10) OECD 4140OPPTS 870.3700, Prenatal development toxicity (teratology), 418-023

T-7485

Study Title

Oral (Gavage) Developmental Toxicity Study of Potassium Perfluorobutane Sulfonate (PFBS) in Rats

Sponsor's Study Number: T-7485.12

Data Requirement

U.S. Environmental Protection Agency
Pesticide Assessment Guidelines
Subdivision F, 83-3

U.S. Environmental Protection Agency
Toxic Substances Control Act Test Guidelines -
Health Effects Testing Guidelines - 798.4900

Author

Raymond G. York, Ph.D., DABT
(Study Director)

Study Completed On

18 April, 2002
(Final Report)

Performing Laboratory

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Laboratory Project ID

Argus Research, Protocol Number: 418-023

Confidentiality Page
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GOOD LABORATORY PRACTICE STATEMENT

This study was conducted according to U.S. Environmental Protection Agency (EPA FIFRA/TSCA) "Good Laboratory Practice Standards; Final Rule" (40 CFR Part 160/792), the Organisation for Economic Co-operation and Development (OECD) and the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF) "Good Laboratory Practice Standards" (59 NohSan No. 3850). Any areas of noncompliance are documented in the study record. No deviations existed that affected the validity of the study.

Study Director: 18 APR 2002

Raymond G. York, Ph.D., DABT Date
Argus Research

Sponsor: 08 MAY 2002

Paul H. Lieder, Ph.D., DABT Date
3M Corporate Toxicology

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TITLE: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS

SPONSOR'S STUDY NUMBER: T-7485.12

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SUBJECT PAGE

TITLE: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS

ARGUS RESEARCH
PROTOCOL NUMBER: 418-023
SPONSOR'S STUDY NUMBER: T-7485.12

I. SUMMARY AND CONCLUSION

A. Methods[a]

One hundred Crl:CD®(SD)IGS BR VAF/Plus® presumed pregnant female rats were randomly assigned to four dosage groups (Groups I through IV), 25 rats per dosage group. The test substance, Potassium Perfluorobutane Sulfonate (PFBS or T-7485), or the vehicle, aqueous 0.1% carboxymethylcellulose, were administered via gavage once daily to these female rats on days 6 through 20 of gestation (DGs 6 through 20). Dosages of 0 (Vehicle), 100, 300 and 1000 were administered at a dosage volume of 10 mL/kg, adjusted daily on the basis of the individual body weights recorded before intubation and administered at approximately the same time each day.

The female rats were observed for viability at least twice each day of the study. Rats were also examined for clinical observations of effects of the test substance, abortions, premature deliveries and deaths before and approximately 60 ± 10 minutes after dosage administration and on the day of scheduled sacrifice. Body weights were recorded daily during the dosage period and prior to sacrifice. Feed consumption values were recorded on DGs 0, 6, 9, 12, 15, 18, 20 and 21.

All surviving rats were sacrificed on DG 21, Caesarean-sectioned and a gross necropsy of the thoracic, abdominal and pelvic viscera was performed. The gravid uterus was excised and weighed. The number of corpora lutea in each ovary was recorded. The uterus of each rat was excised and examined for pregnancy, number and distribution of implantations, live and dead fetuses and early and late resorptions. Each fetus was identified, weighed and examined for sex and gross external alterations. Approximately one-half of the fetuses in each litter were examined for soft tissue alterations and the remaining fetuses were examined for skeletal alterations.

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a. Detailed descriptions of all procedures used in the conduct of this study are provided in the appropriate sections of this report and in APPENDIX C (PROTOCOL).

B. Results

Two rats in the 1000 mg/kg/day dosage group were found dead. The death of one of these rats was attributed to an intubation accident. No cause of death was determined for the other rat that was found dead in this dosage group, but the death was considered unrelated to the test substance because it was a single event. One rat in each of the 0 (Vehicle) and 300 mg/kg/day dosage groups began delivery before Caesarean-sectioning on day 21 of gestation (DG 21) and were sacrificed. All other rats survived until scheduled sacrifice.

All clinical and necropsy observations were considered unrelated to the test substance.

Maternal body weight gains were significantly reduced on DGs 6 to 9 and 18 to 21 in the 1000 mg/kg/day dosage group. As a result of these reductions, maternal body weight gains were significantly reduced for the entire gestation period (DGs 0 to 21) and maternal body weights were significantly reduced on DGs 20 and 21 in this dosage group. Gravid uterine weights were slightly reduced (91% of control value) in the 1000 mg/kg/day dosage group, but this reduction was not statistically significant.

Absolute (g/day) and relative (g/kg/day) feed consumption values were significantly reduced on DGs 9 to 12 (relative only) and 18 to 21 in the 1000 mg/kg/day dosage group. As a result of these reductions, absolute and relative feed consumption values were significantly reduced in the 1000 mg/kg/day dosage group for the entire dosage period (calculated as DGs 6 to 21).

Fetal body weights (total, male and female) were significantly reduced in the 1000 mg/kg/day dosage group, compared to the control group value. No other Caesarean-sectioning or litter parameters were affected by dosages of the test substance as high as 1000 mg/kg/day. No gross external, soft tissue or skeletal fetal alterations (malformations or variations) were considered test substance related.

