or no maternal and/or fetal toxicity. The low exposure concentration selected for the main study was 1 ppm, since it was likely that maternal or fetal toxicity would not occur at this concentration.

Treatment Schedule

The schedule for study functions was as follows:

Function	Approximate Study Week			
	Pretest	1	2	3
Cage-Site Examination	←daily→			
Chamber Clinical Observations		3 times daily during exposures		
Post-Exposure Clinical Observation		daily following exposures		
Individual Clinical Observation	the day after arrival, daily thereafter, and twice daily on days 6-20G			
Body Weight	the day after arrival and daily thereafter			
Food Consumption		days 4, 6, 8, 10, 12, 14, 16, 18, 20, and 21G		

E. Analytical

1. Test Substance

The test substance, DCBD, is a reactive liquid and may spontaneously polymerize (unless inhibited) or dimerize. To minimize sample degradation, polymerization inhibitors were added to the test substance prior to shipping, and the test substance was shipped on ice. Upon receipt, the test substance was stored under nitrogen in a freezer maintained at approximately -20°C except when used to generate test atmospheres and when being analyzed.

The test substance used for this study was assigned a unique identification number, H-25953 and was supplied from one production lot in multiple bottles by DuPont Dow Elastomers, L. L. C., Louisville, Kentucky. The amount of test substance in one bottle was sufficient for conducting at least eight exposures; routinely, fresh bottles were used after four exposures were conducted so the levels of dichlorobutadiene dimers remained within acceptable levels (<1,000 ppm).

DuPont Dow Elastomers provided information on the purity, composition, contaminants, basic physical properties, and hazards of the test material on the Haskell Laboratory Test Substance Evaluation form. The sponsor supplied analytical methods to characterize the test substance for purity[a] and for cyclic Diels Alder components (dichlorobutadiene dimers) quantification.[b] GLP verification of the test substance purity/stability and dimer content were performed by Haskell Laboratory prior to the initiation of the first exposure and following the final exposure and utilized the same gas chromatograph (GC) column and chromatographic methods as were used by DuPont Dow Elastomers.

a DuPont Dow Elastomers method A 237.0600S used for purity analysis.
b DuPont Dow Elastomers method LL-AR-1608 used for Dimer quantification.

2. Analytical Measurements

Purity/stability analysis and dimer quantification of H-25953 were performed by capillary gas chromatography. Mass spectral identification was performed by Gas Chromatography/Mass Spectroscopy (GC/MS) for all peaks ≥ 0.1% normalized area percent. Inhibitor concentrations were below 0.1% and are not reported.

a. Purity/Stability Analysis by GC

Approximately 30 to 40 mg of undiluted (neat) H-25953 was transferred into a 1.5-mL glass vial and mixed with methanol (1.0 mL). One µL injections of the sample were made in triplicate into a Hewlett Packard (HP) 6890 *Plus* gas chromatograph (GC) and analyzed using the chromatographic conditions listed below. Injections were made using an HP 7683 auto injector. Normalized area percent purity values for DCBD and the major impurities (toluene, DIB-1 and DIB-2) were based on response factors supplied by DuPont Dow Elastomers. Normalized percent values were determined by applying individual response factors to each of the GC peak areas (except the solvent peak) to compensate for changes that occur in detector sensitivity for different sample components.

Chromatographic Conditions

Instrument:	HP 6890 *Plus* GC
Column:	J & W Scientific DB-5
Column dimensions:	30m X 0.53mm X 1.50µm
Carrier Gas:	Helium @ 5.0 mL/min.
Split Flow:	30 mL/min.
Injection port temperature:	150°C
Carrier Gas Mode:	Ramped pressure
Carrier Gas Profile:	Initial Pressure: 3.70 psi (hold time = 5.0 min.)
	Pressure ramp 1 rate: 2.0 psi/min.
	Final pressure: 15.0 psi (hold time = 20 min.)
Oven Temperature Profile:	Initial Temp.: 45°C (hold time = 5.0 min.)
	Oven ramp 1 rate: 6°C/min.
	Oven ramp 1 final Temp.: 75°C(hold time = 0.5 min.)
	Oven ramp 2 rate: 10°C/min.
	Oven ramp 2 final Temp.: 120°C(hold time = 0 min.)
	Oven ramp 3 rate: 30°C/min.
	Oven ramp 3 final Temp.: 200°C(hold time = 5.0 min.)
Detector:	Flame ionization (FID)
Detector gases:	Hydrogen – 30 mL/min.
	Air – 400 mL/min.
	Makeup Helium – 20mL/min.
Detector temperature:	250°C

b. Dimer Quantification by GC

Approximately 1.0 mL of undiluted (neat) H-25953 was transferred into a 20-mL glass scintillation vial. Approximately 0.02% (vol.:vol.) hexadecane in acetone (5.0 mL) was added to the vial. Hexadecane was used as an internal standard for quantifying dimer concentrations. For dimer quantification, DuPont Dow Elastomers supplied individual response factors for the three major dichlorobutadiene dimers.[2] One µL injections of these samples were made in duplicate using the same GC, column, detector, and injector as mentioned above. The chromatographic conditions that were different than those used for the DCBD purity/stability analysis are listed below.

Chromatographic Conditions

Carrier Gas:	Helium @ 9.8 mL/min.
Split Flow:	15 mL/min.
Carrier Gas Mode:	Ramped pressure
Carrier Gas Profile:	Initial Pressure: 10.0 psi (hold time = 7.0 min.)
	Pressure ramp 1 rate: 10.0 psi/min.
	Final pressure: 30.0 psi (hold time = 4.0 min.)
Oven Temperature Profile:	Initial Temp.: 155°C (hold time = 3.0 min.)
	Oven ramp 1 rate: 6°C/min.
	Oven ramp 1 final Temp.: 210°C (hold time = 0 min.)

c. Mass Spectral Identification by GC/MS

A separate but representative lot of the test substance (H-25902[a]) was used for mass spectral identification of components with normalized area percent purity values of 0.1% or greater by GC. The sample of H-25902 was prepared in the same manner as the sample analyzed for percent purity. A 1-µL injection of the sample was made into a Hewlett Packard (HP) 6890 *Plus* GC and analyzed using the chromatographic conditions listed below. Injections were made using a Gerstel auto injector.

GC/MS is a widely used, sensitive, and definitive means for identification of volatile compounds by using retention indices and electron-ionization mass spectral 'fingerprints' of unknown compounds. Key to GC/MS identification is an automated 'library search' where measured spectra are compared to those in a mass spectral library and scored with a "goodness of fit." GC/MS identification was performed using the HP Enviroquant Chemstation (version B.01.00) which searches the Wiley Library for best spectral fit. The software not only suggests the compound identity, it eliminates others from consideration. A spectral fit of 85% (as determined by the Chemstation software) or better was considered to be a probable match for the identity of the unknown.

a H-25902 was used for conducting the pilot inhalation study.

Chromatographic Conditions

Instrument:	HP 6890 *Plus* GC
Column:	J & W Scientific DB-5MS
Column dimensions:	30m X 0.25mm X 1.00μm
Carrier Gas:	Helium @ 1.5 mL/min.
Split Flow:	148 mL/min.
Injection port temperature:	200°C
Carrier Gas Mode:	Constant pressure
Oven Temperature Profile:	Initial Temp.: 45°C (hold time = 5.0 min.)
	Oven ramp 1 rate: 6°C/min.
	Oven ramp 1 final Temp.: 75°(hold time = 0.5 min.)
	Oven ramp 2 rate: 10°C/min.
	Oven ramp 2 final Temp.: 120°C(hold time = 0 min.)
	Oven ramp 3 rate: 30°C/min.
	Oven ramp 3 final Temp.: 200°C(hold time = 5.0 min.)
Detector:	HP5973 Mass Selective Detector

3. Degree of Absorption

For the purposes of this study, clinical signs of toxicity or other manifestations of toxic effects were considered to indicate absorption of the test substance. No attempt was made to establish the actual dose each rat received. All toxic effects were reported as a function of the exposure concentration(s) rather than as a function of dose.

4. Duration of Exposure

Each group of rats was exposed 6 hours/day, over a 15-day period (weekends and holidays included). The starting time of each exposure was defined as the time when the generation system was turned on. The ending time of each exposure was defined as the time when the generation system was turned off. Rats were 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 were returned to their cages. The exposure period was defined as the period between initiation of the first exposure and completion of the last exposure.

5. Inhalation Exposure System

a. Atmosphere Generation

Chamber atmospheres were generated by passing nitrogen over the liquid test substance. Nitrogen flows were metered with a Brooks MF Series mass flow controller for the 1 ppm chamber and with a Brooks model 5850E mass flow controller for the 0, 10, and 50 ppm chambers. A separate mass flow controller was used for each chamber and a Brooks model 0154/0154E power supply indicator (with digital display) was used to regulate the mass flow controllers. Nitrogen flows ranged from 0.12-0.23, 0.45-0.73, or 2.0-3.3 L/min for the 1, 10, or 50 ppm chambers, respectively. Nitrogen flow for the control chamber was maintained at

0.8 L/min. The test substance was contained within a glass container (one per test chamber) and each glass container was partially immersed in a low-temperature water bath to maintain a constant temperature and to control the evaporation rate. The temperature of the bath was maintained at approximately –8 to –7°C for the 10 and 50 ppm chambers and approximately –19 to -14°C for the 1 ppm chamber. The test vapor was diluted by conditioned, filtered air as it entered the exposure chamber. Test atmospheres were generated dynamically using airflows needed to achieve at least 10 air changes per hour in the exposure chamber. Chamber concentrations of test substance were primarily controlled by varying the nitrogen flow over the test substance.

Test atmospheres were discharged directly into an exhaust stack.

b. Chamber Construction and Design

All exposure chambers were constructed of stainless steel and glass (NYU style) with a nominal internal volume of 1.4 m^3. A tangential feed at the chamber inlet promoted uniform chamber distribution of the test atmosphere. Homogeneous distribution of DCBD vapor for this type exposure chamber was verified during prestudy method development.

c. Exposure Mode

During exposure, animals were individually placed in stainless steel wire mesh cages and exposed, whole-body, inside the exposure chamber. The chamber volume was chosen so that the total body volume of the test animals did not exceed 5% of the chamber volume.

6. Characterization of Chamber Atmosphere

a. Test Substance Sampling and Analysis

The atmospheric concentration of DCBD was determined by gas chromatography at least hourly during each exposure. Known volumes of chamber atmosphere were drawn from the breathing zone of the animals and were directly injected into a Hewlett Packard model 6890 gas chromatograph equipped with a flame ionization detector. All samples were chromatographed isothermally at 90°C on a J&W Scientific DB-5 column. The atmospheric concentration of the test substance was determined from a standard curve derived from gas standards. Standards were prepared prior to each exposure by injecting known volumes of DCBD liquid into Tedlar® bags that contained known volumes of air.

b. Environmental Monitoring

Chamber airflow was targeted to be at least 10 air changes per hour. Chamber temperature, relative humidity, and oxygen were targeted to be 20-24°C, 40-60%, and at least 19%, respectively. Chamber airflow was measured with an Omega model FMA-604-V-S thermal anemometer (one per chamber), monitored continually with a CAMILE Inhalation Toxicology Automated Data System (CITADS), and manually recorded 3 times during each exposure for each chamber. The chamber temperature and humidity were monitored continually with a VWR Thermo-Humidity meter (one per chamber) and recorded 3 times during each exposure for each

chamber. Chamber oxygen was measured with a Biosystems model 3100R oxygen analyzer and recorded at least once during each exposure for each chamber.

F. In-life

1. Test Species

The Crl:CD®(SD)IGS BR rat was selected for this study because it is a preferred species for developmental toxicity testing as recommended by the regulatory guidelines. The Crl:CD®(SD)IGS BR strain was chosen because extensive background information is available from the literature, the supplier, and previous studies with other compounds at Haskell Laboratory. This strain is also considered suitable relative to hardiness and incidence of spontaneous disease.

Eighty-eight nulliparous, time-mated females were received from Charles River Laboratories, Inc., Raleigh, North Carolina. Sixty-six rats were received on July 24, 2003, and 22 rats were received on July 25, 2003. The rats for this study were requested to be 63 days old and be at either 1, 2, or 3 days of gestation upon arrival. This age corresponds to an estimated weight range of 201-225 grams according to the vendor; however, the weight range was not a factor for the purposes of this study and, therefore, deviations outside of this range are expected not to have any impact on the study. Body weights on the day the rats were mated, day 0 of gestation (day 0G), were supplied by the vendor. The day 0G body weights are documented in the study records and provided in the final report.

2. Animal Husbandry

a. Housing

Animal rooms were maintained at an acceptable temperature of 18°-26°C (targeted at 22°-24°C) and maintained at an acceptable relative humidity of 30%-70% (targeted at 40%-60%). Animal rooms were artificially illuminated (fluorescent light) on a 12-hour light/dark cycle (approximately 0600-1800 hours). Animals were housed individually in suspended, wire-mesh, stainless steel cages. Nesting material was not provided because the dams were euthanized prior to parturition.

b. Feed and Water

Except during exposure, PMI® Nutrition International, LLC Certified Rodent LabDiet® 5002 and tap water (from United Water Delaware) were available *ad libitum*.

c. Identification

Each rat was assigned a number and identified with an AVID Microchip implant by the supplier prior to shipping. Upon receipt, each animal was assigned a Haskell animal number. Both the Haskell animal number and the AVID Microchip implant number were recorded on each cage

card. A master list of Haskell animal numbers and corresponding unique AVID Microchip implant numbers are maintained with the study records.

d. Health 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 samples are analyzed for total bacterial counts, and the presence of coliforms, lead, and other contaminants.
- Feed samples are analyzed for total bacterial, spore and fungal counts.
- Samples from freshly washed cages and cage racks are analyzed to ensure adequate sanitation by the cagewashers.

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 presence of these contaminants below the maximum concentration stated by the manufacturer would not be expected to impact the integrity of the study.

The animal health and environmental monitoring program is administered by the attending laboratory animal veterinarian. Evaluation of these data did not indicate any conditions that affected the validity of the study.

3. Quarantine and Pretest Period

Upon receipt, rats were individually housed in suspended stainless steel cages. Clinical observations and body weights were determined daily beginning the day after arrival. The rats were released for the study upon approval of the Laboratory Animal Veterinarian designee, based on the absence of clinical indications of disease and on body weight gain.

4. Randomization

Upon arrival, dams were assigned to lots according to their gestation day. Rats were ranked within their respective lots on the basis of day 0G body weights and assigned to control and experimental groups by random sampling from the ranked list. The distribution resulted in mean body weights for all groups that were not statistically different ($p > 0.05$).

5. Parameters Studied

a. In-life Observations of Females

1. Clinical Observations

Clinical observations were recorded on the day after arrival and daily until the end of the study. Clinical observations were recorded twice daily on days 6-20G.

Cage-site examinations to detect moribund or dead rats and abnormal behavior and appearance among rats were conducted at the time of loading the animals into the chamber on exposure days, and at least once daily on non-exposure days.

At least 3 times during the daily exposures, abnormal clinical signs observed were recorded for the animals collectively within a chamber, since individual animal identification was not visible to the observer during exposure.

Immediately following each exposure, each rat was individually handled and examined for abnormal behavior and appearance. Clinical signs of hair loss, and fur/skin stains associated with urination and defecation during exposure were not recorded for the post-exposure observations.

2. Body Weight

Body weights were recorded on the day after arrival and daily until the end of the study.

3. Food Consumption

Food consumption was measured on days 4, 6, 8, 10, 12, 14, 16, 18, 20, and 21G.

b. Postmortem Observations of Females Surviving to Scheduled Euthanasia

Viscera were examined grossly immediately after euthanasia. The intact and the empty uterus of each dam having at least one viable fetus was weighed to permit calculation of maternal body weight adjusted to exclude the weight of the products of conception, except for one rat in the 1 ppm exposure concentration (Group II). The empty uterus weight for this rat was inadvertently not recorded and, therefore, the corrected body weight could not be calculated. This deviation did not adversely affect the study because sufficient data were available from the other animals in the group to permit evaluation of this parameter. The *corpora lutea* count for each ovary of females with viable fetuses was recorded.

For each female with visible implantation sites, the types of implants (live and dead fetuses, and resorptions) and their relative positions were recorded.

c. Fetuses of Females Surviving to Scheduled Euthanasia

For each fetus, the following parameters were recorded: identification number, intrauterine location, sex, and body weight. The external alterations detected for each live fetus were also recorded.

For each litter, the first live fetus and every other live fetus thereafter (approximately 50% of the fetuses) were examined for visceral alterations.[3] Retarded renal development was classified using the scheme of Woo and Hoar.[4] In addition, all live fetuses with malformations visible at external examination were examined for soft tissue alterations; decapitation of these fetuses was at the discretion of the study director or a designee.

After fixation in Bouin's fixative, the heads of decapitated fetuses (fetuses that were decapitated prior to visceral examination; approximately 50% of the fetuses) were examined and alterations were recorded. Examinations were based on the method of Barrow and Taylor.[5] After alcohol fixation, the alizarin-stained skeletons were examined and skeletal alterations were recorded for all live fetuses (excluding the fetal heads fixed in Bouin's fixative).

One fetus from a 0 ppm litter that had paw malformations noted externally was inadvertently not subjected to a visceral examination, and 2 fetuses from 10 ppm litters were not examined skeletally due to disarticulation during skeletal processing. These deviations did not impact the study because sufficient fetal examination data were available from the other fetuses in these groups to permit evaluation of these parameters.

6. Animal Euthanasia

Females were euthanized by carbon dioxide asphyxiation. Fetuses were decapitated before proceeding with visceral examinations; those to be viscerally examined without decapitation were injected with Beuthanasia-D. All other fetuses also were injected with Beuthanasia-D before fixation.

7. Control of Bias

In addition to random assignment to groups, all females were coded before scheduled euthanasia and remained coded during the collection of postmortem and fetal data.

8. Statistical Analyses

Descriptive statistics including mean, standard deviation, and standard error of the mean were used to summarize exposure concentration and environmental data. Descriptive statistics were calculated for all parameters listed below and are presented in the relevant tables of this report.

For litter parameters, the proportion of affected fetuses per litter or the litter mean was used as the experimental unit for statistical evaluation.[6] For each parameter analyzed with a trend test, the test was applied to the data sequentially. If a significant dose-response was detected, data from the top dose group were excluded and the test repeated until no further trend was detected. The level of significance selected was $p < 0.05$.

	Method of Statistical Analysis		
Parameter	Preliminary Test	If Preliminary Test is Not Significant	If preliminary test is significant
Maternal Weight Maternal Weight Change Maternal Food Consumption Live Fetuses Dead Fetuses Resorptions Implantations	Levene's test for homogeneity[7] and Shapiro-Wilk test[8] for normality[a]	One-way analysis of variance[9] and Dunnett's test[10,11,12]	Kruskal-Wallis test[13] followed with Dunn's test[14]
Incidence of Pregnancy Clinical Observations Maternal Mortality Females with Total Resorptions Early Deliveries	None	Cochran-Armitage trend test[9]	
Incidence of Fetal Alterations	None	Exact Mann-Whitney with a Bonferroni-Holm adjustment[15]	
Fetal weight (Covariates: litter size, sex ratio) Sex ratio (Covariate: litter size)	None	Analysis of covariance[16]	Dunnett-Hsu[17]

a 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.

RESULTS AND DISCUSSION

Analytical Measurements

A. Purity and Stability of H-25953

Samples of H-25953 from stored and previously unopened bottles were analyzed for purity of 2,3-dichloro-1,3-butadiene on July 17th, 2003 and August 14th, 2003. The average normalized area percent (purity) for the July sample was 98.211% ± 2.01E-3 for replicate analyses (n = 3), and the August sample was 98.159% ± 5.88E-3 (n = 3). Based on the data from these analyses, the test substance was considered stable over the duration of the study and of acceptable purity.

Text Table I: Normalized[a] Purity (%) of H-25953

Injection #	Pre-study	Post-study
1	98.209	98.222
2	98.213	98.147
3	98.211	98.107
Average	98.211	98.159
Standard Deviation	2.01E-3	5.88E-3

a Data represent normalized percent purity for DCBD determined by applying individual response factors to each of the peak areas (except for the solvent peak) to compensate for changes that occur in detector sensitivity for different sample components.

B. Dimer Concentrations of H-25953

Samples of H-25953 from stored and previously unopened bottles were analyzed for dichlorobutadiene dimer content on July 17th, 2003 and August 14th, 2003. The average content of dichlorobutadiene dimers for the July sample was 496 ± 3.80 ppm for duplicate analyses and for the August sample was 576 ± 3.30 ppm (n = 2). Analysis of liquid DCBD from the generation flasks showed that dimer concentrations increased with time but remained below 1000 ppm after four days of exposure. Fresh samples of DCBD were used after four days to ensure that dimer concentrations in H-25953 used to generate test atmospheres were less than 1000 ppm, the maximal level considered acceptable for this study.

Text Table II: Dichlorobutadiene Dimer[a] Concentrations in H-25593

Injection #	Pre-study Dimer Concentration (ppm)	Post-study Dimer Concentration (ppm)
1	493	574
2	498	579
Average	496	576
Standard Deviation	3.80	3.30

a The GC column separated the 3 major dimers, which were quantified separately then combined to produce the concentrations appearing in Table II.

C. Mass Spectral Identification

Mass spectral analysis was performed using a separate lot of DCBD (H-25902). Besides DCBD, there were three components in H-25902 that had normalized percent purity values that exceeded 0.1%. These same three components exceeded 0.1% in H-25953 and the chromatograms from both of these lots (see Figures 1 and 2 of the FID normalized area percent purity analyses) revealed similar retention times and normalized area percent values for all components, therefore the GC/MS analysis of H-25902 was considered representative for H-25953 and no further mass spectral analysis of H-25953 was necessary.

Results of the GC/MS qualitative analysis are given in the table below. DCBD (retention time = 7.66 minutes) was not in the Wiley Library so the spectrum was interpreted manually by comparing the MS fragmentation patterns of closely related compounds. The results of the mass spectral analysis were corroborated by the component identification supplied by DuPont Dow Elastomers.

Text Table III: Mass Spectral Identification of H-25902 Components

Retention Time (minutes)	Identification	Molecular Weight	Formula	Spectral Fit
6.41	2,4,4-trimethyl-1-pentene (DIB-1)	112 Da	C_8H_{16}	91%
6.98	2,4,4-trimethyl-2-pentene (DIB-2)	112 Da	C_8H_{16}	91%
7.66	2,3-dichloro-1,3-butadiene (DCBD)	122 Da	$C_4H_4Cl_2$	N/A[a]
8.72	Toluene	92 Da	C_7H_8	94%

a The major peak in H-25902, DCBD, was not found in the Wiley Library and was identified manually.

D. Component Quantification

Three other components ranging from 0.1% to 1.0% were identified in samples of DCBD by mass spectral analysis. Analyses were performed on July 17, 2003 and August 14, 2003 via the normalized area percent method used to determine DCBD purity. The percentages for these three components were considered acceptable for this study.

Text Table IV: Normalized[a] Purity (%) of H-25953 Components

Injection Number	Pre-Study			Post-Study		
	DIB-1	DIB-2	Toluene	DIB-1	DIB-2	Toluene
1	0.860	0.203	0.576	0.850	0.202	0.578
2	0.857	0.203	0.576	0.855	0.203	0.576
3	0.859	0.203	0.575	0.852	0.202	0.576
Average	0.859	0.203	0.576	0.853	0.202	0.577
Standard Deviation	1.78E-3	3.73E-3	3.54E-4	2.35E-3	5.18E-4	8.91E-4

a Data represent normalized percent purity for H-25953 components determined by applying individual response factors to each of the peak areas (except for the solvent peak) to compensate for changes that occur in detector sensitivity for different sample components.