C. Conclusion

On the basis of these data, the maternal no-observable-adverse-effect-level (NOAEL) of PFBS is 300 mg/kg/day (the 1000 mg/kg/day dosage caused reductions in body weight gain and reduced absolute and relative feed consumption values). The developmental NOAEL is also 300 mg/kg/day (the 1000 mg/kg/day dosage caused reductions in fetal body weights).

18 APR-02

Alan M. Hoberman, Ph.D., DABT Date
Director of Research

18 APR 2002

Raymond G. York, Ph.D., DABT Date
Associate Director of Research and
Study Director

II. DESCRIPTION OF TEST PROCEDURES

A. Conduct of Study

A.1. Sponsor

3M Corporate Toxicology, 3M Center, Building 220-2E-02, St. Paul, Minnesota 55144-1000

A.2. Testing Facility

Argus Research, 905 Sheehy Drive, Building A, Horsham, Pennsylvania 19044-1297

A.3. Study Number

418-023

A.4. Sponsor's Study Number

T-7485.12

A.5. Purpose of the Study

The purpose of this study was to evaluate the developmental toxicity (embryo-fetal toxicity and teratogenic potential) of Potassium Perfluorobutane Sulfonate (PFBS) administered orally via gavage to Crl:CD®(SD)IGS BR VAF/Plus® presumed pregnant female rats.

A.6. Study Design

The requirements of the U.S. Environmental Protection Agency (EPA)[1,2], the Organization for Economic Cooperation and Development (OECD)[3], and the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF)[4] were used as the basis for study design.

A.7. Regulatory Compliance

The study was conducted in compliance with Good Laboratory Practice (GLP) regulations of the U.S. Environmental Protection Agency (EPA)[5,6], the Organization for Economic Cooperation and Development (OECD)[7], and the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF)[8]. There were no deviations from the GLP regulations that affected the quality or integrity of the study. Quality Assurance Unit findings derived from the inspections during the conduct of this study are documented and have been provided to the Study Director and the Testing Facility Management.

A.8. Ownership of the Study

The Sponsor owns the study. All raw data, analyses, reports and preserved tissues are the property of the Sponsor.

A.9. Study Monitor

Paul H. Lieder, Ph.D., DABT

A.10. Study Director

Raymond G. York, Ph.D., DABT (Associate Director of Research, Argus Research, 905 Sheehy Drive, Building A, Horsham, Pennsylvania 19044-1297)

A.11. Technical Performance

John F. Barnett, B.S. (Director of Laboratory Operations)
Todd J. Killino, B.S. (Research Associate)
Timothy J. Brommer, B.S. (Laboratory Technician)
Brian K. Kelsch (Necropsy Laboratory Technician)
Christopher K. Ruppert, B.S. (Formulation Laboratory Technician)

A.12. Report Preparation

Raymond G. York, Ph.D., DABT
Jo Ann Frazee, M.S. (Study Coordinator)
Cindy L. Mininger, B.S. (Data Management Specialist)
Natalie A. Farst (Report Administrator)
Georgia Y. Burnett, A.A.S. (Report Administrator)

A.13. Report Review

Valerie A. Sharper, M.S. (Director of Study Management)

A.14. Date Protocol Signed

16 February 2001

A.15. Dates of Technical Performance

Rat Arrival	13 FEB 01
Cohabitation Period	18 FEB 01 PM - 23 FEB 01 AM
DG 0[a]	19 FEB 01 - 23 FEB 01
Dosage Period (DGs 6 through 20)	25 FEB 01 - 14 MAR 01
Caesarean-Sectioning Period (DG 21)	12 MAR 01 - 15 MAR 01

a. DG is an abbreviation used for day of (presumed) gestation.

A.16. Records Maintained

The original report, raw data and reserve samples of the test substance and vehicle are retained in the archives of Argus Research. Any preserved tissues are retained in the archives of the Testing Facility for one year after the mailing of the draft final report, after which time the Sponsor will decide their final disposition. All unused prepared formulations were discarded at the Testing Facility. Unused bulk test substance will be returned to the Sponsor.

B. Test Substance Information

B.1. Description

Potassium Perfluorobutane Sulfonate (PFBS or T-7485) - a white powder

B.2. Lot Number

5

B.3. Date Received and Storage Conditions

The test substance was received on 23 February 2001, and stored at room temperature.

B.4. Special Handling Instructions

Standard safety precautions (use of protective clothing, gloves, dust-mist/HEPA-filtered mask, safety goggles or safety glasses and a face-shield) were taken during preparation and dosage. Tyvek® sleeves and a half-face respirator were worn and procedures were conducted in a chemical fume hood when using the bulk test substance.

B.5. Analysis of Activity

Information regarding the identity, composition, method of synthesis, strength and purity of the test substance is on file with the Sponsor. A Certificate of Analysis is available in APPENDIX E.