Inhalation Exposures

A. Chamber Concentrations of the Test Substance
(Table 1, Figures 3-4, Appendices B and C)

There were 4 different breeding lots of rats exposed during this study. Due to the staggered starts for the different lots, a total of 18 exposures were conducted, however, each lot received only 15 exposures. There was no significant difference in the overall mean chamber concentrations of DCBD during the 15 days that each lot was exposed. Given that the very small differences in the statistical data between the individual lot concentrations have no toxicologically relevant consequences in the interpretation of the data, the exposure concentration data for all 18 exposures combined were reported. The analytically determined overall mean concentrations ± S.E.M. of DCBD in the exposure chambers targeted to 1, 10, or 50 ppm were 1.0 ± 0.0072, 10 ± 0.050, or 50 ± 0.070, respectively. The daily mean chamber concentrations for 6 hours of exposure were consistent throughout the study, with minimal day-to-day variability.

The dimer and inhibitor concentrations in the chamber atmosphere during exposure were not measured in the current study. However, in the pilot study[(1)] the concentration of the inhibitor H-22703-268 in the high level chamber atmosphere was approximately 1.2 ppb. In a subsequently conducted fertility study,[(18)] the concentration of dichlorobutadiene dimer in the high level chamber atmosphere was below the detectable limit of 13 ppb.[a]

B. Chamber Environmental Conditions
(Table 2, Appendix D)

The mean temperatures in the 4 exposure chambers during the 18 exposures ranged from 20 - 23°C.

The mean relative humidity in the 4 exposure chambers during the 18 exposures ranged from 51%-67%. Although the chamber humidity exceeded the targeted range of 40%-60%, the slightly higher humidity did not adversely affect the health of the animals, based on their clinical appearance.

The airflows in the 4 exposure chambers during the 18 exposures were sufficient to achieve 11 - 16 air changes per hour over the course of the study and maintain oxygen concentrations of 21%.

C. Inhalation Exposure Conclusions

Overall, the chamber concentrations were considered acceptable for evaluating the toxicity of the test substance and the environmental conditions in the exposure chambers were within acceptable comfort levels for the rats and considered adequate for conduct of the study.

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a Volume of chamber air sampled was 114 liters; final volume of acetone in the impinger was approximately 15 mLs.

Developmental Toxicology

A. Mortality and Clinical Observations
(Tables 3 and 4, Appendix E)

No test substance-related maternal mortality occurred at any exposure concentration tested; all animals on study survived to the scheduled sacrifice. Gasping was observed in rats during the first exposure period for 50 ppm females and labored breathing was observed during the third exposure period for 50 ppm females. The number of rats affected could not be quantified since not all of the animals were visible to the observer through the chamber window. However, these signs were not observed when the animals were returned to the home cage following exposure, and they were not observed during subsequent exposure periods. In addition, there were no test substance-related clinical signs of toxicity observed during the non-exposure period for any exposure concentration.

B. Body Weights and Body Weight Changes
(Tables 5 and 6; Appendices F and G)

Adverse test substance-related decreases in body weight and body weight gain occurred in dams exposed to 50 ppm. Body weights in 50 ppm dams were significantly decreased on gestation days 7-21; and mean body weight on gestation day 21, corrected for the products of conception, was 11.5% lower than the control mean. Weight gain in 50 ppm dams was also significantly decreased on gestation days 6-8, 16-18, and 6-21; and weight gain on gestation day 21, corrected for the products of conception, was 72% lower than the control value. The effects on weight and weight gain were primarily a result of a mean weight loss of 16.8 grams in 50 ppm dams during gestation days 6-8 compared to a mean weight gain of 10.1 grams for the control dams, and the result of a slower rate of weight gain during the remainder of the gestation period. Mean weight gain of 10 ppm females was significantly lower than control on gestation days 6-8. However, this decrease was not considered to be adverse because the magnitude of the difference was small, and the slight reduction had no impact on either body weight or on overall weight gain. Furthermore, there was no other corroborative evidence of maternal toxicity at this concentration. There were no test substance-related effects on body weight or weight gain in rats exposed to 1 ppm.

C. Food Consumption
(Table 7; Appendix H)

Test substance-related significant reductions in mean food consumption values occurred in dams exposed to 50 ppm during gestation days 6-21. The reduction in food consumption in 50 ppm dams was consistent with the decreased body weight and weight gain. There were no test substance-related effects on food consumption in dams exposed to 10 ppm or below.

D. Postmortem Findings

1. Maternal Gross Postmortem Findings
(Appendix I)

No test substance-related maternal gross postmortem findings were observed for any exposure concentration. One dam in the control group had bilateral, distended, renal pelvis. All remaining control group animals and all test substance-exposed dams appeared normal at necropsy.

2. Reproductive Outcome Data and Fetal Weight
(Table 8, Appendices J and K)

A test substance-related, statistically significant decrease in mean fetal body weight occurred in the 50 ppm group (6.2% lower than controls) compared to the control value. Mean fetal body weights for the 1 ppm and 10 ppm groups were similar to the control value.

All other endpoints describing reproductive outcome (resorptions per litter, litter size, and fetal sex ratio) were comparable across all groups.

E. Fetal Alterations
(Appendix K)

1. Malformations
(Table 9, Appendix K)

No test substance-related fetal malformations were observed at any exposure concentration. One fetus in the control group had a malformed paw (clubbed and digital soft tissue fusion). Another fetus in the control group had a bent pelvis. Three fetuses in the 10 ppm group had malformations including filamentous tail, cleft lip, micrognathia, imperforate anus, and microphthalmia. One fetus in the 50 ppm group had absent vertebra. None of these observations were considered related to the test substance. There was no dose-response relationship evident for any specific malformation and all of the observations seen in the test substance-exposed litters have been observed in control group animals of this strain.

2. Variations
(Table 10, Appendix K)

No test substance-related fetal variations were observed for any exposure concentration. The number and type of developmental variations observed were similar for all groups, and were common to this strain and developmental age.

CONCLUSIONS

Under the conditions of the study, maternal toxicity occurred at an exposure concentration of 50 ppm based on decreased maternal body weight, weight gain, food consumption, and clinical signs of toxicity during exposure. Developmental toxicity occurred at 50 ppm, evident as decreased fetal weight. Therefore, the maternal and fetal no-observed-adverse-effect levels (NOEL)[a] were both considered to be 10 ppm.

RECORDS AND SAMPLE STORAGE

A sample of the test substance was not retained at Haskell Laboratory due to potential safety hazards from the chemical instability of the test substance. Specimens, raw data, and the final report will be retained at Haskell Laboratory, Newark, Delaware, or at Iron Mountain Records Management, Wilmington, Delaware.

a The NOEL for this study is defined as the highest dose at which adverse effects attributable to the test substance were not detected. Thus, for this study, the NOEL is equivalent to the NOEL as defined by the U.S. EPA[18] and to the no-observed-adverse-effect level (NOAEL) as defined by the European Union.[19]

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TABLES

TABLES

EXPLANATORY NOTES

INHALATION EXPOSURE DATA

Notes

Chamber Concentrations of DCBD
Chamber Environmental Conditions
Values are reported to 2 significant figures.
Calculations were performed prior to rounding values.

Abbreviations

Chamber Concentrations of DCBD
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
FID = Flame ionization detector

DEVELOPMENTAL TOXICITY STUDY DATA

Note

Day 21C = Corrected final maternal body weight = final maternal body weight minus the gravid uterine weight plus the empty uterine weight.

Abbreviations

--- = No Data
S.D. = Standard Deviation
S.E. = Standard Error
N = Number in Group

TABLE 1

CHAMBER CONCENTRATIONS OF DCBD

DESIGN CONCENTRATION (ppm)	LOT	MEASURED CONCENTRATION (ppm)[a]			
		MEAN	S.E.M.	RANGE	n
0	A	0.00	0.00	0.00	15
	B	0.00	0.00	0.00	15
	C	0.00	0.00	0.00	15
	D	0.00	0.00	0.00	15
	combined[b]	0.00	0.00	0.00	18
1	A	1.0	0.0081	0.95 - 1.1	15
	B	1.0	0.0081	0.95 - 1.1	15
	C	1.0	0.0065	0.99 - 1.1	15
	D	1.0	0.0064	0.97 - 1.1	15
	combined	1.0	0.0072	0.95 - 1.1	18
10	A	10	0.060	9.7 - 11	15
	B	10	0.049	9.7 - 10	15
	C	10	0.049	9.7 - 10	15
	D	10	0.048	9.7 - 10	15
	combined	10	0.050	9.7 - 11	18
50	A	50	0.081	50 - 51	15
	B	50	0.085	50 - 51	15
	C	50	0.084	50 - 51	15
	D	50	0.084	50 - 51	15
	combined	50	0.070	50 - 51	18

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 Lot exposure starts were staggered by 1 day. Each lot received 15 exposures.

TABLE 2

CHAMBER ENVIRONMENTAL CONDITIONS

DESIGN CONCENTRATION (ppm)	LOT	TEMPERATURE (°C)[a] RANGE	RELATIVE HUMIDITY (%)[a] RANGE	AIRFLOW (L/min)[b] RANGE	AIR CHANGES PER HOUR[c]	n
0	A	21 - 23	52 - 67	261 - 284	11 - 12	15
	B	21 - 23	52 - 67	261 - 284	11 - 12	15
	C	21 - 23	52 - 67	261 - 298	11 - 13	15
	D	21 - 23	53 - 67	261 - 298	11 - 13	15
	combined[d]	21 - 23	52 - 67	261 - 298	11 - 13	18
1	A	20 - 23	51 - 65	298 - 320	13 - 14	15
	B	20 - 23	51 - 65	298 - 320	13 - 14	15
	C	20 - 23	51 - 65	298 - 321	13 - 14	15
	D	20 - 23	52 - 65	298 - 321	13 - 14	15
	combined	20 - 23	51 - 65	298 - 321	13 - 14	18
10	A	20 - 23	51 - 66	278 - 341	12 - 15	15
	B	20 - 23	51 - 66	278 - 341	12 - 15	15
	C	20 - 23	51 - 66	278 - 363	12 - 16	15
	D	21 - 23	51 - 66	278 - 367	12 - 16	15
	combined	20 - 23	51 - 66	278 - 367	12 - 16	18
50	A	20 - 23	54 - 67	259 - 296	11 - 13	15
	B	20 - 23	54 - 67	259 - 296	11 - 13	15
	C	20 - 23	54 - 67	259 - 296	11 - 13	15
	D	20 - 23	55 - 67	259 - 296	11 - 13	15
	combined	20 - 23	54 - 67	259 - 296	11 - 13	18

a Values represent the range for all samples obtained from n exposures.
b Values represent the range of the daily mean values obtained from n exposures.
c Air Changes = Mean Airflow (L/min) × 60 (min/hr) ÷ Chamber Volume (L)
d Lot exposure starts were staggered by 1 day. Each lot received 15 exposures.

TABLE 3

SUMMARY OF OBSERVATIONS IN RATS DURING EXPOSURE

EXPOSURE NUMBER	LOT	0 ppm	1 ppm	10 ppm	50 ppm
1	A	NAD	NAD	NAD	Gasping (2)[a]
2	A, B	NAD	NAD	NAD	NAD
3	A, B, C	NAD	NAD	NAD	Labored Breathing (2)
4	A, B, C, D	NAD	NAD	NAD	NAD
5	A, B, C, D	NAD	NAD	NAD	NAD
6	A, B, C, D	NAD	NAD	NAD	NAD
7	A, B, C, D	NAD	NAD	NAD	NAD
8	A, B, C, D	NAD	NAD	NAD	NAD
9	A, B, C, D	NAD	NAD	NAD	NAD
10	A, B, C, D	NAD	NAD	NAD	NAD
11	A, B, C, D	NAD	NAD	NAD	NAD
12	A, B, C, D	NAD	NAD	NAD	NAD
13	A, B, C, D	NAD	NAD	NAD	NAD
14	A, B, C, D	NAD	NAD	NAD	NAD
15	A, B, C, D	NAD	NAD	NAD	NAD
16	B, C, D	NAD	NAD	NAD	NAD
17	C, D	NAD	NAD	NAD	NAD
18	D	NAD	NAD	NAD	NAD

a Numbers in parentheses are the approximate hours after exposure initiation when response was first observed.

TABLE 4

CLINICAL OBSERVATIONS

GESTATION DAY		GROUP :	I	II	III	IV
		EXPOSURE CONCENTRATION (ppm) :	0	1	10	50
		NO. EXAMINED :	22	22	22	22
4-5	ALOPECIA		2	0	0	0
6-21	ALOPECIA		3	0	0	2

There were no statistically significant trends (Cochran-Armitage test); $p < 0.05$.

TABLE 5

MEAN MATERNAL BODY WEIGHTS (grams)

Group:	I	II	III	IV
Exposure Concentration (ppm):	0	1	10	50
Gestation Day				
0	240.7 11(22)	240.1 13(22)	242.6 13(22)	241.4 14(22)
4	257.5 13.4(22)	256.3 17.0(22)	260.9 16.4(22)	255.2 17.6(22)
6	274.0 13.7(22)	272.1 20.1(22)	277.2 16.7(22)	272.8 17.1(22)
7	278.9 12.3(22)	277.5 17.3(22)	279.6 18.8(22)	257.2* 19.7(22)
8	284.1 12.4(22)	281.6 16.4(22)	282.5 18.3(22)	255.9* 21.4(22)
9	290.2 13.2(22)	286.3 17.6(22)	288.3 19.8(22)	264.9* 17.4(22)
10	295.7 13.6(22)	292.6 17.7(22)	293.6 21.4(22)	271.3* 17.3(22)
11	302.7 14.3(22)	299.4 17.4(22)	300.6 21.8(22)	276.8* 15.4(22)
12	307.9 16.0(22)	305.0 17.9(22)	307.0 22.0(22)	281.1* 16.4(22)
13	313.6 16.0(22)	310.2 19.6(22)	311.3 21.2(22)	286.4* 16.3(22)

TABLE 5 (Continued)

MEAN MATERNAL BODY WEIGHTS (grams)

Group:	I	II	III	IV
Exposure Concentration (ppm):	0	1	10	50
Gestation Day				
14	319.7 16.4(22)	315.7 19.5(22)	317.1 22.6(22)	289.1* 17.3(22)
15	328.2 17.8(22)	325.7 21.1(22)	325.3 23.8(22)	296.2* 17.1(22)
16	339.3 18.1(22)	335.9 21.0(22)	336.8 24.1(22)	306.7* 17.6(22)
17	353.0 17.7(22)	349.4 21.5(22)	349.4 26.0(22)	317.5* 18.9(22)
18	369.4 19.6(22)	366.2 22.6(22)	365.0 27.1(22)	331.0* 20.7(22)
19	383.2 20.4(22)	381.6 23.9(22)	380.1 28.3(22)	345.1* 21.3(22)
20	400.0 22.2(22)	398.0 24.5(22)	396.9 29.3(22)	356.5* 23.1(22)
21	417.6 23.5(22)	415.0 25.8(22)	416.7 33.0(22)	373.6* 24.6(22)
21C	324.0 20.4(22)	315.3 20.6(21)	319.8 30.0(22)	286.7* 18.0(22)

Data summarized as: Mean
Standard Deviation (n)

* Statistically significant compared to the control group ($p < 0.05$) by One-Way Analysis of Variance and Dunnett's test (Dunnett/Tamhane-Dunnett).

TABLE 6

MEAN MATERNAL BODY WEIGHT CHANGES (grams)

Group:	I	II	III	IV
Exposure Concentration (ppm):	0	1	10	50
Gestation Days				
0-4	16.8 8.1(22)	16.2 14.5(22)	18.3 9.7(22)	13.9 10.8(22)
4-6	16.5 6.5(22)	15.9 10.3(22)	16.3 6.8(22)	17.5 7.0(22)
6-8	10.1 3.2(22)	9.5 7.1(22)	5.3@ 3.8(22)	-16.8@ 12.6(22)
8-10	11.6 3.5(22)	11.0 4.0(22)	11.2 4.3(22)	15.4 9.4(22)
10-12	12.2 5.3(22)	12.5 3.4(22)	13.3 3.7(22)	9.8 7.1(22)
12-14	11.8 4.0(22)	10.7 4.7(22)	10.1 4.9(22)	8.0 7.1(22)
14-16	19.6 5.2(22)	20.1 4.7(22)	19.7 4.0(22)	17.6 5.9(22)
16-18	30.1 5.0(22)	30.3 4.4(22)	28.3 6.3(22)	24.2* 4.6(22)
18-21	48.2 7.4(22)	48.9 8.1(22)	51.7 8.6(22)	42.7 8.2(22)
6-21	143.6 20.4(22)	142.9 20.5(22)	139.5 19.6(22)	100.9* 15.3(22)
6-21C	50.0 15.4(22)	43.1 16.9(21)	42.6 17.3(22)	13.9@ 12.6(22)

Data summarized as: Mean
Standard Deviation (n)

* Statistically significant compared to the control group ($p < 0.05$) by One-Way Analysis of Variance and Dunnett's test (Dunnett/Tamhane-Dunnett).

@ Statistically significant compared to the control group ($p < 0.05$) by Kruskal Wallis and Dunn's test.

TABLE 7

MEAN MATERNAL FOOD CONSUMPTION (grams/day)

Group:	I	II	III	IV
Exposure Concentration (ppm):	0	1	10	50
Gestation Days				
4-6	23.3 2.3(22)	22.5 5.9(22)	24.5 2.7(22)	23.1 4.5(22)
6-8	24.5 1.9(22)	24.5 3.4(22)	23.3 2.7(22)	12.5@ 5.2(22)
8-10	26.0 2.2(22)	25.1 2.8(22)	24.9 2.5(22)	20.8* 3.0(22)
10-12	26.1 2.7(22)	26.2 2.9(22)	26.6 3.0(22)	22.4* 3.4(22)
12-14	27.9 3.4(22)	26.6 3.1(22)	26.4 2.9(22)	22.4* 3.2(22)
14-16	28.1 3.3(22)	27.8 3.2(22)	27.4 3.1(22)	24.0* 3.0(22)
16-18	29.3 3.1(22)	29.1 3.2(22)	29.0 3.0(22)	26.4* 4.1(22)
18-21	29.0 3.1(22)	28.1 3.3(22)	28.2 3.3(22)	25.2* 3.1(22)
6-21	27.4 2.5(22)	26.9 2.8(22)	26.7 2.6(22)	22.2* 2.3(22)

Data summarized as: Mean
Standard Deviation (n)

* Statistically significant compared to the control group ($p < 0.05$) by One-Way Analysis of Variance and Dunnett's test (Dunnett/Tamhane-Dunnett).

TABLE 8

REPRODUCTIVE OUTCOME

Group:		I	II	III	IV
Exposure Concentration (ppm):		0	1	10	50
No. Mated		22	22	22	22
No. Pregnant		22	22	22	22
No. Aborted		0	0	0	0
No Delivered Early		0	0	0	0
No. Deaths		0	0	0	0
No. With Total Resorptions		0	0	0	0
No. Litters		22	22	22	22
Mean Corpora Lutea[a]		15.6 (2.9)[b]	15.5 (3.1)	15.0 (2.1)	15.4 (2.4)
Implantations		13.9 (2)	14.1 (2)	14.2 (2)	13.8 (2)
Live Fetuses[c]:	Total	13.3 (2)	14.0 (2)	13.6 (2)	13.2 (2)
	Males	7.0 (2.8)	6.9 (2.3)	7.0 (2.5)	6.6 (2.1)
	Females	6.3 (2.4)	7.0 (2.1)	6.6 (2.3)	6.6 (2.5)
Dead Fetuses		0.0	0.0	0.0	0.0
Resorptions:	Total	0.5 (1)	0.2 (0)	0.6 (1)	0.5 (1)
	Early	0.5 (1)	0.2 (0)	0.6 (1)	0.5 (1)
	Late	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Mean Fetal Weight:	Total	5.51 (0.40)	5.61 (0.28)	5.59 (0.26)	5.17 (0.31)*
	Males	5.64 (0.42)	5.82 (0.32)	5.79 (0.29)	5.30 (0.34)
	Females	5.36 (0.42)	5.38 (0.27)	5.41 (0.30)	5.01 (0.30)
Sex Ratio[d]		0.52 (0.18)	0.49 (0.15)	0.51 (0.16)	0.50 (0.15)

a Statistical analyses are not conducted on mean corpora lutea data; these data are presented for information only.
b Standard deviation is reported in parentheses.
c Statistical analyses are only conducted on the mean total number of live fetuses per litter and total mean fetal weight. The means for males and females are presented for information only.
d Number male fetuses/total number fetuses per litter.

Note: The incidence of pregnancy, maternal mortality, the total resorptions, and early deliveries were statistically analyzed using the Cochran-Armitage test. Live fetuses, dead fetuses, resorptions, and implantations were analyzed by One-Way Analysis of Variance and Dunnett's test. Fetal weight and sex ratio were analyzed using Analysis of Covariance and Dunnett-Hsu.

* Statistically significant at $p < 0.05$.

TABLE 9

INCIDENCE OF FETAL MALFORMATIONS

GROUP:	I	II	III	IV
Exposure Concentration(ppm):	0	1	10	50
EXTERNAL				
No. examined	293[22]	307[22]	299[22]	291[22]
Anus - Imperforate	...	...	1(1)	...
Chin - Micrognathia	...	...	1(1)	...
Mouth - Cleft Lip	...	...	1(1)	...
Paw				
- Clubbed	1(1)	...	...	...
- Fused[a]	1(1)	...	...	...
Tail - Filamentous	...	...	1(1)	...
No. affected	1[1]	0[0]	2[2]	0[0]
VISCERAL				
No. examined	151[22]	159[22]	155[22]	150[22]
No. affected	0[0]	0[0]	0[0]	0[0]
HEAD				
No. examined	151[22]	159[22]	154[22][b]	150[22]
Eye - Microphthalmia	...	...	1(1)	...
No. affected	0[0]	0[0]	1[1]	0[0]
SKELETAL				
No. examined	293[22]	307[22]	297[22]	291[22]
Mandible - Micrognathia	...	...	1(1)	...
Pelvis - Bent	1(1)	...	...	...
Vertebra - Absent	...	...	...	1(1)
No. affected	1[1]	0[0]	1[1]	1[1]
TOTAL NUMBER AFFECTED	2(2)	0(0)	3(3)	1(1)

Data summarized as: Number examined and affected, including the number affected with the listed malformations expressed as Fetuses[Litters] or Fetuses (Litters).

a Soft tissue only.

b One malformed fetus was viscerally examined without decapitation.

Note: Statistical analyses are only conducted on the individual endpoints. The overall total and totals by exam type are presented for information only.

Statistical Methods: Exact Mann-Whitney with a Bonferroni-Holm adjustment; $p < 0.05$.

There were no statistically significant differences from control.