C. Vehicle Information

C.1. Description

Aqueous 0.1% carboxymethylcellulose[a] (CMC, medium viscosity) prepared using carboxymethylcellulose, an off-white powder, and reverse osmosis membrane processed deionized water (R.O. deionized water)

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a. See APPENDIX D (DEVIATIONS FROM THE PROTOCOL AND THE STANDARD OPERATING PRTOCEDURES OF THE TESTING FACILTY), item 1.

C.2. Lot Number

49H1332

C.3. Date Received and Storage Conditions

The powdered carboxymethylcellulose was received from Sigma Chemical Co., St. Louis, Missouri, on 19 October 1999, and stored at room temperature. R.O. deionized water is available from a continuous source at the Testing Facility and is maintained at room temperature.

C.4. Special Handling Instructions

Standard safety precautions (use of protective clothing, gloves, dust-mist/HEPA-filtered mask, safety goggles or safety glasses and a face-shield) were taken when handling the vehicle.

C.5. Analysis of Purity

Neither the Sponsor nor the Study Director was aware of any potential contaminants likely to have been present in the vehicle that would have interfered with the results of this study.

D. Test Substance Preparation and Storage Conditions

Suspensions of the test substance were prepared approximately every 10 days at the Testing Facility. Prepared test substance and vehicle formulations were stored at 2°C to 8°C.

D.1. Sample Information

Sample Type	Size	Date Retained	Storage/Shipping Conditions	Shipped To	Date Shipped
Bulk Test Substance	1 g	14 MAR 01	Room temperature	Southern Research Institute[a]	14 MAR 01
Concentration[b] (all levels)	2 mL	23 FEB 01 08 MAR 01	Refrigerated	Southern Research Institute[a]	26 FEB 01 08 MAR 01
Bulk Test Substance Reserve	1 g	20 MAR 01	Room temperature	Testing Facility Archives	12 APR 01
Bulk Vehicle Components Reserve			Room temperature	Testing Facility Archives	
Carboxymethylcellulose	1 g	20 MAR 01			12 APR 01
R.O. Deionized Water	1 g	20 MAR 01			12 APR 01

a. James D. Johnson, Southern Research Institute, 2000 Ninth Avenue South, Birmingham, Alabama 35205.

b. Duplicate samples were taken from each concentration of the first and last preparation on the day prepared. One sample of each set was shipped for analysis. The remaining samples were retained at 2°C to 8°C at the Testing Facility as backup samples.

D.2. Analytical Results

The 10 and 30 mg/mL samples were all found to be within ± 10% of the target concentrations; the 100 mg/mL samples were 86.3% (first preparation) and 106% (last preparation) of target. Information to document the homogeneity and concentration of the test substance in the prepared vehicle over the range of concentrations used in this study and stability data for prepared formulations bracketing the range of concentrations in this study, are available in APPENDIX F. Result of the bulk test substance analysis is available in APPENDIX F.

E. Test System

E.1. Species

Rat

E.2. Strain

Crl:CD®(SD)IGS BR VAF/Plus®

E.3. Supplier (Source)

Charles River Laboratories, Inc., Raleigh, North Carolina

E.4. Sex

Female (Note: Male rats were used only for the purposes of breeding and are not considered part of the Test System.)

E.5. Rationale for Test System

The Crl:CD®(SD)IGS BR VAF/Plus® rat was selected as the Test System because: 1) it is one mammalian species accepted and widely used throughout industry for nonclinical studies of developmental toxicity (embryo-fetal toxicity/teratogenicity); 2) this strain has been demonstrated to be sensitive to developmental toxins; and 3) historical data and experience exist at the Testing Facility[9-11].

E.6. Test System Data

Number of Rats	140
Approximate Date of Birth	11 DEC 00
Approximate Age at Arrival	65 days
Weight (g) on the Day after Arrival	187 - 227
Weight (g) at Study Assignment	220 - 244

E.7. Breeder Male Rat Data

Number of Rats	250
Approximate Date of Birth	17 JUL 00
Approximate Age at Arrival	79 days
Weight (g) on the Day after Arrival	310 - 388
Weight (g) at Cohabitation	526 - 876

E.8. Method of Randomization

Upon arrival, male and female rats were assigned to individual housing on the basis of computer-generated random units. Healthy, mated female rats were assigned to four dosage groups (Groups I through IV), 25 rats per dosage group, using a computer-generated (weight-ordered) randomization procedure based on body weights recorded on DG 0.

E.9. System of Identification

Rats were permanently identified with a Monel® self-piercing ear tag (Gey Band and Tag Co., Inc., No. MSPT 20101). Male rats were given unique permanent identification numbers upon assignment to the Testing Facility's breeder male rat population. Female rats were assigned temporary numbers at receipt and given unique permanent identification numbers when assigned to study. Cage tags were marked with the study number, permanent rat number, sex, test substance identification, generation and dosage level.

F. Husbandry

F.1. Research Facility Registration

USDA Registration No. 14-R-0144 under the Animal Welfare Act, 7 U.S.C. 2131 *et seq.*

F.2. Study Rooms

The study rooms were maintained under conditions of positive airflow relative to a hallway and independently supplied with a minimum of ten changes per hour of 100% fresh air that had been passed through 99.97% HEPA filters. Room temperature and humidity were monitored constantly throughout the study. Room temperature was targeted at 64°F to 79°F (18°C to 26°C); relative humidity was targeted at 30% to 70%[a].

F.3. Housing

Rats were individually housed in stainless steel, wire-bottomed cages except during the cohabitation period. During cohabitation, each pair of male and female rats was housed in the male rat's cage. All cage sizes and housing conditions were in compliance with the *Guide for the Care and Use of Laboratory Animals*[12].

F.4. Lighting

An automatically-controlled fluorescent light cycle was maintained at 12-hours light: 12-hours dark, with each dark period beginning at 1900 hours EST.

F.5. Sanitization

Cage pan liners were changed approximately four times weekly. Cages were changed approximately every other week.

F.6. Feed

Rats were given *ad libitum* access to Certified Rodent Diet® #5002 (PMI Nutrition International, St. Louis, Missouri) in individual feeders.

F.7. Feed Analysis

Analyses were routinely performed by the feed supplier. No contaminants at levels exceeding the maximum concentration limits for certified feed or deviations from expected nutritional requirements were detected by these analyses. Copies of the results of the feed analyses are available in the raw data and APPENDIX G.

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a. See APPENDIX G (ENVIRONMENTAL AND HUSBANDRY REPORTS).

Neither the Sponsor nor the Study Director was aware of any potential contaminants likely to have been present in the feed that would have interfered with the results of this study.

F.8. Water

Local water that had been processed by passage through a reverse osmosis membrane (R.O. water) was available to the rats *ad libitum* from an automatic watering access system. Chlorine was added to the processed water as a bacteriostat.

F.9. Water Analysis

The processed water is analyzed twice annually for possible chemical contamination (Lancaster Laboratories, Lancaster, Pennsylvania) and monthly for possible bacterial contamination (Analytical Laboratories, Inc., Chalfont, Pennsylvania). Copies of the results of the water analyses are available in the raw data and APPENDIX G.

Neither the Sponsor nor the Study Director was aware of any potential contaminants likely to have been present in the water that would have interfered with the results of this study.

G. Methods

G.1. Dosage Administration

Dosage Group	Dosage[a] (mg/kg/day)	Concentration (mg/mL)	Dosage Volume (mL/kg)	Number of Rats	Assigned Rat Numbers
I	0 (Vehicle)	0	10	25	19101 - 19125
II	100	10	10	25	19126 - 19150
III	300	30	10	25	19151 - 19175
IV	1000	100	10	25	19176 - 19200

a. The test substance was considered 100% pure for the purpose of dosage calculations.

G.2. Rationale for Dosage Selection

Dosages were selected on the basis of a dosage-range study (Argus Research, Protocol 418-023P). It was anticipated that the highest dosage level selected would induce some overt developmental and/or maternal mortality, the intermediate dosage levels would produce minimal observed toxic effects and the lowest dosage level would not produce any evidence of either maternal or developmental toxicity.

In the 418-023P study, all rats survived to scheduled sacrifice. Clinical observations considered test substance-related were limited to urine-stained abdominal fur in four rats in the 2000 mg/kg/day dosage group. Rats in the 2000 mg/kg/day dosage group lost

weight on DGs 6 to 9 and body weight gains were reduced at several intervals tabulated during the dosage period. Reflecting these effects of the test substance, body weight gain was reduced in the 2000 mg/kg/day dosage group for the entire treatment (DGs 6 to 21) and gestation (DGs 0 to 21) periods. Absolute and relative feed consumption values were reduced in the 2000 mg/kg/day dosage group on DGs 6 to 9, 9 to 12, 12 to 15, 15 to 18 and 18 to 21, and for the entire treatment and gestation periods. Fetal body weights were reduced in the 2000 mg/kg/day dosage group, as compared with the control group. No other Caesarean-sectioning or litter parameters were affected by dosages of the test substance as high as 2000 mg/kg/day. No fetal gross alterations occurred.

G.3. Route and Rationale for Route of Administration

The oral (gavage) route was selected for use because: 1) in comparison with the dietary route, the exact dosage can be accurately administered; and 2) it is one possible route of human exposure.

G.4. Frequency of Administration

Appropriate dosages of the test substance or vehicle were administered orally (via gavage) once daily to rats on DGs 6 through 20. The dosage volume was adjusted daily on the basis of the individual body weights recorded before intubation. The rats were intubated once daily at approximately the same time each day.

G.5. Method of Study Performance

After acclimation, 140 healthy virgin female rats were placed into cohabitation with 140 breeder male rats, one male rat per female rat. The cohabitation period consisted of a maximum of five days. Mating performance was evaluated daily during the cohabitation period. Female rats with spermatozoa observed in a smear of the vaginal contents and/or a copulatory plug *in situ* were considered to be at DG 0 and assigned to individual housing.

Rats were observed for viability at least twice each day of the study. Rats were also examined for clinical observations and general appearance weekly during the acclimation period and on DG 0. Observations for clinical signs of effects of the test substance, abortions, premature deliveries and deaths were also made daily before and approximately 60 ± 10 minutes after dosage administration and on the day of scheduled sacrifice.