TABLE 10

INCIDENCE OF FETAL VARIATIONS

GROUP:	I	II	III	IV
Exposure Concentration(ppm):	0	1	10	50
DEVELOPMENTAL VARIATIONS				
EXTERNAL				
No. examined	293[22]	307[22]	299[22]	291[22]
No. affected	0[0]	0[0]	0[0]	0[0]
VISCERAL				
No. examined	151[22]	159[22]	155[22]	150[22]
No. affected	0[0]	0[0]	0[0]	0[0]
HEAD				
No. examined	151[22]	159[22]	154[22]	150[22]
No. affected	0[0]	0[0]	0[0]	0[0]
SKELETAL				
No. examined	293[22]	307[22]	297[22][a]	291[22]
Rib				
- Rudimentary Cervical	1(1)	...	...	...
- Supernumerary	13(9)	8(5)	10(5)	19(11)
Sternebra - Misaligned	...	...	...	1(1)
No. affected	14[10]	8[5]	10[5]	20[11]
TOTAL WITH DEVELOPMENTAL VARIATIONS	14(10)	8(5)	10(5)	20(11)

TABLE 10 (Continued)

INCIDENCE OF FETAL VARIATIONS

GROUP:	I	II	III	IV
Exposure Concentration(ppm):	0	1	10	50
VARIATIONS DUE TO RETARDED DEVELOPMENT				
EXTERNAL				
No. examined	293[22]	307[22]	299[22]	291[22]
No. affected	0[0]	0[0]	0[0]	0[0]
VISCERAL				
No. examined	151[22]	159[22]	155[22]	150[22]
Heart &/or Greater Vessels - Patent Ductus Arteriosis	...	...	1(1)	...
Kidney[b]				
- Small Papilla - Size 2	2(2)	3(3)	4(4)	2(2)
- Papilla - Size 3	6(5)	6(6)	4(4)	10(8)
No. affected	8[7]	9[8]	9[7]	11[8]
HEAD				
No. examined	151[22]	159[22]	154[22]	150[22]
No. affected	0[0]	0[0]	0[0]	0[0]
SKELETAL				
No. examined	293[22]	307[22]	297[22][a]	291[22]
Pelvis - Retarded Ossification	...	2(1)	1(1)	...
Rib - Retarded Ossification	...	1(1)	...	...
Skull - Retarded Ossification	10(5)	16(8)	9(4)	11(7)
Sternebra - Retarded Ossification	11(4)	4(3)	2(2)	2(2)
Vertebra - Retarded Ossification	31(13)	53(16)	31(14)	86(17)
No. affected	51[16]	71[19]	42[17]	91[18]
TOTAL WITH VARIATIONS DUE TO RETARDED DEVELOPMENT	59(19)	78(20)	50(18)	100(18)
TOTAL NUMBER FETUSES WITH VARIATIONS	68(21)	84(20)	59(19)	110(20)

Data summarized as: Number examined and affected, including the number affected with the listed variations, expressed as Fetuses[Litters] or Fetuses (Litters).

a Two fetuses could not be examined due to disarticulation during processing.

b Statistical analyses were conducted on the combined incidences of small renal papillae; the details for each size are presented for information only.

Note: Statistical analyses are only conducted on the individual endpoints. The overall total and totals by exam are presented for information only.

Statistical Methods: Exact Mann-Whitney with a Bonferroni-Holm adjustment on mean percent affected for each finding; $p < 0.05$.

There were no statistically significant differences from control.

FIGURES

FIGURE 1

H-25902 FID Purity Analysis Chromatogram

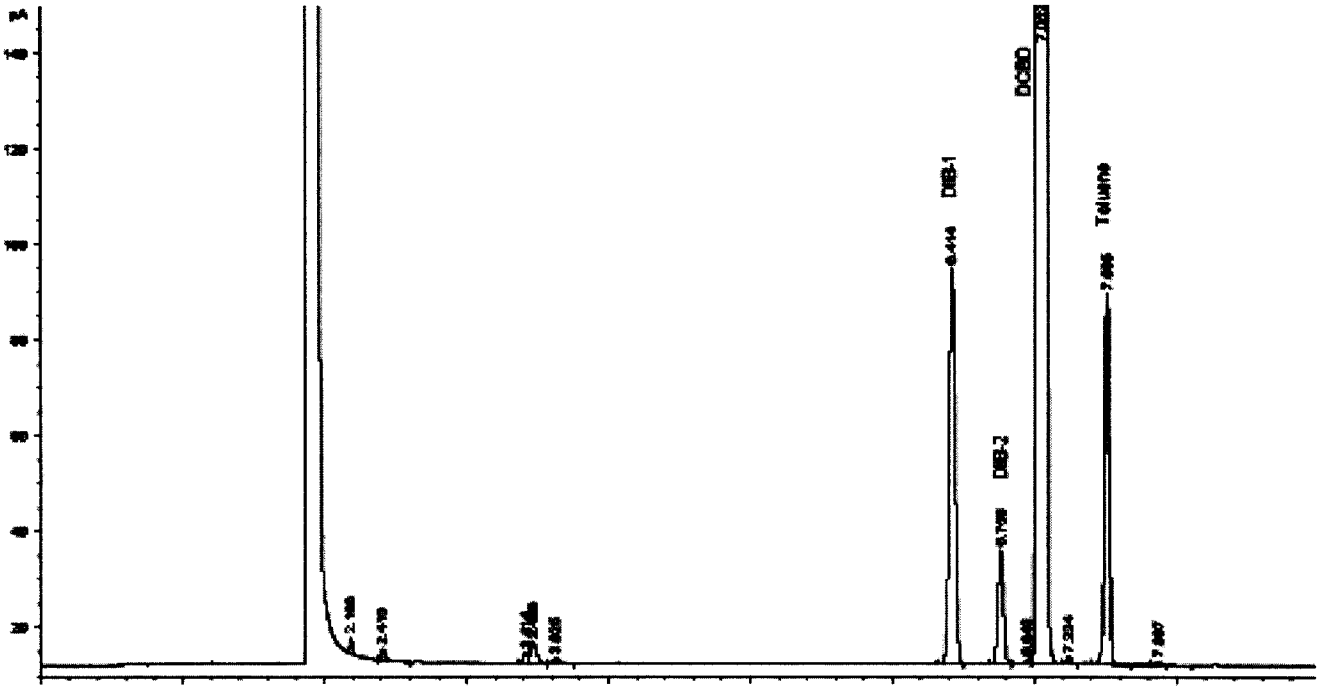


FIGURE 2

H-25953 FID Purity Analysis Chromatogram

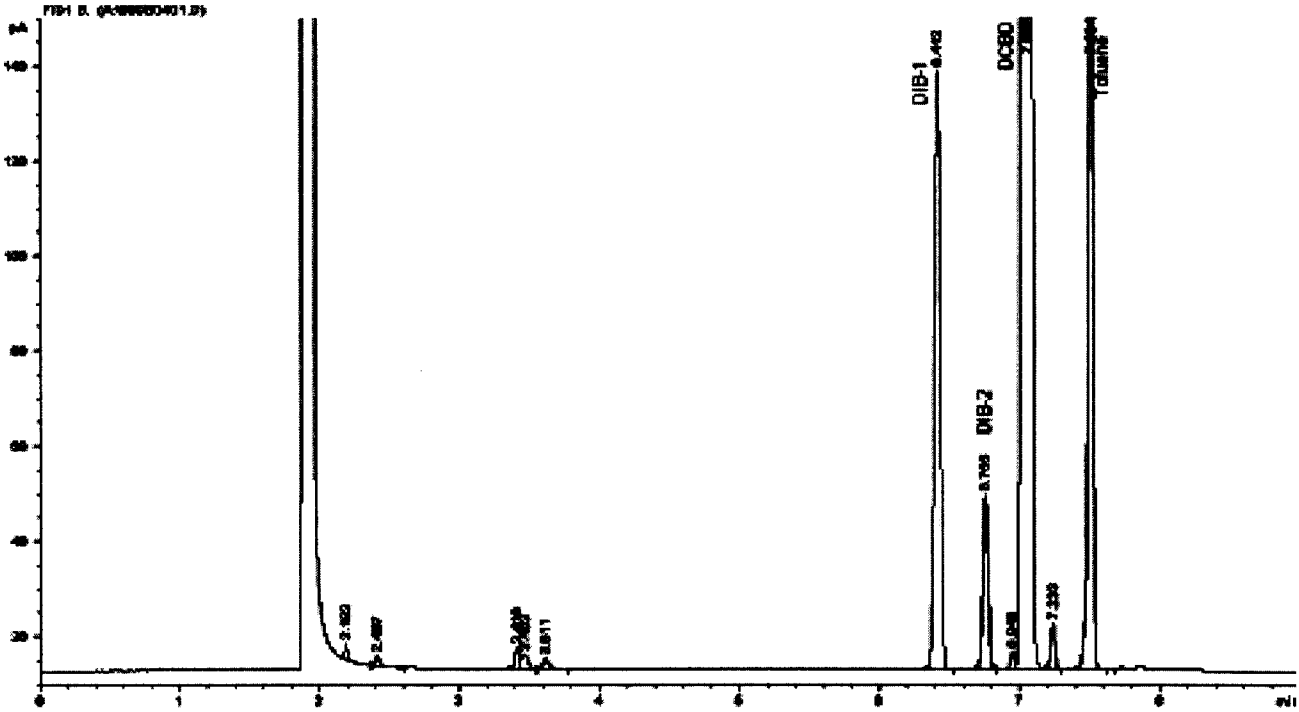


FIGURE 3

SCHEMATIC OF EXPOSURE SYSTEM

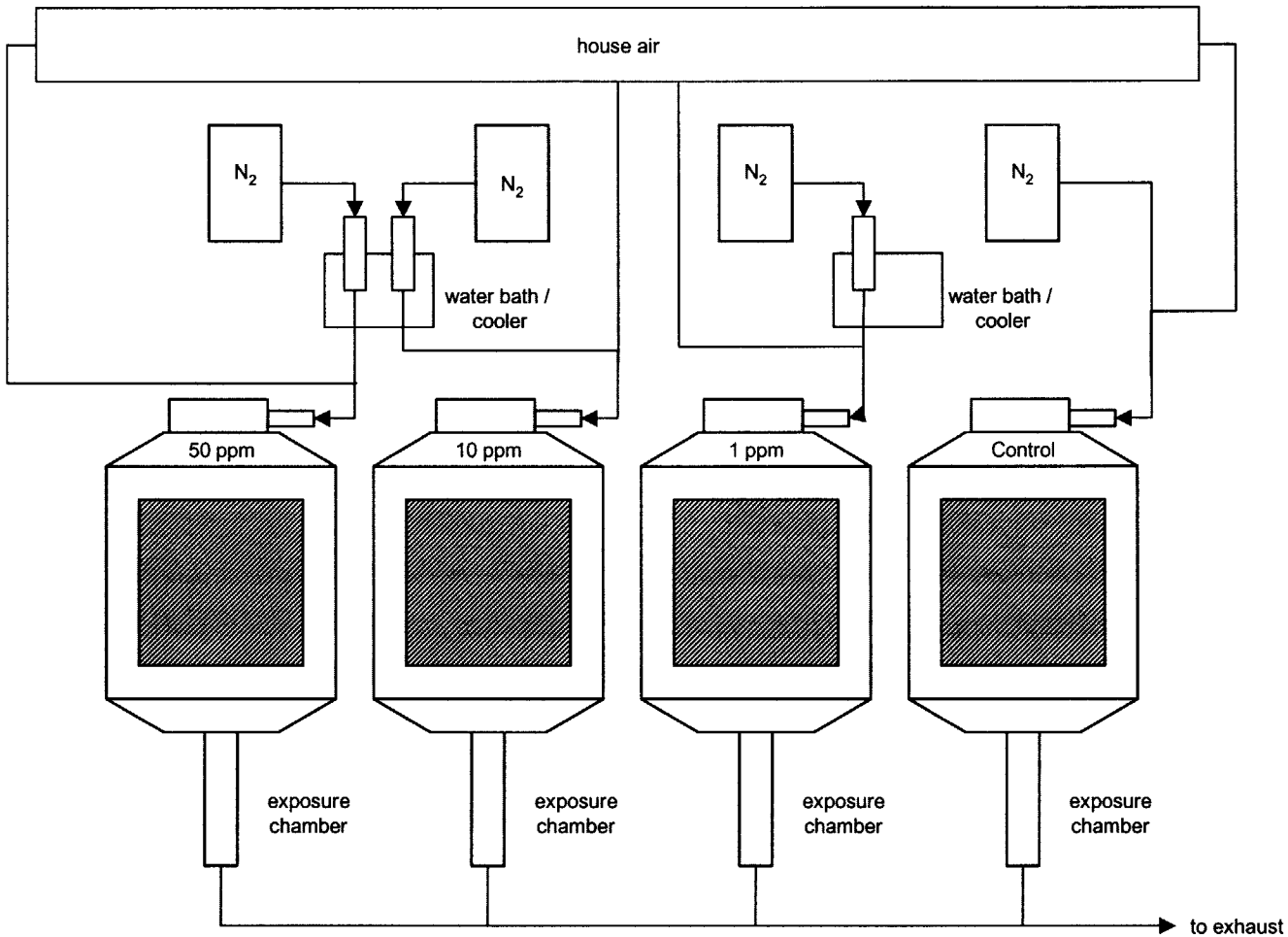
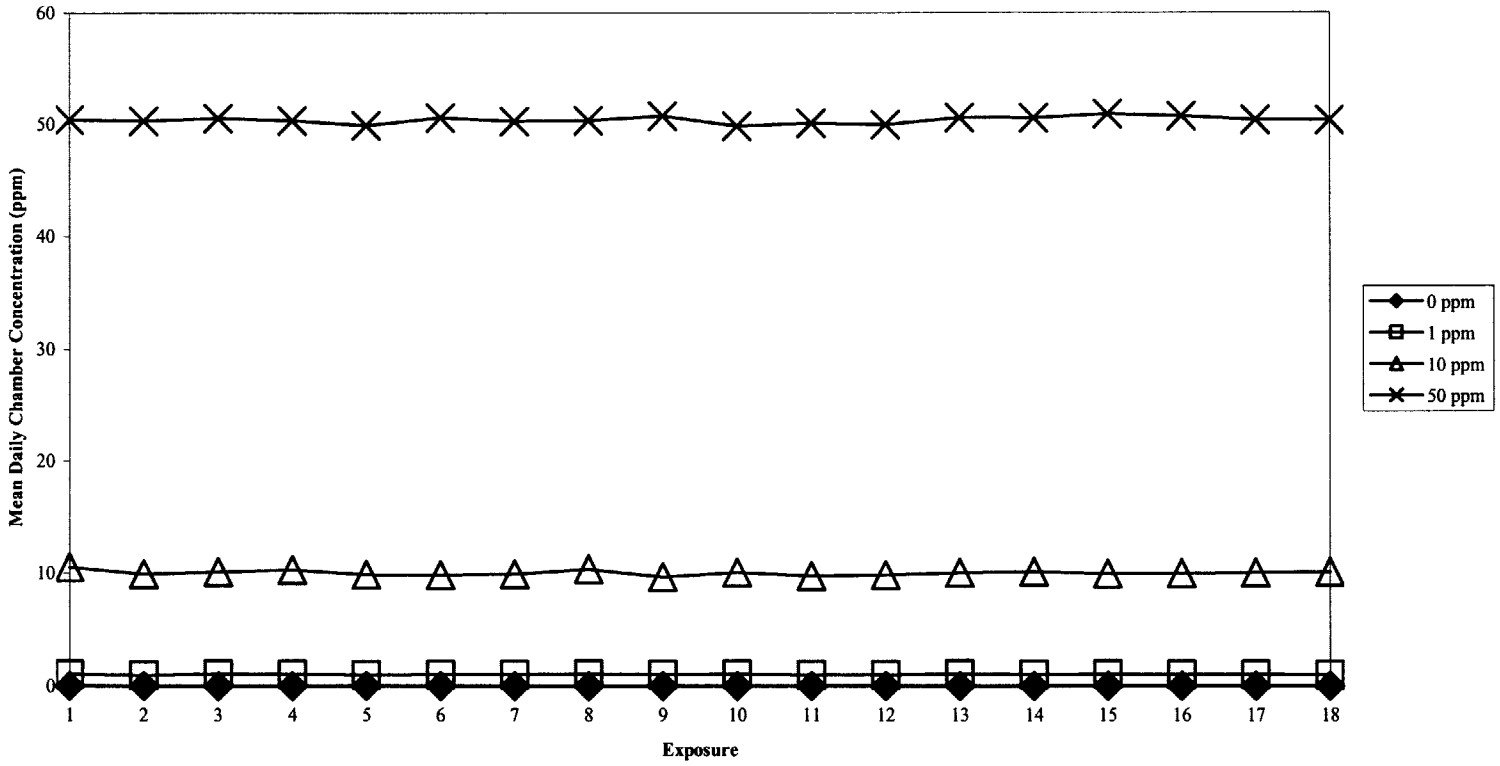


FIGURE 4

MEAN DAILY CHAMBER CONCENTRATIONS



APPENDICES

APPENDIX A

Certificate of Analysis

2,3-Dichloro-1,3-butadiene (DCBD): Inhalation Developmental Toxicity Study in Rats DuPont-13227

HASKELL
LABORATORY FOR HEALTH AND ENVIRONMENTAL SCIENCES

Certificate of Analysis

Test substance name:	H-25953
Lot number:	7/14/03
Sample receipt date:	July 15, 2003
Appearance:	Pale yellow liquid
Purity:	98.2%
Analysis based on:	Capillary Gas Chromatography via flame-ionization detector and normalized area percent
Sponsor:	The International Institute of Synthetic Rubber Producers through DuPont Dow Elastomers, L. L. C.
Quality Assurance:	This study was conducted in compliance with U.S. EPA TSCA (40 CFR part 792) Good Laboratory Practice Standards, which are consistent with the OECD Principles of Good Laboratory Practice (as revised in 1997) published in ENV/MC/CHEM(98)17 and MAFF Japan Good Laboratory Practice Standards (59 NohSan No. 3850).
Expiration date:	12/31/2003 (predicted date dimer concentration will exceed 1,000 ppm under suggested storage conditions)
Suggested storage conditions:	Store in freezer under nitrogen
Date of analysis:	July 17, 2003
Analyst signature/date:	Thomas A. Kegelman 17-Dec-2003

Thomas A. Kegelman

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APPENDIX B

Daily Chamber Concentrations

DAILY CHAMBER CONCENTRATIONS

EXPLANATORY NOTES

NOTES:

Calculations were performed prior to rounding values.

ABBREVIATIONS:

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

Daily Chamber Concentrations (ppm)

	0 ppm				1 ppm				10 ppm				50 ppm			
Exposure	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n	Mean	S.D.	Range	n
1	0.00	0.00	0.00	1	1.03	0.35	0.32 - 1.79	19	10.51	0.48	9.24 - 11.85	19	50.42	1.17	49.01 - 52.41	19
2	0.00	0.00	0.00	1	0.95	0.40	0.27 - 1.53	19	9.91	1.21	7.28 - 12.42	19	50.31	1.92	47.27 - 53.76	19
3	0.00	0.00	0.00	1	1.07	0.02	1.03 - 1.11	19	10.13	0.80	8.89 - 12.51	19	50.55	1.75	46.13 - 52.78	19
4	0.00	0.00	0.00	1	1.04	0.10	0.96 - 1.39	19	10.30	0.43	9.92 - 11.55	19	50.34	1.50	47.98 - 53.13	19
5	0.00	0.00	0.00	1	0.99	0.14	0.57 - 1.14	18	9.86	0.35	9.30 - 10.70	18	49.92	0.85	47.63 - 50.99	18
6	0.00	0.00	0.00	1	1.01	0.10	0.96 - 1.40	19	9.84	1.71	7.17 - 14.27	19	50.59	4.14	39.60 - 58.56	19
7	0.00	0.00	0.00	1	1.00	0.24	0.50 - 1.42	19	9.91	1.02	5.82 - 10.37	19	50.27	1.43	47.19 - 52.80	19
8	0.00	0.00	0.00	1	1.05	0.14	0.55 - 1.23	19	10.35	0.61	8.87 - 10.98	19	50.35	2.14	46.14 - 54.94	19
9	0.00	0.00	0.00	1	1.02	0.12	0.75 - 1.25	19	9.67	0.73	8.49 - 11.46	19	50.75	2.23	45.44 - 54.66	19
10	0.00	0.00	0.00	1	1.03	0.21	0.83 - 1.69	19	10.06	0.45	9.56 - 11.27	19	49.85	7.01	31.15 - 58.81	19
11	0.00	0.00	0.00	1	0.99	0.11	0.83 - 1.23	19	9.76	0.59	8.48 - 10.74	19	50.10	2.59	43.53 - 53.36	19
12	0.00	0.00	0.00	1	0.99	0.11	0.75 - 1.21	19	9.82	0.45	8.87 - 10.29	19	49.97	2.86	43.26 - 54.73	19
13	0.00	0.00	0.00	1	1.06	0.22	0.76 - 1.85	19	10.03	0.74	9.09 - 12.58	19	50.60	1.28	47.85 - 52.52	19
14	0.00	0.00	0.00	1	1.01	0.15	0.93 - 1.56	19	10.11	0.55	9.21 - 11.87	19	50.58	1.73	47.31 - 53.02	19
15	0.00	0.00	0.00	1	1.03	0.10	0.89 - 1.19	19	9.95	0.39	8.96 - 10.39	19	50.94	1.99	45.04 - 53.77	19
16	0.00	0.00	0.00	1	1.02	0.20	0.71 - 1.80	19	9.97	0.49	9.37 - 11.65	19	50.75	1.43	48.36 - 52.81	19
17	0.00	0.00	0.00	1	1.02	0.10	0.88 - 1.12	19	10.02	0.75	9.40 - 12.59	19	50.41	0.80	49.08 - 52.55	19
18	0.00	0.00	0.00	1	0.97	0.01	0.94 - 1.00	19	10.08	0.60	8.85 - 11.82	19	50.36	0.70	49.40 - 51.88	19

APPENDIX C

Daily Nominal Concentration Calculations

DAILY NOMINAL CONCENTRATION CALCULATIONS

EXPLANATORY NOTES

NOTES:

Calculations were performed prior to rounding values.

FOOTNOTES:

a The nominal data for the 1 ppm chamber were not consistently within the typical range of values generally observed in vapor generation studies conducted at this laboratory. The variance in the data at this concentration level is interpreted to be due to the difficulties associated with the physical properties of generating this test substance (e.g., formation of ice/frost on the outer surfaces of the generation vessels). Therefore, the actual measured chamber concentration data is considered to be the most accurate representation of the test substance concentration in the 1 ppm chamber.

b Nominal Concentration (ppm) = Amount of Test Substance Used (g) ÷ 360 (min) ÷ 123 (g/mole) × 24.45 (L/mole) ÷ Mean Airflow (L/min) × 10^6

c Percent of Nominal Concentration = Actual Concentration (ppm) ÷ Nominal Concentration (ppm) × 100

Daily Nominal Concentration Calculations for 1 ppm Chamber[a]

Exposure Number	Amount of Test Substance Used (g)	Mean Airflow (L/min)	Nominal Concentration (ppm)[b]	Actual Concentration (ppm)	Actual Concentration Compared to Nominal Concentration (%)[c]
1	0.6	312	1.1	1.03	97
2	1.7	314	3.0	0.95	32
3	0.6	307	1.1	1.07	99
4	0.7	309	1.3	1.04	83
5	0.8	310	1.4	0.99	69
6	1.9	307	3.4	1.01	30
7	1.2	313	2.1	1	47
8	0.6	316	1.0	1.05	100
9	0.6	315	1.1	1.02	97
10	1	298	1.9	1.03	56
11	0.7	306	1.3	0.99	78
12	0.4	308	0.7	0.99	138
13	0.3	310	0.5	1.06	198
14	0.3	308	0.5	1.01	188
15	0.8	320	1.4	1.03	75
16	1.2	313	2.1	1.02	48
17	0.7	321	1.2	1.02	85
18	0.8	320	1.4	0.97	70

Daily Nominal Concentration Calculations for 10 ppm Chamber

Exposure Number	Amount of Test Substance Used (g)	Mean Airflow (L/min)	Nominal Concentration (ppm)[b]	Actual Concentration (ppm)	Actual Concentration Compared to Nominal Concentration (%)[c]
1	5.4	293	10.2	10.51	103
2	4.7	289	9.0	9.91	110
3	5.1	298	9.4	10.13	107
4	4.9	303	8.9	10.3	115
5	4.6	296	8.6	9.86	115
6	8.1	278	16.1	9.84	61
7	6.2	309	11.1	9.91	89
8	5.8	306	10.5	10.35	99
9	5.3	320	9.1	9.67	106
10	5.9	310	10.5	10.06	96
11	5.6	296	10.4	9.76	93
12	7.2	310	12.8	9.82	77
13	6.6	316	11.5	10.03	87
14	6.3	338	10.3	10.11	98
15	6.6	341	10.7	9.95	93
16	7.1	330	11.9	9.97	84
17	6.3	363	9.6	10.02	105
18	6.6	367	9.9	10.08	102

Daily Nominal Concentration Calculations for 50 ppm Chamber

Exposure Number	Amount of Test Substance Used (g)	Mean Airflow (L/min)	Nominal Concentration (ppm)[b]	Actual Concentration (ppm)	Actual Concentration Compared to Nominal Concentration (%)[c]
1	20.5	285	39.7	50.42	127
2	21.5	292	40.7	50.31	124
3	22.2	285	43.0	50.55	118
4	20.5	296	38.2	50.34	132
5	20.1	276	40.2	49.92	124
6	24.9	264	52.1	50.59	97
7	26.6	265	55.4	50.27	91
8	23	271	46.9	50.35	107
9	23.6	259	50.3	50.75	101
10	22.9	268	47.2	49.85	106
11	22.7	269	46.6	50.1	108
12	27.3	273	55.2	49.97	90
13	25.1	275	50.4	50.6	100
14	25.3	273	51.2	50.58	99
15	27.4	273	55.4	50.94	92
16	26.8	287	51.6	50.75	98
17	24.3	282	47.6	50.41	106
18	25.1	286	48.5	50.36	104

APPENDIX D

Daily Chamber Environmental Conditions

DAILY CHAMBER ENVIRONMENTAL CONDITIONS

EXPLANATORY NOTES

NOTES:

Calculations were performed prior to rounding values.