Body weights were recorded weekly during the acclimation period, on DG 0, daily during the dosage period and prior to sacrifice. Feed consumption values were recorded on DGs 0, 6, 9, 12, 15, 18, 20 and 21.

G.6. Gross Necropsy

In order to minimize bias, Caesarean-sectioning and subsequent fetal observations were conducted without knowledge of dosage group. All surviving rats were sacrificed by carbon dioxide asphyxiation on DG 21, Caesarean-sectioned and a gross necropsy of the thoracic, abdominal and pelvic viscera was performed. The gravid uterus was excised and weighed[a]. Uteri of apparently nonpregnant rats were examined while being pressed between glass plates to confirm the absence of implantation sites.

The number of corpora lutea in each ovary was recorded. The uterus of each rat was excised and examined for pregnancy, number and distribution of implantations, live and dead fetuses and early and late resorptions. An early resorption was defined as one in which organogenesis was not grossly evident. A late resorption was defined as one in which the occurrence of organogenesis was grossly evident. A live fetus was defined as a term fetus that responded to stimuli. Nonresponding term fetuses were considered to be dead (there were no dead fetuses). Dead fetuses and late resorptions were differentiated by the degree of autolysis present; marked to extreme autolysis indicated that the fetus was a late resorption.

Each fetus was removed from the uterus, placed in an individual container and identified with a tag noting the study number, litter number, uterine distribution and fixative. Each fetus was subsequently weighed and examined for sex and gross external alterations. Live fetuses were sacrificed by an intraperitoneal injection of sodium pentobarbital. Late resorptions were examined to the extent possible.

Approximately one-half of the fetuses in each litter were examined for soft tissue alterations using a variation of the microdissection technique of Staples[(13)]. These fetuses were fixed in Bouin's solution and the heads were subsequently examined by free-hand sectioning; head sections were retained in alcohol. The decapitated carcasses were discarded. The remaining fetuses (approximately one-half of the fetuses in each litter) were examined for skeletal alterations (bone and cartilage) after staining with alizarin red S[(14)]. The fetuses were initially fixed in alcohol; skeletal preparations were retained in glycerin with thymol added as a preservative.

Rats that died or were sacrificed because of premature delivery were examined for the cause of death on the day the observation was made. The rats were examined for gross lesions. Pregnancy status and uterine contents of female rats were recorded. Gravid uterine weights were recorded unless precluded by autolysis. Delivered pups and fetuses *in uteri* were examined to the extent possible, using the methods described for term fetuses. Uteri of apparently nonpregnant rats will be examined while being pressed between glass plates to confirm the absence of implantation sites.

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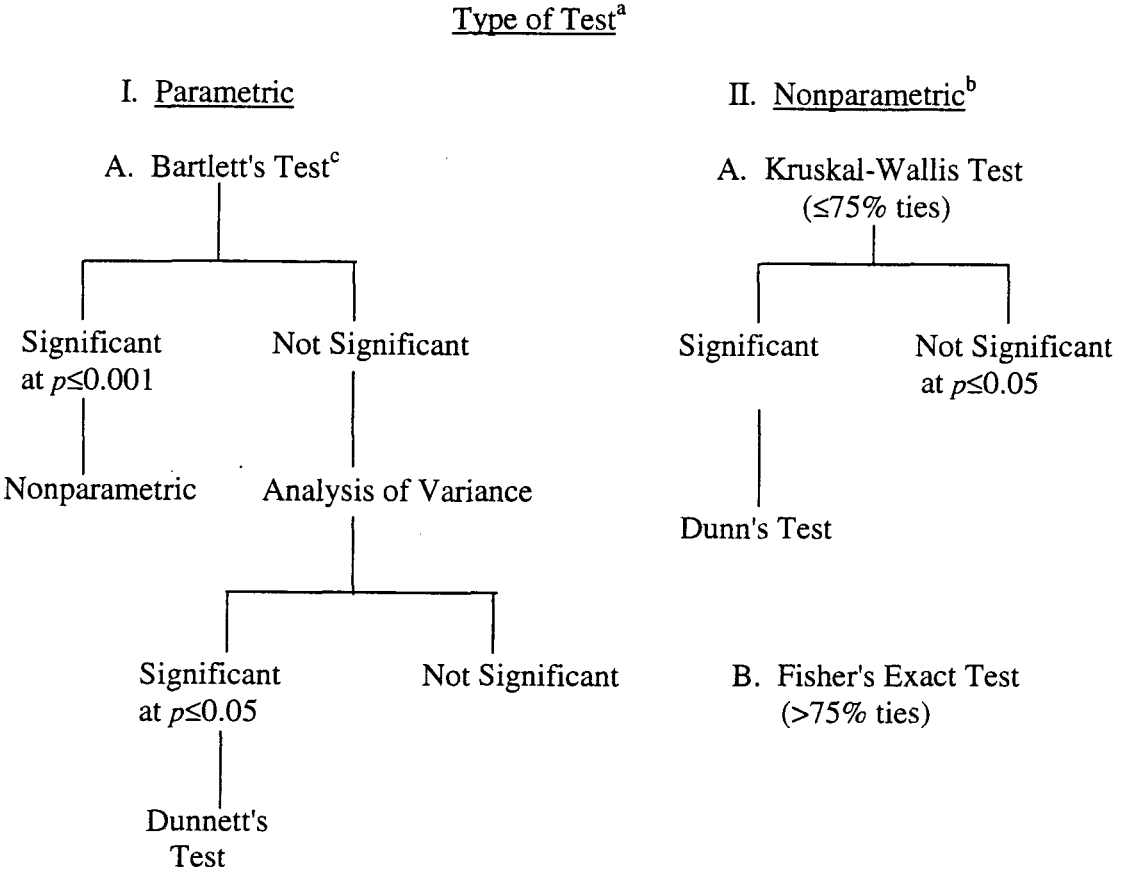
a. See APPENDIX D, item 2.