ABBREVIATIONS:

n - number of observations

Daily Chamber Environmental Conditions - Temperature (ºC)

	0 ppm		1 ppm		10 ppm		50 ppm	
Exposure	Range	n	Range	n	Range	n	Range	n
1	21 - 22	3	21	3	21	3	21	3
2	21 - 22	3	21 - 22	3	21 - 22	3	21 - 22	3
3	21 - 22	3	20 - 21	3	20 - 21	3	21	3
4	21 - 22	3	21 - 22	3	21 - 22	3	21 - 22	3
5	21 - 22	3	21 - 22	3	21 - 22	3	21 - 22	3
6	21 - 23	3	21 - 22	3	22	3	21 - 22	3
7	22 - 23	3	22 - 23	3	22 - 23	3	22 - 23	3
8	22 - 23	3	22 - 23	3	22 - 23	3	22 - 23	3
9	22 - 23	3	22 - 23	3	22 - 23	3	22 - 23	3
10	22 - 23	3	22	3	22 - 23	3	22 - 23	3
11	21 - 22	3	20 - 22	3	21 - 22	3	21 - 22	3
12	21 - 22	3	20 - 22	3	21 - 22	3	20 - 22	3
13	21 - 22	3	20 - 22	3	21 - 22	3	20 - 22	3
14	22	3	21 - 22	3	22	3	21 - 22	3
15	22 - 23	3	21 - 22	3	21 - 22	3	21 - 22	3
16	22	3	21 - 22	3	21 - 22	3	21 - 22	3
17	21 - 22	3	21 - 22	3	21 - 22	3	21 - 22	3
18	21 - 22	3	20 - 21	3	21 - 22	3	20 - 22	3

Daily Chamber Environmental Conditions - Relative Humidity (%)

	0 ppm		1 ppm		10 ppm		50 ppm	
Exposure	Range	n	Range	n	Range	n	Range	n
1	59 - 61	3	57 - 59	3	57 - 58	3	62 - 63	3
2	57 - 60	3	54 - 57	3	55 - 57	3	59 - 61	3
3	52 - 58	3	51 - 58	3	51 - 55	3	54 - 56	3
4	53 - 60	3	52 - 57	3	51 - 58	3	55 - 61	3
5	59 - 60	3	58 - 62	3	57 - 58	3	61 - 62	3
6	60 - 67	3	57 - 65	3	59 - 66	3	62 - 67	3
7	61 - 63	3	58 - 59	3	61 - 62	3	62 - 63	3
8	61 - 65	3	58 - 62	3	61 - 62	3	62 - 64	3
9	59 - 64	3	57 - 61	3	59 - 63	3	62 - 64	3
10	57 - 64	3	56 - 60	3	57 - 61	3	60 - 65	3
11	57 - 60	3	55 - 57	3	57 - 59	3	59	3
12	59 - 65	3	57 - 63	3	60 - 63	3	62 - 65	3
13	58 - 62	3	56 - 58	3	59 - 61	3	61 - 62	3
14	60 - 65	3	58 - 62	3	61 - 64	3	63 - 66	3
15	60 - 64	3	58 - 62	3	61 - 64	3	64	3
16	58 - 62	3	56 - 60	3	60 - 62	3	61 - 62	3
17	61 - 63	3	58 - 60	3	62	3	63	3
18	61 - 62	3	60	3	61 - 63	3	63 - 65	3

Daily Chamber Environmental Conditions - Airflow (L/min)

	0 ppm		1 ppm		10 ppm		50 ppm	
Exposure	Mean	n	Mean	n	Mean	n	Mean	n
1	272	3	312	3	293	3	285	3
2	278	3	314	3	289	3	292	3
3	272	3	307	3	298	3	285	3
4	280	3	309	3	303	3	296	3
5	278	3	310	3	296	3	276	3
6	261	3	307	3	278	3	264	3
7	278	3	313	3	309	3	265	3
8	273	3	316	3	306	3	271	3
9	270	3	315	3	320	3	259	3
10	278	3	298	3	310	3	268	3
11	279	3	306	3	296	3	269	3
12	283	3	308	3	310	3	273	3
13	280	3	310	3	316	3	275	3
14	276	3	308	3	338	3	273	3
15	284	3	320	3	341	3	273	3
16	282	3	313	3	330	3	287	3
17	298	3	321	3	363	3	282	3
18	286	3	320	3	367	3	286	3

APPENDIX E

Individual Clinical Observations

Individual Clinical Observations

Explanatory Notes

Notes

Clinical observations were recorded for all animals on the day after arrival and daily until the end of the study. Observations before gestation day 4 are not included in the report, but are documented in the study records.

The first observation recorded each day is indicated by "a"; the second by "b". Observations were made twice daily on days 6-20G. If no abnormal signs were observed during the study examinations, the "b" entries are omitted from the report.

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP I: 0 PPM

ANIMAL NUMBER:	OBSERVATION		DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
1			
	ALOPECIA BOTH FRONT PAW	a:	,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
		b:	, ,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,
	ALOPECIA BOTH FRONT LEG	a:	, , , ,8,9,10,11,12,13,14,15,16,17,18,19,20,21
		b:	, , , ,8,9,10,11,12,13,14,15,16,17,18,19,20,
	SACRIFICED BY DESIGN 8/11/03	a:	, , , , , , , , , , , , , , , , , ,21
13			
	SACRIFICED BY DESIGN 8/11/03	a:	, , , , , , , , , , , , , , , , , ,21
15			
	SACRIFICED BY DESIGN 8/11/03	a:	, , , , , , , , , , , , , , , , , ,21
16			
	SACRIFICED BY DESIGN 8/11/03	a:	, , , , , , , , , , , , , , , , , ,21
19			
	SACRIFICED BY DESIGN 8/11/03	a:	, , , , , , , , , , , , , , , , , ,21
23			
	ALOPECIA BOTH FRONT LEG	a:	,5,6,7,8,9,10,11, ,13,14,15,16,17,18,19,20,21
		b:	, ,6,7,8,9,10, ,12,13,14,15,16,17,18,19,20,
	ALOPECIA BOTH FRONT PAW	a:	, ,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
		b:	, ,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,
	ALOPECIA BACK FRONT LEG	a:	, , , , , , , ,12, , , , , , , , ,
		b:	, , , , , , ,11, , , , , , , , ,
	ALOPECIA LEFT REAR LEG	a:	, , , , , , , , ,13,14,15,16,17,18,19, ,
		b:	, , , , , , , , ,13,14,15,16,17,18,19, ,
	ALOPECIA BOTH REAR LEG	a:	, , , , , , , , , , , , , , , ,20,21
		b:	, , , , , , , , , , , , , , , ,20,
	SACRIFICED BY DESIGN 8/12/03	a:	, , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP I: 0 PPM

ANIMAL NUMBER:	OBSERVATION		DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
25			
	SACRIFICED BY DESIGN 8/12/03	a:	, , , , , , , , , , , , , , , , ,21
28			
	ALOPECIA BOTH FRONT LEG	a:	, , , , , , , , , , , ,16,17,18,19,20,21
		b:	, , , , , , , , , , , ,16,17,18,19,20,
	SACRIFICED BY DESIGN 8/12/03	a:	, , , , , , , , , , , , , , , , ,21
31			
	SACRIFICED BY DESIGN 8/12/03	a:	, , , , , , , , , , , , , , , , ,21
40			
	SACRIFICED BY DESIGN 8/12/03	a:	, , , , , , , , , , , , , , , , ,21
41			
	SACRIFICED BY DESIGN 8/12/03	a:	, , , , , , , , , , , , , , , , ,21
52			
	SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , ,21
53			
	SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , ,21
56			
	SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , ,21
60			
	SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , ,21
64			
	SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP I: 0 PPM

ANIMAL NUMBER:	OBSERVATION	DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
67	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , , ,21
69	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , , ,21
70	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , , ,21
77	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , , ,21
80	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , , ,21
84	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP II: 1 PPM

ANIMAL NUMBER:	OBSERVATION	DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
4	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
7	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
10	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
14	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
17	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
22	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
26	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
29	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
32	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
37	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP II: 1 PPM

ANIMAL NUMBER:	OBSERVATION	DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
39	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , ,21
50	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , ,21
51	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , ,21
54	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , ,21
57	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , ,21
62	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , ,21
66	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , ,21
68	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , ,21
74	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , ,21
81	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP II: 1 PPM

ANIMAL NUMBER:	OBSERVATION	DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
83		
SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21
85		
SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP III: 10 PPM

ANIMAL NUMBER:	OBSERVATION	DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
2	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
3	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
5	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
11	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
21	SACRIFICED BY DESIGN 8/11/03	a: , , , , , , , , , , , , , , , , , ,21
24	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
27	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
34	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
35	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
42	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP III: 10 PPM

ANIMAL NUMBER:	OBSERVATION	DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
43		
SACRIFICED BY DESIGN 8/12/03	a:	, , , , , , , , , , , , , , , , , ,21
48		
SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , , ,21
49		
SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , , ,21
58		
SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , , ,21
59		
SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , , ,21
61		
SACRIFICED BY DESIGN 8/13/03	a:	, , , , , , , , , , , , , , , , , ,21
71		
SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21
72		
SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21
76		
SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21
78		
SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP III: 10 PPM

ANIMAL NUMBER:	OBSERVATION	DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
79		
SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21
88		
SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP IV: 50 PPM

ANIMAL NUMBER:	OBSERVATION		DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
6			
SACRIFICED BY DESIGN 8/11/03		a:	, , , , , , , , , , , , , , , , , ,21
8			
	ALOPECIA ABDOMINAL	a:	, , , , , , ,11,12,13,14, , , , , , ,
		b:	, , , , , , ,11,12,13,14, , , , , , ,
	ALOPECIA BOTH SIDE	a:	, , , , , , ,11,12,13,14,15,16,17,18,19,20,21
		b:	, , , , , , ,11,12,13,14,15,16,17,18,19,20,
	ALOPECIA UNDERBODY	a:	, , , , , , , , , , ,15,16,17,18,19,20,21
		b:	, , , , , , , , , , ,15,16,17,18,19,20,
	ALOPECIA BOTH HIND QUARTERS	a:	, , , , , , , , , , , , , ,18,19,20,21
		b:	, , , , , , , , , , , , , ,18,19,20,
	SACRIFICED BY DESIGN 8/11/03	a:	, , , , , , , , , , , , , , , , , ,21
9			
SACRIFICED BY DESIGN 8/11/03		a:	, , , , , , , , , , , , , , , , , ,21
12			
SACRIFICED BY DESIGN 8/11/03		a:	, , , , , , , , , , , , , , , , , ,21
18			
SACRIFICED BY DESIGN 8/11/03		a:	, , , , , , , , , , , , , , , , , ,21
20			
SACRIFICED BY DESIGN 8/11/03		a:	, , , , , , , , , , , , , , , , , ,21
30			
SACRIFICED BY DESIGN 8/12/03		a:	, , , , , , , , , , , , , , , , , ,21
33			
SACRIFICED BY DESIGN 8/12/03		a:	, , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP IV: 50 PPM

ANIMAL NUMBER:	OBSERVATION	DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
36	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
38	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
44	SACRIFICED BY DESIGN 8/12/03	a: , , , , , , , , , , , , , , , , , ,21
45	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , , ,21
46	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , , ,21
47	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , , ,21
55	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , , ,21
63	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , , ,21
65	SACRIFICED BY DESIGN 8/13/03	a: , , , , , , , , , , , , , , , , , ,21
73	SACRIFICED BY DESIGN 8/14/03	a: , , , , , , , , , , , , , , , , , ,21

INDIVIDUAL CLINICAL OBSERVATIONS

GROUP IV: 50 PPM

ANIMAL NUMBER:	OBSERVATION		DAYS OF GESTATION ON WHICH SIGN WAS OBSERVED: 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
75			
	SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21
82			
	SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21
86			
	SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21
87			
	ALOPECIA LEFT SIDE	a:	, , , , , , , , , ,13,14,15,16,17,18,19,20,21
		b:	, , , , , , , , , ,13,14,15,16,17,18,19,20,
	ALOPECIA ABDOMINAL	a:	, , , , , , , , , ,13,14,15,16,17,18,19,20,21
		b:	, , , , , , , , , ,13,14,15,16,17,18,19,20,
	SACRIFICED BY DESIGN 8/14/03	a:	, , , , , , , , , , , , , , , , , ,21

APPENDIX F

Individual Adult Body Weights

Individual Adult Body Weights

Explanatory Notes

Notes

Reporting of body weight data that were collected prior to study start (Day 6G) are limited to Day 0 and Day 4G because weight data are available for all animals on these days. Any additional body weight data collected for the separate breeding lots of animals on days prior to Day 6G are available in the raw data.

Day C21 = Corrected final maternal body weight = final maternal body weight minus the gravid uterine weight plus the empty uterine weight.

Abbreviation

--- = No data

INDIVIDUAL ADULT BODY WEIGHTS

GROUP I: 0 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 0	DAY 4	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10
1	230.0	238.7	249.8	262.7	264.4	271.8	275.5
13	242.0	271.1	282.0	289.9	293.2	300.4	311.3
15	238.0	259.0	276.3	283.2	287.0	289.1	299.0
16	240.0	261.2	276.8	280.4	285.8	292.4	295.4
19	220.0	235.6	261.8	271.5	280.1	281.5	294.5
23	240.0	255.2	277.7	285.9	285.3	293.9	297.4
25	244.0	249.3	280.5	283.3	290.5	300.7	303.6
28	250.0	260.6	283.1	286.7	296.3	308.2	315.9
31	265.0	277.2	296.0	293.0	302.8	301.8	307.9
40	249.0	278.5	295.6	304.1	304.6	311.7	317.8
41	247.0	255.9	279.6	281.7	285.0	291.5	294.9
52	229.0	253.8	265.6	269.7	276.7	279.3	285.8
53	243.0	264.6	279.0	280.4	287.5	290.2	301.9
56	245.0	260.6	276.4	279.5	284.8	292.9	297.3
60	224.0	245.2	247.8	254.9	259.4	262.9	267.4
64	220.0	236.8	250.7	258.3	263.7	268.2	273.1
67	239.0	235.0	257.7	262.7	270.4	280.0	282.0
69	242.0	270.1	276.8	281.3	285.1	295.7	297.4
70	257.0	273.7	287.5	286.9	295.1	302.1	305.5
77	253.0	272.5	286.8	292.7	299.7	308.0	309.7
80	246.0	257.6	274.3	278.2	279.9	281.4	285.0
84	233.0	252.3	265.6	267.8	272.9	281.6	286.7

INDIVIDUAL ADULT BODY WEIGHTS

GROUP I: 0 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 11	DAY 12	DAY 13	DAY 14	DAY 15	DAY 16	DAY 17
1	285.2	288.2	293.4	297.9	306.4	316.4	332.4
13	317.8	326.8	332.2	336.8	347.5	360.5	365.9
15	307.8	311.6	319.2	320.9	334.9	347.6	357.9
16	303.8	308.6	309.0	313.2	327.8	341.2	354.4
19	313.8	317.1	326.9	331.3	344.6	359.0	375.4
23	306.3	312.6	320.5	329.3	331.8	341.0	356.0
25	316.3	329.4	329.1	338.8	346.5	350.1	367.8
28	326.5	335.8	335.7	344.7	354.8	363.1	382.6
31	312.3	316.9	325.7	330.6	337.5	345.9	359.8
40	321.1	328.7	333.0	341.1	350.9	362.5	374.8
41	305.4	308.2	314.2	321.7	329.5	342.1	357.5
52	295.9	301.8	310.5	316.2	317.4	332.0	343.5
53	306.7	310.3	318.4	324.5	333.0	348.2	359.2
56	300.1	307.0	316.7	321.0	333.5	346.4	362.4
60	268.0	272.9	273.4	279.5	284.0	296.4	315.6
64	281.0	279.1	288.3	295.9	302.1	315.9	330.1
67	287.0	291.3	295.8	299.3	307.2	311.1	328.7
69	299.8	306.7	308.5	314.3	321.0	330.1	340.8
70	311.6	313.3	316.6	319.6	327.5	336.5	343.1
77	310.5	316.4	326.0	333.0	345.1	359.5	372.8
80	292.4	293.5	297.9	305.7	312.1	321.7	331.9
84	289.4	297.7	307.6	317.5	324.6	337.5	352.8

INDIVIDUAL ADULT BODY WEIGHTS

GROUP I: 0 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 18	DAY 19	DAY 20	DAY 21	DAY C21
1	350.0	364.6	383.3	403.9	297.6
13	385.8	396.1	417.2	439.4	348.9
15	375.7	391.4	409.7	430.2	321.5
16	370.6	391.6	411.0	427.7	315.8
19	396.0	417.3	436.0	463.1	359.0
23	377.8	384.9	399.9	421.0	320.8
25	383.6	400.8	417.3	421.1	328.9
28	401.0	412.5	432.8	456.5	362.2
31	374.0	389.1	400.7	424.6	350.8
40	393.9	410.1	428.7	436.0	328.9
41	372.0	388.6	397.3	425.0	336.3
52	358.7	371.6	386.1	402.9	318.1
53	372.5	388.0	402.0	415.0	327.1
56	374.9	386.9	408.0	418.8	324.4
60	327.3	345.4	361.1	373.1	280.9
64	346.8	358.3	375.3	393.2	304.3
67	342.5	352.2	366.3	378.4	289.5
69	350.3	361.3	372.5	392.5	319.9
70	360.0	366.2	384.9	400.4	325.1
77	392.7	404.8	426.6	443.8	332.7
80	345.2	359.6	373.5	393.5	311.8
84	375.4	388.6	410.6	427.1	323.8

INDIVIDUAL ADULT BODY WEIGHTS

GROUP II: 1 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 0	DAY 4	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10
4	228.0	237.0	253.4	253.7	260.5	266.0	266.5
7	232.0	246.7	263.0	266.9	274.9	278.8	286.6
10	228.0	245.1	259.9	262.5	267.0	274.7	279.1
14	252.0	250.5	278.8	294.5	301.2	305.8	315.0
17	233.0	251.1	270.0	269.6	274.8	280.1	289.3
22	221.0	219.3	205.4	229.6	239.6	243.1	252.0
26	241.0	244.4	266.5	272.1	271.6	274.9	283.3
29	247.0	258.5	282.0	283.7	284.9	294.9	303.4
32	250.0	259.0	281.5	285.5	288.8	291.3	300.7
37	266.0	237.5	280.1	287.9	294.7	304.6	313.4
39	240.0	258.5	279.4	283.5	286.9	296.4	302.4
50	251.0	267.8	283.5	284.6	294.9	293.8	304.7
51	240.0	263.0	274.2	284.3	281.6	282.3	287.5
54	234.0	267.7	283.4	285.7	289.7	296.3	302.7
57	241.0	268.1	273.7	278.2	278.7	284.6	284.7
62	226.0	258.6	269.8	281.0	284.9	288.2	294.6
66	216.0	232.7	241.8	248.5	250.7	249.7	255.9
68	251.0	276.3	290.5	294.7	296.6	296.1	302.4
74	240.0	272.3	291.7	295.1	296.6	307.3	309.9
81	231.0	250.7	266.8	269.9	276.9	278.3	284.6
83	260.0	286.0	293.8	294.5	297.4	301.0	303.7
85	254.0	286.7	297.1	300.0	302.5	310.9	314.1

INDIVIDUAL ADULT BODY WEIGHTS

GROUP II: 1 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 11	DAY 12	DAY 13	DAY 14	DAY 15	DAY 16	DAY 17
4	276.2	279.5	281.8	286.2	297.2	306.0	319.4
7	295.9	301.6	304.4	312.0	321.0	331.7	344.9
10	286.2	290.3	291.4	296.7	302.8	308.8	320.7
14	324.9	333.3	341.4	340.8	354.2	371.2	381.8
17	293.3	300.7	301.2	304.2	313.5	324.5	336.4
22	260.9	270.6	275.3	277.5	290.3	300.0	312.9
26	291.3	295.9	301.0	307.4	318.7	329.0	341.3
29	307.5	313.3	318.6	325.2	336.0	344.2	358.0
32	302.6	312.7	316.3	316.0	330.9	341.5	359.0
37	324.1	331.0	339.7	349.6	365.2	375.4	391.2
39	310.8	318.5	325.7	331.8	337.7	345.9	366.2
50	310.7	316.4	327.0	331.7	340.8	351.8	365.6
51	289.9	293.3	298.7	310.5	314.6	335.9	344.5
54	311.8	312.3	320.1	330.1	334.9	350.3	357.3
57	299.8	300.6	307.5	312.5	324.4	328.5	346.0
62	307.3	307.7	313.3	323.3	328.5	335.8	347.5
66	260.5	265.2	269.5	277.9	281.4	297.4	308.9
68	306.5	312.3	313.3	321.3	330.8	334.8	348.9
74	315.1	324.2	333.9	340.0	356.4	363.7	377.6
81	289.7	296.7	298.6	303.4	312.8	325.3	340.5
83	308.6	312.4	315.0	320.8	330.5	336.6	352.3
85	313.2	322.3	330.2	327.3	343.7	350.9	365.5

INDIVIDUAL ADULT BODY WEIGHTS

GROUP II: 1 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 18	DAY 19	DAY 20	DAY 21	DAY C21
4	332.4	351.2	363.2	374.7	287.4
7	357.1	374.4	396.7	407.6	306.0
10	335.7	350.2	372.9	390.4	299.2
14	404.0	422.5	440.2	463.7	346.2
17	350.3	368.6	378.2	395.3	---[a]
22	333.0	345.9	362.9	379.9	293.1
26	358.9	375.8	392.4	417.1	305.2
29	375.9	391.0	409.4	431.8	327.2
32	372.8	387.3	409.5	425.6	327.5
37	412.3	433.2	451.7	470.7	342.7
39	386.9	402.7	416.6	436.6	331.4
50	383.2	401.1	409.9	405.3	303.2
51	368.5	382.0	398.0	417.3	305.1
54	373.5	392.7	411.0	424.5	322.7
57	361.1	370.9	393.1	407.1	312.9
62	361.5	374.0	385.4	405.3	335.5
66	324.8	339.0	350.4	369.5	267.3
68	362.4	371.4	386.4	401.3	313.4
74	393.3	412.0	428.8	447.4	343.0
81	359.9	376.7	398.1	414.1	297.8
83	371.4	382.6	399.5	421.3	318.1
85	376.9	390.5	400.9	424.4	335.4

a The empty uterus weight was not determined; therefore, the corrected body weight cannot be calculated.

INDIVIDUAL ADULT BODY WEIGHTS

GROUP III: 10 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 0	DAY 4	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10
2	231.0	244.0	259.5	257.0	262.3	266.8	271.1
3	244.0	254.1	269.1	271.6	273.7	280.7	282.1
5	232.0	254.8	272.2	269.1	274.5	277.0	279.2
11	251.0	262.4	283.7	289.6	296.3	299.2	306.6
21	223.0	227.2	257.7	255.0	261.2	264.6	269.5
24	247.0	269.3	290.3	296.2	298.1	305.5	314.0
27	262.0	277.6	302.1	304.7	304.9	315.0	321.6
34	255.0	246.7	273.5	283.6	284.3	296.1	297.8
35	250.0	261.8	279.0	282.4	283.9	291.3	297.8
42	239.0	245.0	266.0	268.4	269.9	278.8	287.3
43	246.0	264.7	279.8	290.1	293.4	301.5	304.7
48	233.0	253.1	258.3	261.6	262.9	267.9	271.6
49	257.0	285.6	303.7	312.7	311.9	317.1	327.2
58	241.0	265.1	285.5	289.1	291.1	298.3	306.6
59	215.0	233.0	236.0	236.1	238.6	239.4	239.6
61	225.0	252.7	271.0	272.9	274.4	283.8	286.7
71	240.0	266.0	279.2	283.1	279.2	281.1	290.1
72	252.0	271.8	278.2	276.7	282.2	282.9	286.6
76	238.0	264.5	278.4	272.5	277.3	280.1	288.0
78	239.0	265.7	278.0	279.1	286.0	291.9	297.9
79	245.0	277.5	286.1	284.7	288.6	294.9	298.5
88	272.0	297.5	311.4	315.9	319.7	327.9	335.5

INDIVIDUAL ADULT BODY WEIGHTS

GROUP III: 10 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 11	DAY 12	DAY 13	DAY 14	DAY 15	DAY 16	DAY 17
2	275.1	287.2	290.1	293.9	300.7	311.4	313.4
3	288.0	296.7	302.4	306.3	311.2	324.5	332.5
5	288.7	293.0	296.0	298.9	308.4	327.4	336.0
11	314.1	318.6	323.2	328.4	339.1	349.5	365.1
21	277.7	283.3	293.7	292.2	304.1	313.1	326.2
24	321.2	331.9	330.2	339.6	352.6	359.8	376.2
27	328.3	334.5	335.2	343.3	352.2	359.8	378.8
34	309.2	315.2	317.8	324.4	330.7	345.5	355.1
35	303.9	311.9	312.8	320.9	329.1	340.7	356.5
42	298.4	301.1	307.3	311.6	318.1	328.6	342.7
43	312.9	316.5	316.2	321.2	332.8	346.9	360.9
48	277.3	276.2	289.4	294.7	297.7	309.7	319.5
49	338.2	346.0	355.4	364.0	376.1	389.7	400.9
58	315.0	315.5	327.1	331.1	339.6	358.0	374.6
59	249.4	251.8	260.1	267.6	271.3	285.4	295.9
61	296.3	300.1	307.5	316.2	321.3	334.1	343.1
71	290.0	303.3	297.5	302.8	311.5	318.5	331.0
72	286.7	296.7	302.1	305.2	313.5	323.6	337.3
76	297.8	308.5	306.9	315.3	323.5	328.7	345.4
78	304.3	313.2	316.5	321.8	331.2	338.4	352.6
79	299.0	308.1	309.3	315.0	324.2	333.8	346.7
88	342.1	343.8	351.2	361.4	367.0	381.7	396.8

INDIVIDUAL ADULT BODY WEIGHTS

GROUP III: 10 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 18	DAY 19	DAY 20	DAY 21	DAY C21
2	325.4	336.9	346.3	365.2	300.2
3	360.4	374.8	392.6	400.8	284.7
5	349.4	370.6	382.8	397.5	304.4
11	383.9	399.5	423.3	440.8	330.2
21	337.8	352.1	372.7	380.5	284.4
24	391.4	400.7	417.6	436.3	338.7
27	396.8	412.1	434.7	456.2	343.2
34	364.5	378.6	399.3	420.5	338.8
35	370.4	388.4	408.8	433.3	320.5
42	360.6	376.4	395.6	404.1	316.1
43	381.7	399.0	412.8	437.3	313.9
48	328.3	343.9	359.8	376.1	299.8
49	417.2	434.7	450.8	478.3	384.0
58	393.3	417.3	434.6	462.9	338.9
59	313.9	322.5	340.8	360.9	266.7
61	360.1	372.5	388.2	413.6	315.5
71	342.9	355.5	375.7	400.0	304.1
72	355.5	365.3	377.1	390.9	299.0
76	361.6	385.1	397.0	410.5	323.1
78	367.5	379.5	398.7	421.3	313.6
79	354.9	374.8	383.8	408.4	318.2
88	412.9	422.7	438.6	472.3	396.8

INDIVIDUAL ADULT BODY WEIGHTS

GROUP IV: 50 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 0	DAY 4	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10
6	239.0	234.9	272.8	238.8	224.9	251.2	254.3
8	257.0	253.7	280.4	267.4	268.9	273.7	284.5
9	232.0	240.5	257.3	241.1	247.4	254.5	258.2
12	231.0	243.0	259.5	239.5	239.3	252.1	255.0
18	227.0	214.5	239.5	218.0	232.3	236.2	246.2
20	220.0	234.9	253.4	238.0	229.6	236.8	248.6
30	266.0	276.0	293.8	282.4	285.8	291.4	296.9
33	246.0	260.3	274.9	263.4	263.4	271.3	283.2
36	251.0	261.8	284.3	269.5	264.4	267.0	270.3
38	264.0	276.8	292.9	286.3	287.6	294.6	303.8
44	232.0	246.6	263.4	255.4	251.8	262.1	270.8
45	235.0	252.2	263.6	256.7	257.0	259.6	266.0
46	243.0	268.3	279.5	267.6	267.6	269.5	270.1
47	254.0	271.7	286.6	280.8	267.1	280.7	287.4
55	236.0	264.3	280.1	262.2	255.0	272.0	277.4
63	225.0	247.4	255.6	242.4	242.0	250.3	252.3
65	218.0	233.3	238.9	224.9	225.0	236.2	243.8
73	253.0	262.4	276.6	264.6	270.9	272.8	278.0
75	236.0	244.6	271.0	235.4	216.4	250.1	262.2
82	255.0	284.1	301.0	281.9	287.8	286.0	291.8
86	244.0	274.8	286.6	274.9	277.6	283.5	289.0
87	246.0	268.9	289.3	268.2	268.7	276.0	279.5

INDIVIDUAL ADULT BODY WEIGHTS

GROUP IV: 50 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 11	DAY 12	DAY 13	DAY 14	DAY 15	DAY 16	DAY 17
6	269.5	276.9	281.7	284.2	298.5	309.6	325.0
8	297.0	295.5	297.9	297.1	309.2	324.8	330.9
9	268.6	264.5	274.7	269.0	280.7	291.5	301.0
12	263.9	271.1	270.4	268.9	282.3	292.8	301.7
18	259.1	266.3	269.8	270.4	283.5	295.0	305.8
20	253.6	255.3	255.9	250.9	260.2	268.6	276.7
30	302.9	316.4	312.7	307.6	317.1	326.2	339.7
33	288.0	290.0	291.6	300.6	306.2	313.6	324.7
36	271.2	281.7	287.3	295.0	302.8	316.8	328.3
38	306.7	309.4	310.9	315.6	321.1	327.8	344.4
44	278.4	283.2	286.7	289.3	296.1	297.8	313.2
45	272.9	273.5	280.7	284.9	286.9	292.9	305.8
46	277.4	278.7	285.1	295.6	299.7	312.9	321.7
47	289.2	290.1	296.8	299.9	305.0	316.0	320.4
55	277.2	275.1	289.2	293.7	296.8	305.8	314.9
63	259.4	265.5	267.1	274.6	275.3	287.8	298.3
65	248.5	246.3	252.1	255.7	259.6	270.5	276.3
73	276.7	285.9	295.5	295.9	302.2	314.4	326.1
75	267.3	284.1	290.3	302.7	303.6	316.3	330.1
82	282.7	293.4	303.8	299.1	302.3	323.4	333.3
86	290.3	289.4	298.8	300.9	303.5	310.9	320.5
87	288.7	292.2	302.7	308.9	323.0	332.7	346.5

INDIVIDUAL ADULT BODY WEIGHTS

GROUP IV: 50 PPM

ANIMAL NUMBER	DAYS OF GESTATION DAY 18	DAY 19	DAY 20	DAY 21	DAY C21
6	342.2	353.4	367.9	389.5	305.4
8	345.0	355.1	360.4	376.5	287.3
9	309.0	326.2	330.6	350.7	266.5
12	316.9	330.6	343.3	360.2	269.8
18	318.1	335.6	347.1	363.5	272.8
20	285.4	294.3	303.7	311.8	240.9
30	351.4	366.0	383.3	398.7	313.8
33	339.1	353.1	362.8	378.2	306.1
36	345.4	359.2	368.3	379.8	282.2
38	353.1	364.5	378.4	393.7	305.5
44	326.3	339.1	352.5	372.5	287.6
45	314.0	325.0	334.5	349.9	293.5
46	338.9	349.6	358.5	375.6	289.5
47	342.0	366.7	379.3	401.9	299.8
55	324.1	336.7	349.5	368.4	291.1
63	311.6	323.2	336.4	347.6	258.8
65	287.2	306.4	313.3	330.3	267.7
73	335.8	353.5	365.0	384.9	281.6
75	346.4	363.2	386.5	404.7	296.3
82	352.8	370.7	381.1	405.5	307.4
86	333.2	342.3	352.0	376.9	293.9
87	363.2	376.9	388.9	399.2	289.2

APPENDIX G

Individual Adult Body Weight Changes

Individual Adult Body Weight Changes

Explanatory Notes

Note

Reporting of body weight/body weight change data that were collected prior to study start (Day 6G) are limited to Day 0 and Day 4G because weight data are available for all animals on these days. Any additional body weight data collected for the separate breeding lots of animals on days prior to Day 6G are available in the raw data.

6-C21 = Corrected final maternal body weight = final maternal body weight minus the gravid uterine weight plus the empty uterine weight.

Abbreviation

--- = No data

INDIVIDUAL ADULT BODY WEIGHT CHANGES

GROUP I: 0 PPM

ANIMAL NUMBER	DAYS OF GESTATION 0-4	4-6	6-8	8-10	10-12	12-14	14-16
1	8.7	11.1	14.6	11.1	12.7	9.7	18.5
13	29.1	10.9	11.2	18.1	15.5	10.0	23.7
15	21.0	17.3	10.7	12.0	12.6	9.3	26.7
16	21.2	15.6	9.0	9.6	13.2	4.6	28.0
19	15.6	26.2	18.3	14.4	22.6	14.2	27.7
23	15.2	22.5	7.6	12.1	15.2	16.7	11.7
25	5.3	31.2	10.0	13.1	25.8	9.4	11.3
28	10.6	22.5	13.2	19.6	19.9	8.9	18.4
31	12.2	18.8	6.8	5.1	9.0	13.7	15.3
40	29.5	17.1	9.0	13.2	10.9	12.4	21.4
41	8.9	23.7	5.4	9.9	13.3	13.5	20.4
52	24.8	11.8	11.1	9.1	16.0	14.4	15.8
53	21.6	14.4	8.5	14.4	8.4	14.2	23.7
56	15.6	15.8	8.4	12.5	9.7	14.0	25.4
60	21.2	2.6	11.6	8.0	5.5	6.6	16.9
64	16.8	13.9	13.0	9.4	6.0	16.8	20.0
67	-4.0	22.7	12.7	11.6	9.3	8.0	11.8
69	28.1	6.7	8.3	12.3	9.3	7.6	15.8
70	16.7	13.8	7.6	10.4	7.8	6.3	16.9
77	19.5	14.3	12.9	10.0	6.7	16.6	26.5
80	11.6	16.7	5.6	5.1	8.5	12.2	16.0
84	19.3	13.3	7.3	13.8	11.0	19.8	20.0

INDIVIDUAL ADULT BODY WEIGHT CHANGES

GROUP I: 0 PPM

ANIMAL NUMBER	DAYS OF GESTATION 16-18	18-21	6-21	6-C21
1	33.6	53.9	154.1	47.8
13	25.3	53.6	157.4	66.9
15	28.1	54.5	153.9	45.2
16	29.4	57.1	150.9	39.0
19	37.0	67.1	201.3	97.2
23	36.8	43.2	143.3	43.1
25	33.5	37.5	140.6	48.4
28	37.9	55.5	173.4	79.1
31	28.1	50.6	128.6	54.8
40	31.4	42.1	140.4	33.3
41	29.9	53.0	145.4	56.7
52	26.7	44.2	137.3	52.5
53	24.3	42.5	136.0	48.1
56	28.5	43.9	142.4	48.0
60	30.9	45.8	125.3	33.1
64	30.9	46.4	142.5	53.6
67	31.4	35.9	120.7	31.8
69	20.2	42.2	115.7	43.1
70	23.5	40.4	112.9	37.6
77	33.2	51.1	157.0	45.9
80	23.5	48.3	119.2	37.5
84	37.9	51.7	161.5	58.2

INDIVIDUAL ADULT BODY WEIGHT CHANGES

GROUP II: 1 PPM

ANIMAL NUMBER	DAYS OF GESTATION 0-4	4-6	6-8	8-10	10-12	12-14	14-16
4	9.0	16.4	7.1	6.0	13.0	6.7	19.8
7	14.7	16.3	11.9	11.7	15.0	10.4	19.7
10	17.1	14.8	7.1	12.1	11.2	6.4	12.1
14	-1.5	28.3	22.4	13.8	18.3	7.5	30.4
17	18.1	18.9	4.8	14.5	11.4	3.5	20.3
22	-1.7	-13.9	34.2	12.4	18.6	6.9	22.5
26	3.4	22.1	5.1	11.7	12.6	11.5	21.6
29	11.5	23.5	2.9	18.5	9.9	11.9	19.0
32	9.0	22.5	7.3	11.9	12.0	3.3	25.5
37	-28.5	42.6	14.6	18.7	17.6	18.6	25.8
39	18.5	20.9	7.5	15.5	16.1	13.3	14.1
50	16.8	15.7	11.4	9.8	11.7	15.3	20.1
51	23.0	11.2	7.4	5.9	5.8	17.2	25.4
54	33.7	15.7	6.3	13.0	9.6	17.8	20.2
57	27.1	5.6	5.0	6.0	15.9	11.9	16.0
62	32.6	11.2	15.1	9.7	13.1	15.6	12.5
66	16.7	9.1	8.9	5.2	9.3	12.7	19.5
68	25.3	14.2	6.1	5.8	9.9	9.0	13.5
74	32.3	19.4	4.9	13.3	14.3	15.8	23.7
81	19.7	16.1	10.1	7.7	12.1	6.7	21.9
83	26.0	7.8	3.6	6.3	8.7	8.4	15.8
85	32.7	10.4	5.4	11.6	8.2	5.0	23.6

INDIVIDUAL ADULT BODY WEIGHT CHANGES

GROUP II: 1 PPM

ANIMAL NUMBER	DAYS OF GESTATION 16-18	18-21	6-21	6-C21
4	26.4	42.3	121.3	34.0
7	25.4	50.5	144.6	43.0
10	26.9	54.7	130.5	39.3
14	32.8	59.7	184.9	67.4
17	25.8	45.0	125.3	---[a]
22	33.0	46.9	174.5	87.7
26	29.9	58.2	150.6	38.7
29	31.7	55.9	149.8	45.2
32	31.3	52.8	144.1	46.0
37	36.9	58.4	190.6	62.6
39	41.0	49.7	157.2	52.0
50	31.4	22.1	121.8	19.7
51	32.6	48.8	143.1	30.9
54	23.2	51.0	141.1	39.3
57	32.6	46.0	133.4	39.2
62	25.7	43.8	135.5	65.7
66	27.4	44.7	127.7	25.5
68	27.6	38.9	110.8	22.9
74	29.6	54.1	155.7	51.3
81	34.6	54.2	147.3	31.0
83	34.8	49.9	127.5	24.4
85	26.0	47.5	127.3	38.3

a The empty uterus weight was inadvertently not determined; therefore, the corrected body weight cannot be calculated.

INDIVIDUAL ADULT BODY WEIGHT CHANGES

GROUP III: 10 PPM

ANIMAL NUMBER	DAYS OF GESTATION 0-4	4-6	6-8	8-10	10-12	12-14	14-16
2	13.0	15.5	2.8	8.8	16.1	6.7	17.5
3	10.1	15.0	4.6	8.4	14.6	9.6	18.2
5	22.8	17.4	2.3	4.7	13.8	5.9	28.5
11	11.4	21.3	12.6	10.3	12.0	9.8	21.1
21	4.2	30.5	3.5	8.3	13.8	8.9	20.9
24	22.3	21.0	7.8	15.9	17.9	7.7	20.2
27	15.6	24.5	2.8	16.7	12.9	8.8	16.5
34	-8.3	26.8	10.8	13.5	17.4	9.2	21.1
35	11.8	17.2	4.9	13.9	14.1	9.0	19.8
42	6.0	21.0	3.9	17.4	13.8	10.5	17.0
43	18.7	15.1	13.6	11.3	11.8	4.7	25.7
48	20.1	5.2	4.6	8.7	4.6	18.5	15.0
49	28.6	18.1	8.2	15.3	18.8	18.0	25.7
58	24.1	20.4	5.6	15.5	8.9	15.6	26.9
59	18.0	3.0	2.6	1.0	12.2	15.8	17.8
61	27.7	18.3	3.4	12.3	13.4	16.1	17.9
71	26.0	13.2	0.0	10.9	13.2	-0.5	15.7
72	19.8	6.4	4.0	4.4	10.1	8.5	18.4
76	26.5	13.9	-1.1	10.7	20.5	6.8	13.4
78	26.7	12.3	8.0	11.9	15.3	8.6	16.6
79	32.5	8.6	2.5	9.9	9.6	6.9	18.8
88	25.5	13.9	8.3	15.8	8.3	17.6	20.3

INDIVIDUAL ADULT BODY WEIGHT CHANGES

GROUP III: 10 PPM

ANIMAL NUMBER	DAYS OF GESTATION 16-18	18-21	6-21	6-C21
2	14.0	39.8	105.7	40.7
3	35.9	40.4	131.7	15.6
5	22.0	48.1	125.3	32.2
11	34.4	56.9	157.1	46.5
21	24.7	42.7	122.8	26.7
24	31.6	44.9	146.0	48.4
27	37.0	59.4	154.1	41.1
34	19.0	56.0	147.0	65.3
35	29.7	62.9	154.3	41.5
42	32.0	43.5	138.1	50.1
43	34.8	55.6	157.5	34.1
48	18.6	47.8	117.8	41.5
49	27.5	61.1	174.6	80.3
58	35.3	69.6	177.4	53.4
59	28.5	47.0	124.9	30.7
61	26.0	53.5	142.6	44.5
71	24.4	57.1	120.8	24.9
72	31.9	35.4	112.7	20.8
76	32.9	48.9	132.1	44.7
78	29.1	53.8	143.3	35.6
79	21.1	53.5	122.3	32.1
88	31.2	59.4	160.9	85.4

INDIVIDUAL ADULT BODY WEIGHT CHANGES

GROUP IV: 50 PPM

ANIMAL NUMBER	DAYS OF GESTATION 0-4	4-6	6-8	8-10	10-12	12-14	14-16
6	-4.1	37.9	-47.9	29.4	22.6	7.3	25.4
8	-3.3	26.7	-11.5	15.6	11.0	1.6	27.7
9	8.5	16.8	-9.9	10.8	6.3	4.5	22.5
12	12.0	16.5	-20.2	15.7	16.1	-2.2	23.9
18	-12.5	25.0	-7.2	13.9	20.1	4.1	24.6
20	14.9	18.5	-23.8	19.0	6.7	-4.4	17.7
30	10.0	17.8	-8.0	11.1	19.5	-8.8	18.6
33	14.3	14.6	-11.5	19.8	6.8	10.6	13.0
36	10.8	22.5	-19.9	5.9	11.4	13.3	21.8
38	12.8	16.1	-5.3	16.2	5.6	6.2	12.2
44	14.6	16.8	-11.6	19.0	12.4	6.1	8.5
45	17.2	11.4	-6.6	9.0	7.5	11.4	8.0
46	25.3	11.2	-11.9	2.5	8.6	16.9	17.3
47	17.7	14.9	-19.5	20.3	2.7	9.8	16.1
55	28.3	15.8	-25.1	22.4	-2.3	18.6	12.1
63	22.4	8.2	-13.6	10.3	13.2	9.1	13.2
65	15.3	5.6	-13.9	18.8	2.5	9.4	14.8
73	9.4	14.2	-5.7	7.1	7.9	10.0	18.5
75	8.6	26.4	-54.6	45.8	21.9	18.6	13.6
82	29.1	16.9	-13.2	4.0	1.6	5.7	24.3
86	30.8	11.8	-9.0	11.4	0.4	11.5	10.0
87	22.9	20.4	-20.6	10.8	12.7	16.7	23.8

INDIVIDUAL ADULT BODY WEIGHT CHANGES

GROUP IV: 50 PPM

ANIMAL NUMBER	DAYS OF GESTATION 16-18	18-21	6-21	6-C21
6	32.6	47.3	116.7	32.6
8	20.2	31.5	96.1	6.9
9	17.5	41.7	93.4	9.2
12	24.1	43.3	100.7	10.3
18	23.1	45.4	124.0	33.3
20	16.8	26.4	58.4	-12.5
30	25.2	47.3	104.9	20.0
33	25.5	39.1	103.3	31.2
36	28.6	34.4	95.5	-2.1
38	25.3	40.6	100.8	12.6
44	28.5	46.2	109.1	24.3
45	21.1	35.9	86.3	29.8
46	26.0	36.7	96.1	10.0
47	26.0	59.9	115.3	13.1
55	18.3	44.3	88.3	11.0
63	23.8	36.0	92.0	3.1
65	16.7	43.1	91.4	28.8
73	21.4	49.1	108.3	5.0
75	30.1	58.3	133.7	25.3
82	29.4	52.7	104.5	6.4
86	22.3	43.7	90.3	7.3
87	30.5	36.0	109.9	-0.1

APPENDIX H

Individual Daily Food Consumption

INDIVIDUAL DAILY FOOD CONSUMPTION

GROUP I: 0 PPM

ANIMAL NUMBER	DAYS OF GESTATION 4-6	6-8	8-10	10-12	12-14	14-16	16-18
1	21.9	24.3	26.4	26.4	27.9	27.2	29.1
13	23.3	22.5	25.8	26.5	27.8	29.8	28.0
15	22.1	23.8	25.4	26.3	25.9	27.4	26.9
16	25.4	23.0	25.4	26.5	25.1	28.6	29.6
19	26.5	27.1	29.2	34.0	36.1	35.2	34.4
23	23.7	23.7	26.9	26.5	30.4	28.4	29.4
25	28.2	27.6	29.5	27.6	29.8	31.3	32.2
28	22.8	26.1	29.8	29.5	29.2	30.7	32.6
31	21.5	24.7	24.5	25.7	27.3	26.9	28.1
40	22.8	26.4	28.1	27.1	29.9	32.0	33.3
41	22.2	24.6	26.9	27.9	27.9	29.7	31.6
52	23.5	26.6	24.7	27.8	30.3	27.6	30.0
53	23.0	23.4	26.3	25.4	28.0	29.5	29.3
56	19.9	23.1	26.4	25.5	28.3	29.9	29.1
60	18.9	21.6	21.2	20.0	19.4	20.4	22.6
64	19.4	24.4	22.3	22.7	25.1	25.4	26.9
67	23.9	22.7	24.3	23.6	23.9	23.3	26.0
69	22.4	22.8	24.9	23.9	24.7	24.1	24.5
70	24.9	24.1	26.9	25.3	28.2	25.6	27.1
77	26.8	29.3	28.4	27.1	33.1	32.1	32.8
80	25.0	23.8	23.1	23.9	26.1	25.9	28.0
84	25.2	22.7	25.2	25.1	29.9	27.7	33.4