G.7. Data Collection and Statistical Analyses

Data generated during the course of this study were recorded either by hand or using the *Primedica Argus Automated Data Collection and Management System* and the *Vivarium Temperature and Relative Humidity Monitoring System.* All data were tabulated, summarized and/or statistically analyzed using the *Primedica Argus Automated Data Collection and Management System*, the *Vivarium Temperature and Relative Humidity Monitoring System, Microsoft Excel* [part of Microsoft Office 97 (version SR-2)] and/or *the SAS System* (version 6.12).

Averages and percentages were calculated. Litter values were used where appropriate. The following schematic represents the statistical analyses of data:



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a. Statistically significant probabilities are reported as either $p \leq 0.05$ or $p \leq 0.01$.
b. Proportion data are not included in this category.
c. Test for homogeneity of variance.

Clinical observation and other proportion data were analyzed using the Variance Test for Homogeneity of the Binomial Distribution[15].

Continuous data (e.g., maternal body weights, body weight changes, feed consumption values and litter averages for percent male fetuses, percent resorbed conceptuses, fetal body weights, fetal anomaly data and fetal ossification site data) were analyzed using Bartlett's Test of Homogeneity of Variances[16] and the Analysis of Variance[17], when appropriate [i.e., Bartlett's Test was not significant ($p>0.001$)]. If the Analysis of Variance was significant ($p\leq0.05$), Dunnett's Test[18] was used to identify the statistical significance of the individual groups. If the Analysis of Variance was not appropriate [i.e., Bartlett's Test was significant ($p\leq0.001$)], the Kruskal-Wallis Test[19] was used, when less than or equal to 75% ties were present. In cases where the Kruskal-Wallis Test was statistically significant ($p\leq0.05$), Dunn's Method of Multiple Comparisons[20] was used to identify the statistical significance of the individual groups. If there were greater than 75% ties, Fisher's Exact Test[21] was used to analyze the data.

Count data obtained at Caesarean-sectioning of the dams were evaluated using the procedures described above for the Kruskal-Wallis Test[19].

III. RESULTS

A. Mortality, Premature Deliveries and Clinical and Necropsy Observations (Summaries - Tables 1 and 2; Individual Data - Tables 14 and 15)

A.1. Mortality

Two rats in the 1000 mg/kg/day dosage group were found dead. The death of one of these rats was attributed to an intubation accident. No cause of death was determined for the other rat that was found dead in this dosage group, but the death was considered unrelated to the test substance because it was a single event. One rat in each of the 0 (Vehicle) and 300 mg/kg/day dosage groups began delivery before Caesarean-sectioning on day 21 of gestation (DG 21) and were sacrificed. Observations in these rats are described below. All other rats survived until scheduled sacrifice.

Rat 19181 in the 1000 mg/kg/day dosage group was found dead on day 18 of presumed gestation (DG 18) before the 13th daily dosage. This rat was cold to touch and dehydrated on DG 17. This rat had a variable pattern of weight gains and losses after DG 6 and weighed approximately the same amount on DG 16 as on DG 6. There was a weight loss from DG 16 to 17. Feed consumption values were comparable to other nonpregnant rats in this dosage group. All tissues examined appeared normal at necropsy. The rat was not pregnant. No cause of death could be determined.

Rat 19198 in the 1000 mg/kg/day dosage group was found dead on DG 17, seven minutes after the 12th daily dosage. Clinical signs observed prior to being found dead were all normal. After an initial weight loss on DGs 6 to 7, this rat gained weight throughout the study. Feed consumption values were comparable to other rats in the dosage group. Necropsy revealed a 0.1 cm diameter perforation of the esophagus and 3 mL of red substance in the thoracic cavity. All other tissues examined at necropsy appeared normal. The litter consisted of 15 fetuses and one early resorption *in utero*. All fetuses appeared normal at gross external examination; further examination was precluded by early developmental age. Based on the necropsy results, this death was attributed to an intubation error.

Rat 19111 in the vehicle control group delivered two pups on DG 21 and was euthanized. Clinical signs observed prior to delivery were all normal. Body weight gains and feed consumption values were comparable to other rats in the dosage group. All tissues examined at necropsy appeared normal. There were 13 fetuses and one early resorption *in utero*. All pups and fetuses appeared normal at gross external, soft tissue and skeletal examinations.

Rat 19157 in the 300 mg/kg/day dosage group delivered one pup on DG 21 and was euthanized. Clinical signs observed prior to delivery were all normal. Body weight gains and feed consumption values were comparable to other rats in the dosage group. All tissues examined at necropsy appeared normal. There were 16 fetuses *in utero*. All

fetuses and the pup appeared normal at gross external, soft tissue and skeletal examinations.

A.2. Clinical and Necropsy Observations

All clinical observations were considered unrelated to the test substance because: 1) the incidences were not dosage-dependent; or 2) the observations occurred in only one or three rats. These clinical observations included localized alopecia on the limbs in rats in the 0 (Vehicle), 100 and 300 mg/kg/day dosage groups and cold to touch and dehydration in the 1000 mg/kg/day dosage group rat that died as the result of an intubation error.

The only adverse necropsy observations were perforation of the esophagus and red fluid in the thoracic cavity in the 1000 mg/kg/day dosage group rat that died as the result of an intubation error.

B. Maternal Body Weights, Body Weight Changes and Gravid Uterine Weights (Figure 1; Summaries - Tables 3 and 4 Individual Data - Table 16)

Maternal body weight gains were significantly reduced (p#0.05 or p#0.01) on DGs 6 to 9 and 18 to 21 in the 1000 mg/kg/day dosage group. As a result of these reductions, maternal body weight gains were significantly reduced (p#0.01) in the 1000 mg/kg/day dosage group for the entire gestation period (DGs 0 to 21). When the DG 21 body weight was corrected for gravid uterine weight (DG 21C), maternal body weight gains for the entire dosage period (calculated as DGs 6 to 21C) were significantly reduced ($p \leq 0.01$).

Maternal body weights were significantly reduced (p#0.05 or p#0.01) in the 1000 mg/kg/day dosage group on DGs 20 and 21. Gravid uterine weights were slightly reduced (91% of control value) in the 1000 mg/kg/day dosage group, but this reduction was not statistically significant.

Body weights, body weight gains and gravid uterine weights were unaffected by dosages of the test substance as high as 300 mg/kg/day. Maternal body weight gains in the 100 and 300 mg/kg/day dosage groups were significantly reduced (p#0.05 or $p \leq 0.01$) on DGs 18 to 21 and this resulted in a significant reduction on DGs 6 to 21. These reductions were not considered test substance-related because they were single occurrences and were not significant ($p > 0.05$) when the body weights were corrected for uterine contents (calculated DGs 6 to 21).

C. Maternal Absolute (g/day) and Relative (g/kg/day) Feed Consumption Values (Summaries - Tables 5 and 6; Individual Data - Table 17)

Absolute (g/day) and relative (g/kg/day) feed consumption values were significantly reduced (p#0.01) on DGs 18 to 21, and the relative feed consumption value was significantly reduced (p#0.05) on DGs 9 to 12 in the 1000 mg/kg/day dosage group. As a result of these reductions, absolute and relative feed consumption values were

significantly reduced (p#0.01) in the 1000 mg/kg/day dosage group for the entire dosage period (calculated as DGs 6 to 21).

Absolute and relative feed consumption values were unaffected by dosages of the test substance as high as 300 mg/kg/day. Absolute and/or relative feed consumption values were significantly reduced (p#0.05) on DGs 18 to 21 in the 100 and 300 mg/kg/day dosage groups but the reductions were not considered test substance-related because they were single occurrences and did not persist.

D. Caesarean-Sectioning and Litter Observations (Summaries - Tables 7 and 8; Individual Data - Tables 18 through 20)

Caesarean-sectioning observations were based on 24, 22, 23 and 21 pregnant rats that survived to DG 21 in the 0 (Vehicle), 100, 300 and 1000 mg/kg/day dosage groups, respectively.

Fetal body weights (total, male and female) were significantly reduced (p#0.01) in the 1000 mg/kg/day dosage group, compared to the control group value.

No other Caesarean-sectioning or litter parameters were affected by dosages of the test substance as high as 1000 mg/kg/day. The litter averages for implantations, litter sizes, live fetuses, early and late resorptions, percent resorbed conceptuses, and percent live male fetuses were comparable among the four dosage groups and did not significantly differ. No dam had a litter consisting of only resorbed conceptuses, there were no dead fetuses and all placentae appeared normal. The litter average for corpora lutea was significantly reduced (p#0.01) in the 300 mg/kg/day dosage group but the reduction was not considered treatment-related because: 1) it was not dosage dependent; and 2) corpora lutea formation occurred prior to dosage administration.

E. Fetal Alterations (Summaries - Tables 9 through 13; Individual Data - Table 21)

Fetal alternations were defined as: 1) malformations (irreversible changes that occur at low incidences in this species and strain); or 2) variations (common findings in this species and strain and reversible delays or accelerations in development). Litter averages were calculated for specific fetal ossification sites as part of the evaluation of the degree of fetal ossification.