INDIVIDUAL DAILY FOOD CONSUMPTION

GROUP I: 0 PPM

ANIMAL NUMBER	DAYS OF GESTATION 18-21	6-21
1	27.2	26.9
13	30.0	27.4
15	26.1	26.0
16	31.3	27.4
19	36.5	33.4
23	28.7	27.8
25	31.8	30.1
28	31.2	29.9
31	29.8	26.9
40	29.5	29.5
41	31.8	28.8
52	28.7	28.0
53	30.4	27.7
56	29.8	27.6
60	23.9	21.5
64	25.7	24.7
67	24.3	24.0
69	23.8	24.1
70	26.9	26.3
77	29.8	30.3
80	29.1	25.9
84	32.0	28.3

INDIVIDUAL DAILY FOOD CONSUMPTION

GROUP II: 1 PPM

ANIMAL NUMBER	DAYS OF GESTATION 4-6	6-8	8-10	10-12	12-14	14-16	16-18
4	22.4	22.3	23.5	25.2	24.1	25.5	25.4
7	22.1	21.9	23.8	27.2	27.6	27.4	27.6
10	22.5	19.3	23.1	24.0	21.9	22.2	25.9
14	15.9	25.3	27.3	30.4	28.8	30.8	30.0
17	26.0	25.1	26.4	27.6	25.7	26.7	27.1
22	0.4	19.4	25.5	27.3	25.8	27.1	29.4
26	22.5	23.2	22.3	26.7	25.9	27.7	29.9
29	25.3	26.1	26.3	26.4	28.1	28.3	29.3
32	22.9	26.0	23.6	26.6	25.2	28.7	29.6
37	21.6	29.9	29.6	31.9	30.8	35.4	36.4
39	23.0	27.2	27.3	29.4	27.4	28.8	31.2
50	23.3	24.5	25.7	24.6	29.1	28.3	29.5
51	24.1	24.3	24.4	23.6	27.5	28.7	29.9
54	22.8	22.5	24.3	24.8	26.8	27.8	25.8
57	22.6	22.6	22.6	26.7	27.1	27.8	31.1
62	25.9	28.2	25.6	27.8	28.3	29.2	29.9
66	18.8	21.4	20.6	21.0	21.8	22.9	23.6
68	24.6	23.9	23.5	23.5	24.2	25.1	26.6
74	30.9	28.9	30.3	29.2	33.1	31.9	34.7
81	26.4	28.3	26.9	26.9	27.4	27.4	29.8
83	21.9	18.4	20.0	18.9	19.7	21.5	24.6
85	30.1	29.7	29.6	26.9	29.4	31.4	33.1

INDIVIDUAL DAILY FOOD CONSUMPTION

GROUP II: 1 PPM

ANIMAL NUMBER	DAYS OF GESTATION 18-21	6-21
4	25.4	24.5
7	28.8	26.5
10	25.7	23.3
14	32.0	29.4
17	26.4	26.4
22	28.7	26.3
26	27.0	26.2
29	29.5	27.8
32	31.5	27.6
37	32.2	32.3
39	29.4	28.7
50	21.8	25.9
51	26.7	26.5
54	27.5	25.8
57	28.8	26.8
62	33.2	29.2
66	22.0	21.9
68	25.2	24.6
74	30.9	31.2
81	29.1	28.1
83	23.3	21.1
85	33.0	30.6

INDIVIDUAL DAILY FOOD CONSUMPTION

GROUP III: 10 PPM

ANIMAL NUMBER	DAYS OF GESTATION 4-6	6-8	8-10	10-12	12-14	14-16	16-18
2	25.7	21.4	22.3	26.1	25.6	23.6	25.1
3	22.7	20.4	21.9	25.1	25.1	25.1	24.8
5	24.5	18.7	20.9	22.9	21.3	24.9	24.4
11	28.7	26.3	26.9	28.5	27.6	29.3	31.2
21	24.0	20.6	24.4	27.6	28.2	28.8	28.8
24	26.2	25.5	27.8	30.6	28.2	32.3	33.3
27	26.6	25.9	26.9	28.5	28.3	29.9	31.8
34	24.7	25.4	25.4	30.2	25.9	30.1	26.9
35	21.7	22.3	24.1	25.0	22.8	26.0	29.1
42	23.1	22.7	27.3	27.8	27.6	29.0	33.3
43	22.8	26.5	26.6	29.3	25.5	28.9	28.3
48	19.8	21.0	22.6	21.5	24.5	25.0	26.0
49	25.5	26.8	26.5	32.9	32.4	35.9	32.9
58	24.2	24.3	25.4	26.3	27.6	28.1	29.9
59	16.8	17.6	19.0	20.1	23.1	22.6	25.5
61	24.8	25.0	26.3	28.3	28.7	27.4	29.3
71	24.9	22.1	23.1	24.4	24.4	25.0	25.6
72	25.3	23.3	24.3	24.3	23.6	26.3	30.7
76	24.8	20.7	23.1	25.1	24.2	24.3	28.8
78	26.3	24.9	26.4	26.3	27.0	24.5	27.8
79	28.1	24.6	27.3	27.6	26.7	27.0	30.9
88	27.8	26.3	28.7	26.5	32.8	29.8	34.1

INDIVIDUAL DAILY FOOD CONSUMPTION

GROUP III: 10 PPM

ANIMAL NUMBER	DAYS OF GESTATION 18-21	6-21
2	26.0	24.4
3	22.8	23.5
5	25.7	22.9
11	28.7	28.4
21	25.6	26.2
24	28.6	29.4
27	30.8	29.0
34	32.3	28.3
35	29.0	25.7
42	30.2	28.4
43	26.2	27.2
48	28.0	24.3
49	35.4	32.1
58	29.3	27.4
59	24.0	21.8
61	29.4	27.9
71	25.7	24.4
72	26.3	25.6
76	27.6	25.0
78	24.8	25.9
79	29.5	27.8
88	35.1	30.8

INDIVIDUAL DAILY FOOD CONSUMPTION

GROUP IV: 50 PPM

ANIMAL NUMBER	DAYS OF GESTATION 4-6	6-8	8-10	10-12	12-14	14-16	16-18
6	12.7	0.4	17.9	25.5	24.4	27.8	31.2
8	15.6	14.2	23.9	27.2	24.3	28.9	34.1
9	22.9	11.9	19.7	19.1	20.0	22.4	23.1
12	21.8	8.8	18.3	20.6	18.1	22.5	25.1
18	17.1	9.6	22.3	27.5	24.9	27.7	29.0
20	23.1	6.4	17.8	17.1	16.5	20.8	21.5
30	23.8	14.8	21.3	27.9	20.7	25.2	27.9
33	23.1	13.7	21.0	23.6	23.2	26.5	27.6
36	24.4	11.8	16.6	20.1	21.4	26.4	28.0
38	23.6	20.8	26.7	27.0	25.1	25.4	26.6
44	21.3	17.4	22.4	23.0	21.3	22.3	24.3
45	22.3	16.5	18.6	21.9	22.2	21.7	25.7
46	24.9	14.8	17.4	19.1	21.9	24.0	26.2
47	27.2	16.6	24.1	21.7	20.8	21.9	23.4
55	29.5	14.7	24.2	20.4	24.0	21.8	24.0
63	19.3	10.1	19.3	21.3	21.1	18.9	17.4
65	17.8	9.9	18.4	20.6	18.2	20.2	20.8
73	25.9	17.1	20.5	19.0	20.9	23.6	24.8
75	30.2	0.9	26.7	28.4	32.1	27.7	32.7
82	28.5	17.3	18.9	19.3	22.3	21.4	32.2
86	26.6	16.8	23.3	21.5	23.7	22.5	25.3
87	25.5	10.3	19.2	21.4	25.9	28.9	30.8

INDIVIDUAL DAILY FOOD CONSUMPTION

GROUP IV: 50 PPM

ANIMAL NUMBER	DAYS OF GESTATION 18-21	6-21
6	29.8	22.9
8	26.1	25.6
9	20.9	19.7
12	23.0	19.7
18	23.9	23.6
20	21.0	17.5
30	28.1	24.0
33	28.7	23.8
36	22.2	21.0
38	26.9	25.6
44	25.1	22.4
45	26.3	22.1
46	23.5	21.1
47	27.8	22.7
55	24.4	22.1
63	18.9	18.2
65	23.5	19.1
73	25.2	21.9
75	29.7	25.7
82	30.0	23.5
86	24.9	22.7
87	23.4	22.9

APPENDIX I

Gross Postmortem Findings

Gross Postmortem Findings

Explanatory Notes

Abbreviations

--- = No Data
NAD = No Abnormalities Detected

GROSS POSTMORTEM FINDINGS

Group I: 0 ppm

Animal Number	Structure(s)	Finding(s)
1	---	NAD
13	---	NAD
15	---	NAD
16	---	NAD
19	---	NAD
23	---	NAD
25	Kidney	Large, distended pelvis; bilateral
28	---	NAD
31	---	NAD
40	---	NAD
41	---	NAD
52	---	NAD
53	---	NAD
56	---	NAD
60	---	NAD
64	---	NAD
67	---	NAD
69	---	NAD
70	---	NAD
77	---	NAD
80	---	NAD
84	---	NAD

GROSS POSTMORTEM FINDINGS

Group II: 1 ppm

Animal Number	Structure(s)	Finding(s)
4	---	NAD
7	---	NAD
10	---	NAD
14	---	NAD
17	---	NAD
22	---	NAD
26	---	NAD
29	---	NAD
32	---	NAD
37	---	NAD
39	---	NAD
50	---	NAD
51	---	NAD
54	---	NAD
57	---	NAD
62	---	NAD
66	---	NAD
68	---	NAD
74	---	NAD
81	---	NAD
83	---	NAD
85	---	NAD

GROSS POSTMORTEM FINDINGS

Group III: 10 ppm

Animal Number	Structure(s)	Finding(s)
2	---	NAD
3	---	NAD
5	---	NAD
11	---	NAD
21	---	NAD
24	---	NAD
27	---	NAD
34	---	NAD
35	---	NAD
42	---	NAD
43	---	NAD
48	---	NAD
49	---	NAD
58	---	NAD
59	---	NAD
61	---	NAD
71	---	NAD
72	---	NAD
76	---	NAD
78	---	NAD
79	---	NAD
88	---	NAD

GROSS POSTMORTEM FINDINGS

Group IV: 50 ppm

Animal Number	Structure(s)	Finding(s)
6	---	NAD
8	---	NAD
9	---	NAD
12	---	NAD
18	---	NAD
20	---	NAD
30	---	NAD
33	---	NAD
36	---	NAD
38	---	NAD
44	---	NAD
45	---	NAD
46	---	NAD
47	---	NAD
55	---	NAD
63	---	NAD
65	---	NAD
73	---	NAD
75	---	NAD
82	---	NAD
86	---	NAD
87	---	NAD

APPENDIX J

Individual Reproductive Data

INDIVIDUAL REPRODUCTIVE DATA

GROUP I: 0 PPM

ANIMAL NUMBER	CORPORA LUTEA	IMPLAN-TATIONS	RESORPTIONS TOTAL	RESORPTIONS EARLY	RESORPTIONS LATE	DEAD FETUSES	LIVE FETUSES TOTAL	LIVE FETUSES FEMALE	LIVE FETUSES MALE	MEAN FETAL WEIGHT (G)
1	22	14	0	0	0	0	14	6	8	5.96
13	16	14	0	0	0	0	14	4	10	5.26
15	17	17	0	0	0	0	17	7	10	5.08
16	18	18	0	0	0	0	18	5	13	4.94
19	17	14	0	0	0	0	14	5	9	5.92
23	17	15	0	0	0	0	15	4	11	5.27
25	23	16	2	2	0	0	14	7	7	5.20
28	15	14	1	1	0	0	13	6	7	5.70
31	17	13	3	3	0	0	10	7	3	4.65
40	15	15	1	1	0	0	14	8	6	5.87
41	16	14	1	1	0	0	13	7	6	5.48
52	13	12	1	1	0	0	11	6	5	6.05
53	14	14	2	2	0	0	12	4	8	5.80
56	14	14	1	1	0	0	13	4	9	5.45
60	13	13	0	0	0	0	13	10	3	5.55
64	14	12	0	0	0	0	12	3	9	5.64
67	13	13	0	0	0	0	13	9	4	5.40
69	13	11	0	0	0	0	11	6	5	5.30
70	10	10	0	0	0	0	10	6	4	5.91
77	15	14	0	0	0	0	14	9	5	6.28
80	14	12	0	0	0	0	12	3	9	5.41
84	17	16	0	0	0	0	16	13	3	5.13

INDIVIDUAL REPRODUCTIVE DATA

GROUP II: 1 PPM

ANIMAL NUMBER	CORPORA LUTEA	IMPLAN-TATIONS	RESORPTIONS TOTAL	RESORPTIONS EARLY	RESORPTIONS LATE	DEAD FETUSES	LIVE FETUSES TOTAL	LIVE FETUSES FEMALE	LIVE FETUSES MALE	MEAN FETAL WEIGHT (G)
4	12	12	0	0	0	0	12	5	7	5.84
7	14	14	0	0	0	0	14	3	11	5.74
10	14	13	0	0	0	0	13	4	9	5.52
14	21	15	0	0	0	0	15	7	8	6.02
17	16	14	0	0	0	0	14	8	6	5.41
22	14	13	0	0	0	0	13	7	6	5.19
26	19	16	0	0	0	0	16	11	5	5.47
29	15	14	0	0	0	0	14	8	6	5.96
32	15	14	0	0	0	0	14	8	6	5.61
37	18	18	0	0	0	0	18	8	10	5.80
39	19	16	1	1	0	0	15	7	8	5.53
50	17	16	0	0	0	0	16	11	5	5.10
51	15	15	0	0	0	0	15	8	7	5.72
54	23	14	0	0	0	0	14	4	10	5.48
57	13	13	0	0	0	0	13	8	5	5.66
62	10	10	1	1	0	0	9	7	2	6.05
66	14	14	0	0	0	0	14	4	10	5.72
68	14	13	0	0	0	0	13	7	6	5.37
74	16	16	1	1	0	0	15	9	6	5.46
81	14	14	1	1	0	0	13	5	8	6.05
83	16	15	0	0	0	0	15	7	8	5.52
85	12	12	0	0	0	0	12	9	3	5.13

INDIVIDUAL REPRODUCTIVE DATA

GROUP III: 10 PPM

ANIMAL NUMBER	CORPORA LUTEA	IMPLAN-TATIONS	RESORPTIONS TOTAL	RESORPTIONS EARLY	RESORPTIONS LATE	DEAD FETUSES	LIVE FETUSES TOTAL	LIVE FETUSES FEMALE	LIVE FETUSES MALE	MEAN FETAL WEIGHT (G)
2	13	11	1	1	0	0	10	4	6	5.19
3	17	16	0	0	0	0	16	3	13	5.65
5	14	14	0	0	0	0	14	9	5	5.35
11	16	16	0	0	0	0	16	8	8	5.36
21	14	14	1	1	0	0	13	7	6	5.83
24	13	13	0	0	0	0	13	7	6	5.86
27	18	15	0	0	0	0	15	8	7	5.83
34	15	13	1	1	0	0	12	6	6	5.36
35	21	16	0	0	0	0	16	8	8	5.62
42	12	12	0	0	0	0	12	9	3	5.75
43	17	17	0	0	0	0	17	9	8	5.49
48	13	11	0	0	0	0	11	5	6	5.71
49	15	15	2	2	0	0	13	4	9	5.69
58	16	16	0	0	0	0	16	8	8	5.92
59	15	15	0	0	0	0	15	6	9	4.94
61	14	13	0	0	0	0	13	8	5	5.85
71	15	14	0	0	0	0	14	11	3	5.37
72	15	15	2	2	0	0	13	8	5	5.61
76	12	12	0	0	0	0	12	2	10	5.52
78	17	17	2	2	0	0	15	5	10	5.69
79	14	14	1	1	0	0	13	4	9	5.46
88	13	13	3	3	0	0	10	6	4	6.04

INDIVIDUAL REPRODUCTIVE DATA

GROUP IV: 50 PPM

ANIMAL NUMBER	CORPORA LUTEA	IMPLAN-TATIONS	RESORPTIONS TOTAL	RESORPTIONS EARLY	RESORPTIONS LATE	DEAD FETUSES	LIVE FETUSES TOTAL	LIVE FETUSES FEMALE	LIVE FETUSES MALE	MEAN FETAL WEIGHT (G)
6	17	15	2	1	1	0	13	8	5	4.87
8	17	17	3	3	0	0	14	8	6	5.07
9	13	12	0	0	0	0	12	7	5	5.59
12	14	13	0	0	0	0	13	5	8	5.26
18	16	15	1	1	0	0	14	7	7	4.94
20	20	11	0	0	0	0	11	4	7	5.40
30	14	13	0	0	0	0	13	6	7	5.28
33	13	13	2	2	0	0	11	4	7	5.25
36	18	16	0	0	0	0	16	13	3	4.62
38	14	14	2	2	0	0	12	6	6	5.81
44	13	13	1	1	0	0	12	7	5	5.69
45	15	8	0	0	0	0	8	5	3	4.72
46	14	14	0	0	0	0	14	4	10	4.92
47	18	17	1	1	0	0	16	8	8	4.97
55	13	12	0	0	0	0	12	3	9	5.13
63	16	15	0	0	0	0	15	6	9	4.73
65	11	9	0	0	0	0	9	6	3	5.27
73	19	16	0	0	0	0	16	8	8	5.10
75	16	16	0	0	0	0	16	7	9	5.39
82	17	15	0	0	0	0	15	8	7	5.17
86	12	12	0	0	0	0	12	3	9	5.51
87	18	17	0	0	0	0	17	12	5	5.06

APPENDIX K

Individual Fetal Weights and Alterations

Individual Fetal Weights and Alterations

Explanatory Notes

For ease of recording, many of the findings have been abbreviated or coded, as listed below:

ar	=	arch(es)
bil	=	bilateral
cen	=	centrum or centra
lt	=	left
lu	=	lumbar
NAD	=	No Abnormalities Detected
rt	=	right
th	=	thoracic
---	=	No Data
*	=	Subcutaneous hemorrhage that was not present in utero.

Renal papillary sizes refer to papillary development using the scheme of Woo and Hoar.[a]

Supernumerary rib is defined as follows:

Site	=	Ossification site of pinpoint size
Short	=	Rib is equal or less than half the size of the 13th rib
Full	=	Rib is greater than half the length of the 13th rib

Alterations are classed as:

N	=	Notes
DV	=	Developmental Variations
VR	=	Variation due to Retarded Development
M	=	Malformations

Numbers are used to:

- Indicate renal papillary size
- Refer to skeletal position for ribs, vertebra, or sternebra
- Specify skull bones according to the following key:

1. Interparietal
2. Parietal
3. Frontal
4. Nasal
5. Premaxilla
6. Maxilla
7. Zygoma
8. Squamosal
9. Tympanic annulus
10. Basioccipital
11. Exoccipital
12. Supraoccipital
13. Hyoid

a Woo, D.C. and Hoar, R.M. (1972). Apparent Hydronephrosis as a Normal Aspect of Renal Development in Late Gestation of Rats: The Effect of Methyl Salicylate. Teratology, 6:191-196.

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
1				
1	6.19		NAD	
2	5.58		NAD	
3	6.04		NAD	
4	5.73		NAD	
5	6.36		NAD	
6	5.67		NAD	
7	5.95	Kidney	Small Papilla - Size 2 (lt)	VR
8	6.10		NAD	
9	5.41		NAD	
10	5.94		NAD	
11	6.48		NAD	
12	5.84		NAD	
13	6.09		NAD	
14	6.03		NAD	
13				
1	5.49		NAD	
2	5.61		NAD	
3	5.07		NAD	
4	5.51		NAD	
5	5.46		NAD	
6	5.42		NAD	
7	4.93		NAD	
8	4.82		NAD	
9	5.48		NAD	
10	5.34		NAD	
11	5.12		NAD	
12	4.84	Rib	Supernumerary (site 14 lt)	DV
13	5.49		NAD	
14	5.01		NAD	
15				
1	5.19		NAD	
2	5.26		NAD	
3	5.34		NAD	
4	5.28		NAD	
5	5.24	Kidney	Papilla - Size 3 (lt)	VR
6	4.68		NAD	

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
15 (Cont.)				
7	5.01		NAD	
8	5.27	Vertebra	Retarded Ossification (cen th12,13)	VR
9	5.33		NAD	
10	4.78	Rib	Supernumerary (site 14 lt)	DV
11	4.96		NAD	
12	5.14	Subcutis	Hemorrhage (chin *)	N
13	5.44	Vertebra	Retarded Ossification (cen th13)	VR
14[a]	3.80	Paw	Clubbed (rt rear paw)	M
		Paw	Fused[b] (mid 3 digits fused rtrear)	M
		Vertebra	Retarded Ossification (cen th11,12)	VR
15	5.04		NAD	
16	5.40	Vertebra	Retarded Ossification (cen th10,12)	VR
17	5.21		NAD	
16				
1	5.32		NAD	
2	5.09		NAD	
3	4.92		NAD	
4	5.51		NAD	
5	4.78		NAD	
6	4.53		NAD	
7	5.14		NAD	
8	4.98		NAD	
9	4.80	Vertebra	Retarded Ossification (cen th7)	VR
10	4.97		NAD	
11	4.68		NAD	
12	4.53		NAD	
13	4.78		NAD	
14	5.14		NAD	
15	5.18		NAD	
16	5.31		NAD	

a Due to technical error, a visceral examination was not conducted on this fetus.
b Soft tissue only.

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
16 (Cont.)				
17	4.67		NAD	
18	4.58	Sternebra	Retarded Ossification (6)	VR
19				
1	5.93		NAD	
2	6.08		NAD	
3	5.68		NAD	
4	5.79	Vertebra	Retarded Ossification (cen th 11)	VR
5	6.04		NAD	
6	5.65		NAD	
7	5.92		NAD	
8	6.45		NAD	
9	5.74		NAD	
10	5.90		NAD	
11	5.96		NAD	
12	6.35		NAD	
13	5.95		NAD	
14	5.49	Skull	Retarded Ossification (6 rt)	VR
23				
1	5.57		NAD	
2	5.06		NAD	
3	5.49		NAD	
4	4.88		NAD	
5	5.66		NAD	
6	5.00		NAD	
7	4.95	Sternebra	Retarded Ossification (6)	VR
8	5.67		NAD	
9	5.31		NAD	
10	4.47	Rib	Supernumerary (site 14 rt)	DV
11	5.29		NAD	
12	6.00		NAD	
13	5.48		NAD	
14	5.02	Sternebra	Retarded Ossification (6)	VR
15	5.25	Subcutis	Hemorrhage (thoracic, left side)	N

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
25				
1	5.47	Vertebra	Retarded Ossification (cen th11)	VR
2	5.19		NAD	
3	5.64	Vertebra	Retarded Ossification (cen th12)	VR
4	5.51	Skull	Retarded Ossification (12)	VR
5	3.91		NAD	
6	5.50	Rib	Supernumerary (site 14 rt)	DV
		Skull	Retarded Ossification (2,6 bil 12)	VR
7	5.43	Kidney	Papilla - Size 3 (bil)	VR
8	4.70	Skull	Retarded Ossification (2,6,7 bil 1,12)	VR
9	5.24	Rib	Supernumerary (short 13 rt)	DV
10	5.33		NAD	
11	5.18		NAD	
12	5.47	Skull	Retarded Ossification (6 rt)	VR
13	5.08	Rib	Supernumerary (site 14 lt)	DV
		Vertebra	Retarded Ossification (cen th11-12)	VR
14	5.13	Skull	Retarded Ossification (2,6,7 bil 1,12)	VR
28				
1	5.38		NAD	
2	6.04		NAD	
3	5.44		NAD	
4	5.95	Vertebra	Retarded Ossification (cen th12-13)	VR
5	6.22	Vertebra	Retarded Ossification (cen th11)	VR
6	5.30		NAD	
7	5.64		NAD	
8	5.45	Vertebra	Retarded Ossification (cen th11-12)	VR
9	5.68		NAD	
10	5.77		NAD	

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
28 (Cont.)				
11	5.83	Vertebra	Retarded Ossification (cen th11-12)	VR
12	5.68	Vertebra	Retarded Ossification (cen th11,13)	VR
13	5.72		NAD	
31				
1	3.17	Sternebra	Retarded Ossification (1-6)	VR
2	4.19	Sternebra	Retarded Ossification (1-6)	VR
3	4.94		NAD	
4	4.70	Vertebra	Retarded Ossification (cen th12)	VR
5	4.68		NAD	
6	4.75	Vertebra	Retarded Ossification (cen th10)	VR
7	5.35		NAD	
8	5.05	Rib	Supernumerary (site 14 bil)	DV
9	4.24		NAD	
10	5.43	Vertebra	Retarded Ossification (cen th12)	VR
40				
1	5.84		NAD	
2	6.16		NAD	
3	6.14		NAD	
4	6.14		NAD	
5	5.89		NAD	
6	5.87		NAD	
7	5.46		NAD	
8	5.82		NAD	
9	5.83		NAD	
10	5.22	Vertebra	Retarded Ossification (cen th10)	VR
11	5.75		NAD	
12	5.78	Vertebra	Retarded Ossification (cen th11)	VR
13	6.04	Kidney	Small Papilla - Size 2 (rt)	VR

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
40 (Cont.)				
		Rib	Supernumerary (site 14 bil)	DV
14	6.24		NAD	
41				
1	5.74		NAD	
2	5.44		NAD	
3	5.80		NAD	
4	5.53		NAD	
5	5.36		NAD	
6	5.57	Pelvis	Bent (pubis bil)	M
		Skull	Retarded Ossification (2,6 bil;1)	VR
		Vertebra	Retarded Ossification (cen th9,13)	VR
7	5.66		NAD	
8	5.62	Vertebra	Retarded Ossification (cen th10)	VR
9	5.64		NAD	
10	4.48		NAD	
11	5.21	Vertebra	Retarded Ossification (cen th12)	VR
12	5.23	Rib	Supernumerary (short 13 rt)	DV
		Skull	Retarded Ossification (6 rt)	VR
13	5.90		NAD	
52				
1	5.92		NAD	
2	6.01		NAD	
3	6.10		NAD	
4	5.68		NAD	
5	6.18		NAD	
6	6.01		NAD	
7	5.95		NAD	
8	5.86		NAD	
9	6.28		NAD	
10	6.22		NAD	
11	6.32		NAD	

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
53				
1	5.78		NAD	
2	5.76		NAD	
3	6.33		NAD	
4	5.53		NAD	
5	5.46		NAD	
6	6.01		NAD	
7	5.50		NAD	
8	5.88		NAD	
9	5.76		NAD	
10	6.10		NAD	
11	6.26		NAD	
12	5.17	Vertebra	Retarded Ossification (cen th11)	VR
56				
1	5.36		NAD	
2	5.59		NAD	
3	5.05		NAD	
4	5.55		NAD	
5	5.71		NAD	
6	5.78		NAD	
7	5.24		NAD	
8	5.40		NAD	
9	5.44		NAD	
10	5.32		NAD	
11	5.67	Kidney	Papilla - Size 3 (bil)	VR
12	5.45		NAD	
13	5.26		NAD	
60				
1	5.68	Rib	Rudimentary Cervical (7 lt)	DV
2	5.50		NAD	
3	5.91		NAD	
4	5.74		NAD	
5	5.52		NAD	
6	4.86		NAD	
7	5.38		NAD	
8	5.85		NAD	

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
60 (Cont.)				
9	5.30		NAD	
10	5.51		NAD	
11	5.51		NAD	
12	5.79		NAD	
13	5.61		NAD	
64				
1	5.64		NAD	
2	5.62		NAD	
3	5.75		NAD	
4	6.08	Vertebra	Retarded Ossification (cen th11)	VR
5	5.37	Vertebra	Retarded Ossification (cen th11)	VR
6	5.66		NAD	
7	5.80	Vertebra	Retarded Ossification (cen th11)	VR
8	5.72		NAD	
9	5.66		NAD	
10	5.41		NAD	
11	5.41		NAD	
12	5.61		NAD	
67				
1	5.53		NAD	
2	5.07		NAD	
3	6.18	Kidney	Papilla - Size 3 (bil)	VR
4	5.00		NAD	
5	5.82		NAD	
6	5.17		NAD	
7	5.25		NAD	
8	5.36		NAD	
9	5.33	Kidney	Papilla - Size 3 (bil)	VR
10	5.46		NAD	
11	5.12		NAD	
12	5.28		NAD	
13	5.57		NAD	

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
69				
1	5.49		NAD	
2	5.81		NAD	
3	5.87		NAD	
4	4.99	Vertebra	Retarded Ossification (cen th11)	VR
5	5.47		NAD	
6	4.41		NAD	
7	5.70		NAD	
8	5.01		NAD	
9	5.01		NAD	
10	5.44		NAD	
11	5.12		NAD	
70				
1	5.28	Vertebra	Retarded Ossification (cen th12)	VR
2	5.79		NAD	
3	5.51		NAD	
4	5.70	Vertebra	Retarded Ossification (cen th12)	VR
5	6.30		NAD	
6	5.95	Vertebra	Retarded Ossification (cen th12-13)	VR
7	6.21	Kidney	Papilla - Size 3 (bil)	VR
8	6.43		NAD	
9	6.41		NAD	
10	5.57		NAD	
77				
1	5.88		NAD	
2	5.87		NAD	
3	6.33		NAD	
4	6.32	Vertebra	Retarded Ossification (cen th10)	VR
5	5.97		NAD	
6	6.74		NAD	
7	6.19		NAD	
8	6.85		NAD	

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
77 (Cont.)				
9	6.30		NAD	
10	6.14		NAD	
11	6.22		NAD	
12	5.96	Skull	Retarded Ossification (2,6 bil;1)	VR
13	6.88		NAD	
14	6.26		NAD	
80				
1	5.14		NAD	
2	5.66		NAD	
3	5.60		NAD	
4	5.81		NAD	
5	5.86	Rib	Supernumerary (site 14 lt)	DV
6	5.36	Skull	Retarded Ossification (6 bil)	VR
7	5.27		NAD	
8	4.92		NAD	
9	5.25		NAD	
10	5.15		NAD	
11	5.24		NAD	
12	5.69		NAD	
84				
1	4.95	Rib	Supernumerary (site 14 rt)	DV
2	5.28		NAD	
3	4.65	Rib	Supernumerary (site 14 rt)	DV
		Sternebra	Retarded Ossification (6)	VR
4	4.95	Sternebra	Retarded Ossification (6)	VR
5	5.04		NAD	
6	5.08	Sternebra	Retarded Ossification (6)	VR
7	5.27	Rib	Supernumerary (site 14 bil)	DV
8	5.20		NAD	
9	4.82		NAD	
10	5.23		NAD	
11	5.40		NAD	
12	5.14		NAD	
13	5.52	Sternebra	Retarded Ossification (6)	VR

Individual Fetal Weights and Alterations

GROUP I: 0 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
84 (Cont.)				
14	5.11	Sternebra	Retarded Ossification (6)	VR
15	4.93	Subcutis	Hemorrhage (chin*)	N
		Sternebra	Retarded Ossification (6)	VR
16	5.53		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
4				
1	5.52		NAD	
2	6.40		NAD	
3	5.83		NAD	
4	5.82		NAD	
5	5.37		NAD	
6	5.40		NAD	
7	5.96		NAD	
8	6.42		NAD	
9	6.05	Kidney	Papilla - Size 3 (rt)	VR
10	6.01		NAD	
11	6.17		NAD	
12	5.09		NAD	
7				
1	5.59	Kidney	Papilla - Size 3 (lt)	VR
		Pelvis	Retarded Ossification (ischium,pubis bil)	VR
2	5.77	Skull	Retarded Ossification (2,6 bil;7,8 rt;1,12)	VR
		Sternebra	Retarded Ossification (6)	VR
3	6.10		NAD	
4	6.00		NAD	
5	5.63		NAD	
6	6.14	Skull	Retarded Ossification (6,7,8 bil;12)	VR
7	5.39		NAD	
8	5.42	Skull	Retarded Ossification (2,6,7,8 bil;12)	VR
		Sternebra	Retarded Ossification (6)	VR
9	5.49		NAD	
10	5.94	Skull	Retarded Ossification (2,6,7,8 bil;)	VR
11	5.60	Pelvis	Retarded Ossification (pubis bil)	VR
12	5.57		NAD	
13	5.84		NAD	
14	5.93		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
10				
1	5.71		NAD	
2	5.74		NAD	
3	5.32		NAD	
4	5.90	Vertebra	Retarded Ossification (cen th11)	VR
5	5.02	Rib	Retarded Ossification (13 bil)	VR
6	5.53		NAD	
7	5.10	Vertebra	Retarded Ossification (cen th11)	VR
8	5.95		NAD	
9	5.65		NAD	
10	5.35		NAD	
11	5.43		NAD	
12	5.47		NAD	
13	5.54		NAD	
14				
1	6.84		NAD	
2	5.35		NAD	
3	5.84	Vertebra	Retarded Ossification (cen th11)	VR
4	6.47		NAD	
5	5.65		NAD	
6	5.81		NAD	
7	6.07	Vertebra	Retarded Ossification (cen th11)	VR
8	6.29	Skull	Retarded Ossification (6 lt)	VR
9	5.87		NAD	
10	5.60		NAD	
11	5.83	Vertebra	Retarded Ossification (cen th10)	VR
12	6.50	Vertebra	Retarded Ossification (cen th13)	VR
13	6.46	Vertebra	Retarded Ossification (cen th11)	VR

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
14 (Cont.)				
14	6.37	Vertebra	Retarded Ossification (cen th12)	VR
15	5.30		NAD	
17				
1	5.11		NAD	
2	5.34		NAD	
3	5.24		NAD	
4	4.95		NAD	
5	5.60		NAD	
6	5.52		NAD	
7	5.88		NAD	
8	5.54		NAD	
9	5.67		NAD	
10	5.60		NAD	
11	5.17		NAD	
12	5.18		NAD	
13	5.43	Sternebra	Retarded Ossification (6)	VR
14	5.48		NAD	
22				
1	4.50		NAD	
2	5.47		NAD	
3	5.54		NAD	
4	5.39		NAD	
5	4.89		NAD	
6	5.00		NAD	
7	4.37		NAD	
8	5.13		NAD	
9	5.02		NAD	
10	5.85		NAD	
11	5.35		NAD	
12	5.53		NAD	
13	5.47		NAD	
26				
1	5.37		NAD	
2	5.42		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
26 (Cont.)				
3	6.21	Vertebra	Retarded Ossification (cen th1,10,12)	VR
4	5.50	Vertebra	Retarded Ossification (cen th10)	VR
5	5.64		NAD	
6	5.53		NAD	
7	4.87		NAD	
8	5.60		NAD	
9	5.22	Vertebra	Retarded Ossification (cen th11)	VR
10	5.59		NAD	
11	5.11		NAD	
12	5.46		NAD	
13	5.86	Vertebra	Retarded Ossification (cen th9,10)	VR
14	5.40		NAD	
15	5.34		NAD	
16	5.45	Vertebra	Retarded Ossification (cen th9)	VR
29				
1	6.09		NAD	
2	5.66		NAD	
3	5.85		NAD	
4	6.20		NAD	
5	6.03		NAD	
6	6.01		NAD	
7	5.98		NAD	
8	5.69		NAD	
9	5.60	Vertebra	Retarded Ossification (cen th11)	VR
10	5.52		NAD	
11	6.78		NAD	
12	6.41		NAD	
13	5.74		NAD	
14	5.86		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
32				
1	5.76		NAD	
2	5.90		NAD	
3	3.42	Sternebra	Retarded Ossification (1,3,4,6)	VR
4	5.69		NAD	
5	5.61	Kidney	Small Papilla - Size 2 (rt)	VR
6	5.55		NAD	
7	5.59		NAD	
8	6.06		NAD	
9	5.39		NAD	
10	6.18		NAD	
11	5.98		NAD	
12	5.52	Vertebra	Retarded Ossification (cen th 11)	VR
13	6.02		NAD	
14	5.83		NAD	
37				
1	5.26	Rib	Supernumerary (site 14 bil)	DV
2	5.32		NAD	
3	5.69		NAD	
4	5.94		NAD	
5	6.08		NAD	
6	6.15		NAD	
7	6.32	Vertebra	Retarded Ossification (cen th 12)	VR
8	6.06		NAD	
9	5.54	Kidney	Papilla - Size 3 (rt)	VR
10	5.69		NAD	
11	6.35		NAD	
12	5.38	Rib	Supernumerary (site 14 lt)	DV
13	6.26		NAD	
14	5.77		NAD	
15	6.03		NAD	
16	5.46		NAD	
17	6.00		NAD	
18	5.16		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
39				
1	5.21		NAD	
2	5.83		NAD	
3	5.50		NAD	
4	5.10		NAD	
5	5.61	Vertebra	Retarded Ossification (cen th11)	VR
6	5.65		NAD	
7	5.66		NAD	
8	5.08		NAD	
9	5.60		NAD	
10	5.52		NAD	
11	5.77		NAD	
12	5.78		NAD	
13	5.21		NAD	
14	5.60		NAD	
15	5.84		NAD	
50				
1	4.85		NAD	
2	4.86		NAD	
3	5.74		NAD	
4	5.22	Vertebra	Retarded Ossification (cen th11)	VR
5	4.21		NAD	
6	5.29		NAD	
7	4.83		NAD	
8	5.48	Vertebra	Retarded Ossification (cen th12)	VR
9	4.93		NAD	
10	5.16	Vertebra	Retarded Ossification (cen th10-12)	VR
11	5.23	Vertebra	Retarded Ossification (cen th10,12-13)	VR
12	4.91	Vertebra	Retarded Ossification (cen th11-12)	VR
13	5.60	Vertebra	Retarded Ossification (cen th11-13)	VR
14	5.00		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
50 (Cont.)				
15	5.03		NAD	
16	5.31	Skull	Retarded Ossification (2lt,12)	VR
51				
1	6.28		NAD	
2	5.86		NAD	
3	6.35		NAD	
4	6.02		NAD	
5	5.71		NAD	
6	5.68		NAD	
7	5.26		NAD	
8	5.30	Skull	Retarded Ossification (6 bil)	VR
9	5.26		NAD	
10	5.49	Vertebra	Retarded Ossification (cen th12)	VR
11	6.08		NAD	
12	5.87	Skull	Retarded Ossification (6 bil)	VR
		Vertebra	Retarded Ossification (cen th11)	VR
13	5.60		NAD	
14	5.20		NAD	
15	5.89		NAD	
54				
1	5.94		NAD	
2	5.21		NAD	
3	5.66		NAD	
4	5.06		NAD	
5	5.55		NAD	
6	5.87		NAD	
7	4.33		NAD	
8	5.29		NAD	
9	5.39		NAD	
10	5.39		NAD	
11	5.82		NAD	
12	5.66		NAD	
13	5.25		NAD	
14	6.28		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
57				
1	5.72		NAD	
2	6.32		NAD	
3	5.79		NAD	
4	6.15		NAD	
5	5.34	Vertebra	Retarded Ossification (cen th10)	VR
6	5.57	Vertebra	Retarded Ossification (cen th10)	VR
7	5.55		NAD	
8	5.30	Rib	Supernumerary (site 14 lt)	DV
9	5.59		NAD	
10	5.09	Vertebra	Retarded Ossification (cen th12)	VR
11	6.16		NAD	
12	5.53	Rib	Supernumerary (site 14 lt)	DV
13	5.44		NAD	
62				
1	6.07		NAD	
2	5.55	Skull	Retarded Ossification (2 bil)	VR
3	5.94		NAD	
4	6.23		NAD	
5	5.72		NAD	
6	6.18	Skull	Retarded Ossification (7 rt 12)	VR
7	6.37		NAD	
8	5.91		NAD	
9	6.47		NAD	
66				
1	5.36		NAD	
2	6.28		NAD	
3	6.13		NAD	
4	6.02		NAD	
5	5.74		NAD	
6	6.07	Rib	Supernumerary (site 14 lt)	DV
7	5.17		NAD	
8	5.75		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
66 (Cont.)				
9	5.29	Kidney	Small Papilla - Size 2 (bil)	VR
		Vertebra	Retarded Ossification (cen th10)	VR
10	5.17		NAD	
11	5.68		NAD	
12	5.72		NAD	
13	5.64		NAD	
14	6.05	Vertebra	Retarded Ossification (cen th12)	VR
68				
1	5.36	Vertebra	Retarded Ossification (cen th11-13)	VR
2	5.63		NAD	
3	5.66	Vertebra	Retarded Ossification (cen th9,11-12)	VR
4	5.45		NAD	
5	5.10		NAD	
6	4.90		NAD	
7	5.13		NAD	
8	5.52	Rib	Supernumerary (site 14 lt)	DV
		Vertebra	Retarded Ossification (cen th11)	VR
9	5.38	Vertebra	Retarded Ossification (cen th11-12)	VR
10	5.98		NAD	
11	5.24	Vertebra	Retarded Ossification (cen th12)	VR
12	4.98	Rib	Supernumerary (site 14 lt)	DV
13	5.52		NAD	
74				
1	5.47	Vertebra	Retarded Ossification (cen th12)	VR
2	5.50	Vertebra	Retarded Ossification (cen th10,12)	VR
3	5.79		NAD	

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
74 (Cont.)				
4	6.25	Rib	Supernumerary (site 14 bil)	DV
		Vertebra	Retarded Ossification (cen th11-12,14)	VR
5	5.20		NAD	
6	5.72	Skull	Retarded Ossification (12)	VR
		Vertebra	Retarded Ossification (cen th8)	VR
7	5.11	Vertebra	Retarded Ossification (cen th12)	VR
8	5.24	Skull	Retarded Ossification (12)	VR
9	5.99	Kidney	Papilla - Size 3 (BILATERAL)	VR
10	5.93	Skull	Retarded Ossification (12)	VR
		Vertebra	Retarded Ossification (cen th11)	VR
11	5.44		NAD	
12	5.29	Skull	Retarded Ossification (12)	VR
13	5.65		NAD	
14	5.26	Vertebra	Retarded Ossification (cen th11)	VR
15	4.12		NAD	
81				
1	4.42	Kidney	Papilla - Size 3 (rt)	VR
2	7.22	Vertebra	Retarded Ossification (cen th12)	VR
3	5.69		NAD	
4	7.04		NAD	
5	5.31		NAD	
6	4.55		NAD	
7	5.29		NAD	
8	7.04	Vertebra	Retarded Ossification (cen th11)	VR
9	6.09		NAD	
10	7.26		NAD	
11	6.56		NAD	
12	5.30		NAD	
13	6.88	Kidney	Small Papilla - Size 2 (rt)	VR

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
83				
1	5.51	Kidney	Papilla - Size 3 (bil)	VR
2	5.43	Vertebra	Retarded Ossification (cen th11)	VR
3	4.44		NAD	
4	5.39		NAD	
5	6.12		NAD	
6	5.59	Vertebra	Retarded Ossification (cen th10-12)	VR
7	5.68		NAD	
8	5.79		NAD	
9	5.73	Vertebra	Retarded Ossification (cen th10)	VR
10	5.25	Skull	Retarded Ossification (6,7 rt)	VR
11	5.58		NAD	
12	5.47	Vertebra	Retarded Ossification (cen th12)	VR
13	5.76		NAD	
14	5.54	Vertebra	Retarded Ossification (cen th11-12)	VR
15	5.46		NAD	
85				
1	5.29		NAD	
2	5.65		NAD	
3	5.44		NAD	
4	5.32	Skull	Retarded Ossification (6,7,8 bil)	VR
5	4.78		NAD	
6	5.22	Vertebra	Retarded Ossification (cen th12)	VR
7	4.76		NAD	
8	5.46	Vertebra	Retarded Ossification (cen th10)	VR
9	5.34		NAD	
10	4.20	Vertebra	Retarded Ossification (cen th11)	VR

Individual Fetal Weights and Alterations

GROUP II: 1 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
85 (Cont.)				
11	4.92	Vertebra	Retarded Ossification (cen th12)	VR
12	5.17		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
2				
1	4.81		NAD	
2	5.46		NAD	
3	5.11		NAD	
4	5.20	Skull	Retarded Ossification (1)	VR
5	4.92		NAD	
6	4.81	Pelvis	Retarded Ossification (pubis rt)	VR
		Skull	Retarded Ossification (1,12;2,6,7,8 bil)	VR
7	5.49		NAD	
8	5.49		NAD	
9	5.28		NAD	
10	5.31		NAD	
3				
1	5.60		NAD	
2	5.65		NAD	
3	5.60		NAD	
4	5.64		NAD	
5	5.84		NAD	
6	5.69		NAD	
7	5.74		NAD	
8	6.08		NAD	
9	5.49		NAD	
10	5.46		NAD	
11	5.41		NAD	
12	6.00		NAD	
13	5.66		NAD	
14	5.37		NAD	
15	5.56		NAD	
16	5.53		NAD	
5				
1	5.36		NAD	
2	5.46	Vertebra	Retarded Ossification (cen th12)	VR
3	5.68		NAD	
4	5.14		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
5 (Cont.)				
5	5.47	Kidney	Small Papilla - Size 2 (rt)	VR
6	5.45	Vertebra	Retarded Ossification (cen th10)	VR
7	5.38		NAD	
8	5.48		NAD	
9	5.27		NAD	
10	5.74		NAD	
11	5.76	Vertebra	Retarded Ossification (cen th9-11,13)	VR
12	4.61	Vertebra	Retarded Ossification (cen th11)	VR
13	5.04		NAD	
14	5.02		NAD	
11				
1	5.46		NAD	
2	5.68		NAD	
3	5.84		NAD	
4	5.60		NAD	
5	3.31	Sternebra	Retarded Ossification (1,3,4,6)	VR
6	5.10		NAD	
7	5.56		NAD	
8	5.35		NAD	
9	4.91		NAD	
10	5.13		NAD	
11	5.51	Kidney	Small Papilla - Size 2 (rt)	VR
12	5.42	Rib	Supernumerary (site 14 rt)	DV
13	5.57		NAD	
14	5.82		NAD	
15	5.86		NAD	
16	5.68		NAD	
21				
1	6.02		NAD	
2	5.66		NAD	
3	6.31	Kidney	Small Papilla - Size 2 (rt)	VR
4	5.52		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
21 (Cont.)				
5	6.27		NAD	
6	5.33		NAD	
7	5.26		NAD	
8	6.16		NAD	
9	5.99	Rib	Supernumerary (site 14 rt)	DV
10	5.78		NAD	
11	6.23		NAD	
12	5.72	Vertebra	Retarded Ossification (cen th11)	VR
13	5.48		NAD	
24				
1	6.00		NAD	
2	6.07	Vertebra	Retarded Ossification (cen th11)	VR
3	6.13		NAD	
4	6.41	Vertebra	Retarded Ossification (cen th11-12)	VR
5	4.47	Vertebra	Retarded Ossification (cen th10-12)	VR
6	6.30	Vertebra	Retarded Ossification (cen th11)	VR
7	5.24	Vertebra	Retarded Ossification (cen th11)	VR
8	6.12	Vertebra	Retarded Ossification (cen th12)	VR
9	5.72	Vertebra	Retarded Ossification (cen th10-12)	VR
10	6.46	Vertebra	Retarded Ossification (cen th10,12)	VR
11	5.87		NAD	
12	5.37		NAD	
13	5.97		NAD	
27				
1	5.64		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
27 (Cont.)				
2	6.16	Skull	Retarded Ossification (2,3,6,7 bil 1,12)	VR
3	6.17		NAD	
4	6.14	Vertebra	Retarded Ossification (cen th11)	VR
5	6.21		NAD	
6	5.78	Skull	Retarded Ossification (1,12)	VR
7	5.55	Kidney	Papilla - Size 3 (bil)	VR
8	5.72	Skull	Retarded Ossification (2,6 bil 1,12)	VR
9	5.93		NAD	
10	5.54		NAD	
11	5.82		NAD	
12	5.63	Skull	Retarded Ossification (6,7 bil 1,12)	VR
13	5.77		NAD	
14	5.58		NAD	
15	5.88		NAD	
34				
1	5.33		NAD	
2	5.56	Vertebra	Retarded Ossification (cen th10-12)	VR
3	5.26		NAD	
4	4.24		NAD	
5	4.95		NAD	
6	5.52		NAD	
7	4.83	Eye	Microphthalmia (lt)	M
8	5.70		NAD	
9	5.90		NAD	
10	4.98		NAD	
11	6.35		NAD	
12	5.73		NAD	
35				
1	5.57		NAD	
2	5.85		NAD	
3	5.75		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
35 (Cont.)				
4	5.57		NAD	
5	5.50		NAD	
6	5.62		NAD	
7	5.16		NAD	
8	5.71		NAD	
9	5.47		NAD	
10	5.58		NAD	
11	5.40		NAD	
12	5.31		NAD	
13	5.49		NAD	
14	6.20	Vertebra	Retarded Ossification (cen th11)	VR
15	5.77		NAD	
16	6.02		NAD	
42				
1	6.38		NAD	
2	5.70		NAD	
3	6.32		NAD	
4	4.62		NAD	
5	5.92		NAD	
6	5.85		NAD	
7	5.54		NAD	
8	5.66		NAD	
9	5.55		NAD	
10	5.96		NAD	
11	5.87		NAD	
12	5.67		NAD	
43				
1	5.58		NAD	
2	5.45	Vertebra	Retarded Ossification (cen th11)	VR
3	5.92	Kidney	Papilla - Size 3 (bil)	VR
		Vertebra	Retarded Ossification (cen th12)	VR
4	5.28	Skull	Retarded Ossification (12)	VR
5	5.12		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
43 (Cont.)				
6	5.34	Skull	Retarded Ossification (12)	VR
7	5.15	Vertebra	Retarded Ossification (cen th11)	VR
8	5.96	Rib	Supernumerary (site 14 rt)	DV
9	5.79		NAD	
10	5.97	Rib	Supernumerary (site 14 rt)	DV
11	5.89		NAD	
12	5.43		NAD	
13	4.48	Chin	Micrognathia	M
		Mouth	Cleft (upper lip)	M
		Heart &/or Greater Vessels	Patent Ductus Arteriosis	VR
		Mandible	Micrognathia	M
14	6.02		NAD	
15	5.09		NAD	
16	5.70	Vertebra	Retarded Ossification (cen th11)	VR
17[a]	5.08		NAD	
48				
1	6.07		NAD	
2	6.17		NAD	
3	5.54	Subcutis	Hemorrhage (back*)	N
4	5.75		NAD	
5	5.39		NAD	
6	5.20		NAD	
7	5.77		NAD	
8	5.71		NAD	
9	5.54		NAD	
10	5.91		NAD	
11	5.78	Vertebra	Retarded Ossification (cen th11)	VR
49				
1	5.73		NAD	
2	5.85		NAD	
3	5.78		NAD	
4	5.73		NAD	

a This fetus did not receive a skeletal examination due to disarticulation during processing.

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
49 (Cont.)				
5	5.51		NAD	
6	5.65		NAD	
7	5.20		NAD	
8	5.92		NAD	
9	5.39		NAD	
10	5.87		NAD	
11	5.76		NAD	
12	5.72		NAD	
13	5.81		NAD	
58				
1	5.42		NAD	
2	5.94		NAD	
3	6.24		NAD	
4	5.13		NAD	
5	5.60		NAD	
6	5.96		NAD	
7	6.94		NAD	
8	6.09		NAD	
9	5.65		NAD	
10	6.10	Vertebra	Retarded Ossification (cen th10)	VR
11	6.40		NAD	
12	5.54		NAD	
13	5.51		NAD	
14	6.07	Vertebra	Retarded Ossification (cen th10)	VR
15	6.02		NAD	
16	6.06		NAD	
59				
1	3.74	Sternebra	Retarded Ossification (6)	VR
2	5.05		NAD	
3	5.55		NAD	
4	5.15		NAD	
5	5.27		NAD	
6	4.86		NAD	
7	4.50		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
59 (Cont.)				
8	4.75		NAD	
9	4.95		NAD	
10	4.82		NAD	
11	5.59		NAD	
12	5.09		NAD	
13	5.29		NAD	
14	4.47		NAD	
15	5.09		NAD	
61				
1	6.19		NAD	
2	6.06		NAD	
3	5.91		NAD	
4	5.60		NAD	
5	6.02		NAD	
6	5.65		NAD	
7	4.96	Anus	Imperforate	M
		Tail	Filamentous	M
		Vertebra	Retarded Ossification (cen th7)	VR
8	5.79		NAD	
9	6.40	Kidney	Papilla - Size 3 (bil)	VR
10	5.44		NAD	
11	5.60		NAD	
12	6.07	Vertebra	Retarded Ossification (cen th11,12)	VR
13	6.32		NAD	
71				
1	5.54		NAD	
2	4.99		NAD	
3	4.48		NAD	
4	6.13	Vertebra	Retarded Ossification (cen th12)	VR
5	5.13	Vertebra	Retarded Ossification (cen th11)	VR
6	5.58		NAD	
7	5.43		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
71 (Cont.)				
8	5.29		NAD	
9	5.58		NAD	
10	5.54		NAD	
11	5.20		NAD	
12	5.47		NAD	
13	5.45		NAD	
14	5.36		NAD	
72				
1	5.30	Kidney	Papilla - Size 3 (bil)	VR
2	5.35		NAD	
3	5.63		NAD	
4	5.72		NAD	
5	5.19		NAD	
6	6.14		NAD	
7	5.52		NAD	
8	5.82		NAD	
9	5.33		NAD	
10	5.71		NAD	
11	6.17	Kidney	Small Papilla - Size 2 (rt)	VR
12	5.14		NAD	
13	5.97		NAD	
76				
1	5.10	Rib	Supernumerary (site 14 rt)	DV
2	5.77		NAD	
3	5.54	Rib	Supernumerary (site 14 bil)	DV
4	5.79		NAD	
5	5.72		NAD	
6	5.32		NAD	
7	5.32	Rib	Supernumerary (site 14 rt)	DV
8	5.52	Vertebra	Retarded Ossification (cen th11)	VR
9	5.87		NAD	
10	4.76	Skull	Retarded Ossification (2 bil,12)	VR
11	5.43		NAD	

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
76 (Cont.)				
12	6.06	Rib	Supernumerary (site 14 bil)	DV
		Vertebra	Retarded Ossification (cen th11)	VR
78				
1	5.44		NAD	
2	5.94		NAD	
3	5.96		NAD	
4	5.54		NAD	
5	5.79		NAD	
6	5.98		NAD	
7	5.85		NAD	
8	5.97		NAD	
9	5.40		NAD	
10	5.49	Rib	Supernumerary (short 13 bil)	DV
11	5.36		NAD	
12	5.28	Rib	Supernumerary (short 13 bil)	DV
13	5.67		NAD	
14	6.08		NAD	
15	5.64		NAD	
79				
1	4.87		NAD	
2	5.31		NAD	
3	5.18		NAD	
4	5.43		NAD	
5	5.07		NAD	
6	5.40		NAD	
7	5.01		NAD	
8	5.73	Vertebra	Retarded Ossification (cen th11)	VR
9	6.05		NAD	
10	5.85		NAD	
11	5.47		NAD	
12	5.72		NAD	
13[a]	5.87		NAD	

a This fetus did not receive a skeletal examination due to disarticulation during processing.

Individual Fetal Weights and Alterations

GROUP III: 10 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
88				
1	5.55		NAD	
2	6.03	Vertebra	Retarded Ossification (cen th11)	VR
3	6.00		NAD	
4	6.34		NAD	
5	6.14		NAD	
6	6.00		NAD	
7	6.48		NAD	
8	6.05		NAD	
9	5.73		NAD	
10	6.07		NAD	

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
6				
1	4.75		NAD	
2	4.56		NAD	
3	5.13		NAD	
4	5.46		NAD	
5	5.20		NAD	
6	4.89		NAD	
7	4.79		NAD	
8	4.83		NAD	
9	4.71		NAD	
10	4.89		NAD	
11	4.00		NAD	
12	5.09		NAD	
13	4.95		NAD	
8				
1	5.08		NAD	
2	5.01		NAD	
3	5.10		NAD	
4	5.21		NAD	
5	5.10		NAD	
6	5.17		NAD	
7	4.87		NAD	
8	4.66	Vertebra	Retarded Ossification (cen th10)	VR
9	5.43		NAD	
10	5.09		NAD	
11	5.09		NAD	
12	5.38	Rib	Supernumerary (site 14 bil)	DV
13	5.21		NAD	
14	4.64		NAD	
9				
1	5.41	Vertebra	Retarded Ossification (cen th11-12)	VR
2	6.01	Vertebra	Retarded Ossification (cen th11)	VR

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
9 (Cont.)				
3	5.64	Vertebra	Retarded Ossification (cen th11)	VR
4	5.55	Vertebra	Retarded Ossification (cen th11)	VR
5	5.40	Vertebra	Retarded Ossification (cen th10,12)	VR
6	5.30	Vertebra	Retarded Ossification (cen th11)	VR
7	5.63		NAD	
8	5.75		NAD	
9	5.72	Vertebra	Retarded Ossification (cen th10)	VR
10	5.63		NAD	
11	5.43		NAD	
12	5.59	Vertebra	Retarded Ossification (cen th9)	VR
12				
1	5.29	Vertebra	Retarded Ossification (cen th11)	VR
2	4.94		NAD	
3	5.46	Vertebra	Retarded Ossification (cen th11)	VR
4	5.71		NAD	
5	5.29	Vertebra	Retarded Ossification (cen th10-11,13)	VR
6	5.24	Rib	Supernumerary (site 14 lt)	DV
7	5.47		NAD	
8	5.13		NAD	
9	5.33		NAD	
10	5.30	Vertebra	Retarded Ossification (cen th12)	VR
11	4.80		NAD	
12	5.09	Vertebra	Retarded Ossification (cen th11)	VR
13	5.38	Vertebra	Retarded Ossification (cen th11)	VR

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
18				
1	5.26	Kidney	Papilla - Size 3 (bil)	VR
2	4.91	Vertebra	Retarded Ossification (cen th11,13)	VR
3	4.87		NAD	
4	4.95		NAD	
5	4.61	Kidney	Papilla - Size 3 (rt)	VR
6	5.20		NAD	
7	5.26		NAD	
8	4.72		NAD	
9	5.11		NAD	
10	4.69		NAD	
11	5.23		NAD	
12	5.05		NAD	
13	4.72		NAD	
14	4.60		NAD	
20				
1	5.37		NAD	
2	5.54	Vertebra	Retarded Ossification (cen th13)	VR
3	5.60		NAD	
4	6.00		NAD	
5	4.89		NAD	
6	5.49		NAD	
7	5.37		NAD	
8	5.24	Vertebra	Retarded Ossification (cen th11)	VR
9	5.77		NAD	
10	5.06	Skull	Retarded Ossification (2 bil)	VR
11	5.03	Vertebra	Retarded Ossification (cen th10)	VR
30				
1	5.93		NAD	
2	5.55	Vertebra	Retarded Ossification (cen th11)	VR
3	5.35		NAD	

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
30 (Cont.)				
4	4.50	Sternebra	Misaligned (3,4)	DV
		Sternebra	Retarded Ossification (1-6)	VR
		Vertebra	Retarded Ossification (cen th11)	VR
5	5.05		NAD	
6	5.10		NAD	
7	5.23		NAD	
8	5.39	Rib	Supernumerary (site 14 rt)	DV
9	5.30	Vertebra	Retarded Ossification (cen th11)	VR
10	5.56	Vertebra	Retarded Ossification (cen th10,11)	VR
11	5.19		NAD	
12	5.06		NAD	
13	5.42		NAD	
33				
1	5.25	Rib	Supernumerary (site 14 rt)	DV
2	5.77		NAD	
3	4.19	Vertebra	Retarded Ossification (cen th12)	VR
4	5.09		NAD	
5	5.29		NAD	
6	5.73	Rib	Supernumerary (site 14 rt)	DV
		Vertebra	Retarded Ossification (cen th10-13)	VR
7	5.38		NAD	
8	5.09	Vertebra	Retarded Ossification (cen th11-12)	VR
9	5.16		NAD	
10	5.43		NAD	
11	5.40	Rib	Supernumerary (site 14 lt)	DV
36				
1	4.92		NAD	
2	4.87		NAD	
3	4.72	Rib	Supernumerary (site 14 lt)	DV
4	4.67		NAD	

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
36 (Cont.)				
5	4.58		NAD	
6	4.59		NAD	
7	4.35		NAD	
8	4.46		NAD	
9	4.53		NAD	
10	4.59		NAD	
11	4.78		NAD	
12	4.55		NAD	
13	4.61		NAD	
14	4.62		NAD	
15	4.51		NAD	
16	4.54		NAD	
38				
1	5.08		NAD	
2	6.22		NAD	
3	6.51		NAD	
4	5.65		NAD	
5	5.34	Vertebra	Absent (cen arches lu3-s2)	M
6	5.62		NAD	
7	5.52		NAD	
8	5.89		NAD	
9	5.76	Rib	Supernumerary (short rt)	DV
10	5.77		NAD	
11	6.23	Vertebra	Retarded Ossification (cen th11)	VR
12	6.13		NAD	
44				
1	5.47		NAD	
2	5.25		NAD	
3	6.07		NAD	
4	6.01		NAD	
5	5.87		NAD	
6	5.04		NAD	
7	5.32		NAD	
8	5.88		NAD	
9	5.87		NAD	

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
44 (Cont.)				
10	5.94		NAD	
11	5.69	Rib	Supernumerary (site 14 lt)	DV
12	5.85		NAD	
45				
1	4.57		NAD	
2	4.58		NAD	
3	3.94	Subcutis	Hemorrhage (abdomen*)	N
		Subcutis	Hemorrhage (face*)	N
		Sternebra	Retarded Ossification (6)	VR
4	4.83		NAD	
5	5.37		NAD	
6	4.92		NAD	
7	4.84		NAD	
8	4.69		NAD	
46				
1	5.04	Vertebra	Retarded Ossification (centh10)	VR
2	5.19	Vertebra	Retarded Ossification (cen th10-11)	VR
3	5.10	Vertebra	Retarded Ossification (cen th9,11)	VR
4	5.25		NAD	
5	5.83		NAD	
6	4.60	Skull	Retarded Ossification (12)	VR
		Vertebra	Retarded Ossification (cen th11)	VR
7	4.79	Vertebra	Retarded Ossification (cen th11)	VR
8	4.69	Vertebra	Retarded Ossification (cen th11)	VR
9	4.70	Vertebra	Retarded Ossification (cen th1-0-12)	VR
10	5.41	Vertebra	Retarded Ossification (cen th10-11)	VR

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
46 (Cont.)				
11	4.88	Vertebra	Retarded Ossification (cen th11)	VR
12	4.41	Vertebra	Retarded Ossification (cen th10-11)	VR
13	4.33	Vertebra	Retarded Ossification (cen th11)	VR
14	4.68	Vertebra	Retarded Ossification (cen th9)	VR
47				
1	5.05		NAD	
2	4.89		NAD	
3	5.17		NAD	
4	5.17		NAD	
5	4.98		NAD	
6	5.09	Vertebra	Retarded Ossification (cen th12)	VR
7	5.01		NAD	
8	4.63	Vertebra	Retarded Ossification (cen th11)	VR
9	4.72		NAD	
10	5.30		NAD	
11	4.99		NAD	
12	4.21	Skull	Retarded Ossification (2 lt,12)	VR
13	5.10	Kidney	Papilla - Size 3 (bil)	VR
14	4.89		NAD	
15	5.24		NAD	
16	5.08		NAD	
55				
1	5.01		NAD	
2	5.14		NAD	
3	4.86		NAD	
4	5.44		NAD	
5	5.49		NAD	
6	4.75		NAD	
7	4.84		NAD	

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
55 (Cont.)				
8	5.44		NAD	
9	4.87		NAD	
10	5.25		NAD	
11	5.36		NAD	
12	5.10		NAD	
63				
1	4.77	Kidney	Papilla - Size 3 (lt)	VR
2	4.59	Vertebra	Retarded Ossification (cen th11-12)	VR
3	4.75		NAD	
4	5.03	Vertebra	Retarded Ossification (cen th11)	VR
5	4.86		NAD	
6	4.60		NAD	
7	4.93		NAD	
8	4.82		NAD	
9	5.21		NAD	
10	4.45	Vertebra	Retarded Ossification (cen th12)	VR
11	4.28	Vertebra	Retarded Ossification (cen th11)	VR
12	4.88		NAD	
13	4.46	Vertebra	Retarded Ossification (cen th10-11,13)	VR
14	4.80	Vertebra	Retarded Ossification (cen th12)	VR
15	4.57		NAD	
65				
1	5.38		NAD	
2	5.58	Rib	Supernumerary (site 14 rt)	DV
3	5.41	Nasal Cavity	Hemorrhage (bil)	N
4	5.49		NAD	
5	5.43		NAD	
6	5.47		NAD	
7	5.14		NAD	

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
65 (Cont.)				
8	5.13	Vertebra	Retarded Ossification (cen th12)	VR
9	4.40		NAD	
73				
1	4.62		NAD	
2	4.75	Vertebra	Retarded Ossification (cen th10-12)	VR
3	5.37	Kidney	Papilla - Size 3 (bil)	VR
		Vertebra	Retarded Ossification (cen th10-12)	VR
4	5.48		NAD	
5	5.06	Vertebra	Retarded Ossification (cen th12)	VR
6	5.48		NAD	
7	4.56	Vertebra	Retarded Ossification (cen th10-11)	VR
8	5.28	Vertebra	Retarded Ossification (cen th10)	VR
9	5.35		NAD	
10	5.20	Skull	Retarded Ossification (6 bil)	VR
		Vertebra	Retarded Ossification (cen th11-12)	VR
11	5.10		NAD	
12	4.78		NAD	
13	5.16		NAD	
14	5.05	Skull	Retarded Ossification (6,7 bil 1,12)	VR
15	5.21	Vertebra	Retarded Ossification (cen th11)	VR
16	5.18	Skull	Retarded Ossification (6,7 rt,1)	VR
		Vertebra	Retarded Ossification (cen th11-12)	VR
75				
1	5.79	Kidney	Papilla - Size 3 (bil)	VR
2	5.84		NAD	

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
75 (Cont.)				
3	5.66		NAD	
4	4.90		NAD	
5	4.99	Kidney	Papilla - Size 3 (bil)	VR
		Rib	Supernumerary (site 14 lt)	DV
6	5.60	Vertebra	Retarded Ossification (cen th11-12)	VR
7	4.95	Vertebra	Retarded Ossification (cen th11-12)	VR
8	5.30		NAD	
9	5.44	Kidney	Small Papilla - Size 2 (bil)	VR
10	5.13	Vertebra	Retarded Ossification (cen th10-12)	VR
11	5.92		NAD	
12	5.50		NAD	
13	5.01		NAD	
14	5.27		NAD	
15	5.26		NAD	
16	5.71	Vertebra	Retarded Ossification (cen th11)	VR
82				
1	5.11		NAD	
2	4.70	Rib	Supernumerary (site 14 lt)	DV
		Vertebra	Retarded Ossification (cen th11-12)	VR
3	5.26	Vertebra	Retarded Ossification (cen th12)	VR
4	5.13	Rib	Supernumerary (site 14 lt)	DV
		Skull	Retarded Ossification (1,12)	VR
5	5.34	Vertebra	Retarded Ossification (cen th12)	VR
6	5.11	Skull	Retarded Ossification (12)	VR
		Vertebra	Retarded Ossification (cen th10-11,13)	VR
7	5.30	Rib	Supernumerary (site 14 lt)	DV
		Vertebra	Retarded Ossification (cen th12)	VR

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
82 (Cont.)				
8	5.16	Vertebra	Retarded Ossification (cen th11-12)	VR
9	5.69		NAD	
10	5.13	Vertebra	Retarded Ossification (cen th11-14)	VR
11	5.27	Kidney	Papilla - Size 3 (bil)	VR
		Rib	Supernumerary (short 13 lt)	DV
12	4.49	Rib	Supernumerary (site 14 lt)	DV
		Vertebra	Retarded Ossification (cen th9,11,14)	VR
13	5.69		NAD	
14	5.06	Rib	Supernumerary (site 14 rt)	DV
		Vertebra	Retarded Ossification (cen th11-12)	VR
15	5.07		NAD	
86				
1	5.68		NAD	
2	5.97	Vertebra	Retarded Ossification (cen th11)	VR
3	5.90	Rib	Supernumerary (site 14rt)	DV
4	4.95	Rib	Supernumerary (site 14 bil)	DV
		Skull	Retarded Ossification (12)	VR
		Vertebra	Retarded Ossification (cen th10,12-13)	VR
5	5.61		NAD	
6	5.15	Vertebra	Retarded Ossification (cen th10-12)	VR
7	5.00	Vertebra	Retarded Ossification (cen th11)	VR
8	5.39		NAD	
9	5.84	Kidney	Small Papilla - Size 2 (rt)	VR
		Kidney	Papilla - Size 3 (lt)	VR
10	5.31		NAD	
11	5.78		NAD	
12	5.53	Vertebra	Retarded Ossification (cen th11)	VR

Individual Fetal Weights and Alterations

GROUP IV: 50 PPM

DAM #/ FETUS #	FETUS WT.	STRUCTURE	FINDING(S)	CLASSIF-ICATION
87				
1	4.86		NAD	
2	4.86		NAD	
3	5.16	Vertebra	Retarded Ossification (cen th11)	VR
4	5.01	Vertebra	Retarded Ossification (cen th11)	VR
5	5.30	Vertebra	Retarded Ossification (cen th12)	VR
6	5.64	Vertebra	Retarded Ossification (cen th11-12)	VR
7	5.55	Vertebra	Retarded Ossification (cen th12)	VR
8	5.37	Vertebra	Retarded Ossification (cen th11-12)	VR
9	5.03	Vertebra	Retarded Ossification (cen th10)	VR
10	4.56	Skull	Retarded Ossification (2 bil,1,12)	VR
		Vertebra	Retarded Ossification (cen th10,12)	VR
11	4.47	Vertebra	Retarded Ossification (cen th5,10)	VR
12	4.96		NAD	
13	4.74	Kidney	Papilla - Size 3 (bil)	VR
		Vertebra	Retarded Ossification (cen th9,11-12)	VR
14	4.84		NAD	
15	5.08	Vertebra	Retarded Ossification (cen th10,12)	VR
16	5.17	Skull	Retarded Ossification (12)	VR
		Vertebra	Retarded Ossification (cen th11)	VR
17	5.34		NAD	