Fetal evaluations were based on 358, 316, 331 and 311 live, DG 21 Caesarean-delivered fetuses in 24, 22, 23 and 21 litters in the 0 (Vehicle), 100, 300 and 1000 mg/kg/day dosage groups, respectively. Each of these fetuses was examined for gross external alterations. Of these respective fetuses, 173, 150, 157 and 150 fetuses were examined for soft tissue alterations, and 185, 166, 174 and 161 fetuses were examined for skeletal alterations and fetal ossification site averages.

E.1. Summary of Fetal Alterations (Summary - Table 9; Individual Data - Table 21)

The number of litters with fetuses with alterations numbered 4 (16.7%), 8 (36.4%), 3 (13.0%) and 3 (14.3%), in the 0 (Vehicle), 100, 300 and 1000 mg/kg/day dosage groups, respectively. The numbers of fetuses with any alteration observed were 4 (1.1%), 13 (4.1%)**, 3 (0.9%) and 3 (1.0%), and the percentages of fetuses with any alteration per litter were 1.2, 4.3, 0.8 and 1.0 in these same respective dosage groups.

No gross external, soft tissue or skeletal fetal alterations (malformations or variations) were caused by dosages of the test substance as high as 1000 mg/kg/day. There were no dosage-dependent or significant differences in the litter or fetal incidences of any gross external, soft tissue or skeletal alterations. The significant increase ($p\#0.01$) in the percentage of fetuses with any alteration in the 100 mg/kg/day dosage groups was not considered treatment-related because it was not dosage-dependent.

All fetal alterations in this study are described in the following information.

E.2. Fetal Gross External Alterations (Summary - Table 10; Individual Data - Table 21)

No gross external fetal alterations occurred.

E.3. Fetal Soft Tissue Alterations (Summary - Table 11; Individual Data - Table 21)

E.3.a. Malformations

One control group fetus (19118-10) had an absent left eye. No additional alterations occurred in this fetus.

E.3.b. Variations

E.3.b.1. Eyes

Folded retina, a variation usually attributable to processing, occurred in one fetus (19143-19) in the 100 mg/kg/day dosage group. No additional alterations occurred in this fetus.

E.3.b.2. Vessels

The umbilical artery descended to the left of the urinary bladder in 1, 2, 0 and 0 fetuses from 1, 2, 0 and 0 litters from the 0 (Vehicle), 100, 300 and 1000 mg/kg/day dosage groups, respectively. No additional alterations occurred in these fetuses.

** Significantly different from the vehicle control group value at $p\#0.01$

Absent innominate artery occurred in one fetus (19185-8) in the 1000 mg/kg/day dosage group. No additional alterations occurred in this fetus.

E.4. Fetal Skeletal Alterations (Summaries - Tables 12 and 13; Individual Data - Table 21)

E.4.a. Malformations

One fetus in the vehicle control group (19120-5) had a left hemivertebra present as the 14th thoracic vertebra (arch and centrum with attached rib), fused arches of the 13th and 14th thoracic vertebrae, unilateral ossification (left) of the centrum of the 14th thoracic vertebra and not ossified centrum of the 13th thoracic vertebra. This fetus also had a bifid centrum of the 11th thoracic vertebra.

One 100 mg/kg/day dosage group fetus (19138-9) had proximally fused 4th and 5th right ribs. This fetus also had a bifid centrum of the 4th thoracic vertebra.

E.4.b. Variations

As described in the following information, all skeletal variations were reversible delays in fetal ossification[22-23], with the exception of cervical rib, a common variation in this strain of rat[24].

E.4.b.1. Vertebrae

A bifid centrum in a thoracic vertebra occurred in 2, 4, 3 and 1 fetuses in 2, 4, 3 and 1 litters in the four respective dosage groups. Fetuses 19120-5 and 19138-9 in the 0 (Vehicle) and 100 mg/kg/day dosage groups, respectively, had additional skeletal alterations, as previously described.

E.4.b.2. Ribs

A cervical rib at the 7th cervical vertebra, a common variation in this strain of rat[24], was present in 0, 3, 0 and 1 fetuses from 0, 2, 0 and 1 litters in the four respective groups. No additional alterations occurred in these fetuses.

E.4.b.3. Sternum

Delayed sternal ossification (fused 1st and 2nd and asymmetric 1st through 3rd sternal centra) occurred in one fetus (19140-12) in the 100 mg/kg/day dosage group. No additional alterations occurred in this fetus.

E.4.b.4. Pelvis

One fetus (19139-7) in the 100 mg/kg/day dosage group had an incompletely ossified right pubis. No additional alterations occurred in this fetus.

E.4.b.5. Fetal Ossification Site Averages

Fetal ossification sites in the hindlimbs (metatarsals and phalanges) were significantly reduced ($p \leq 0.01$) in the 1000 mg/kg/day dosage group. These reductions in the number of ossification sites are considered reversible delays in ossification associated with the maternal toxicity (reduced body weights, body weight gains and feed consumption) observed at this dosage level.

There were no statistically significant or biologically important differences among the four dosage groups in the average numbers of ossification sites per fetus for the hyoid, vertebrae (cervical, thoracic, lumbar, sacral and caudal), ribs, sternum (manubrium, sternal centers and xiphoid), forelimbs (carpals, metacarpals and phalanges) or hindlimbs (tarsals).

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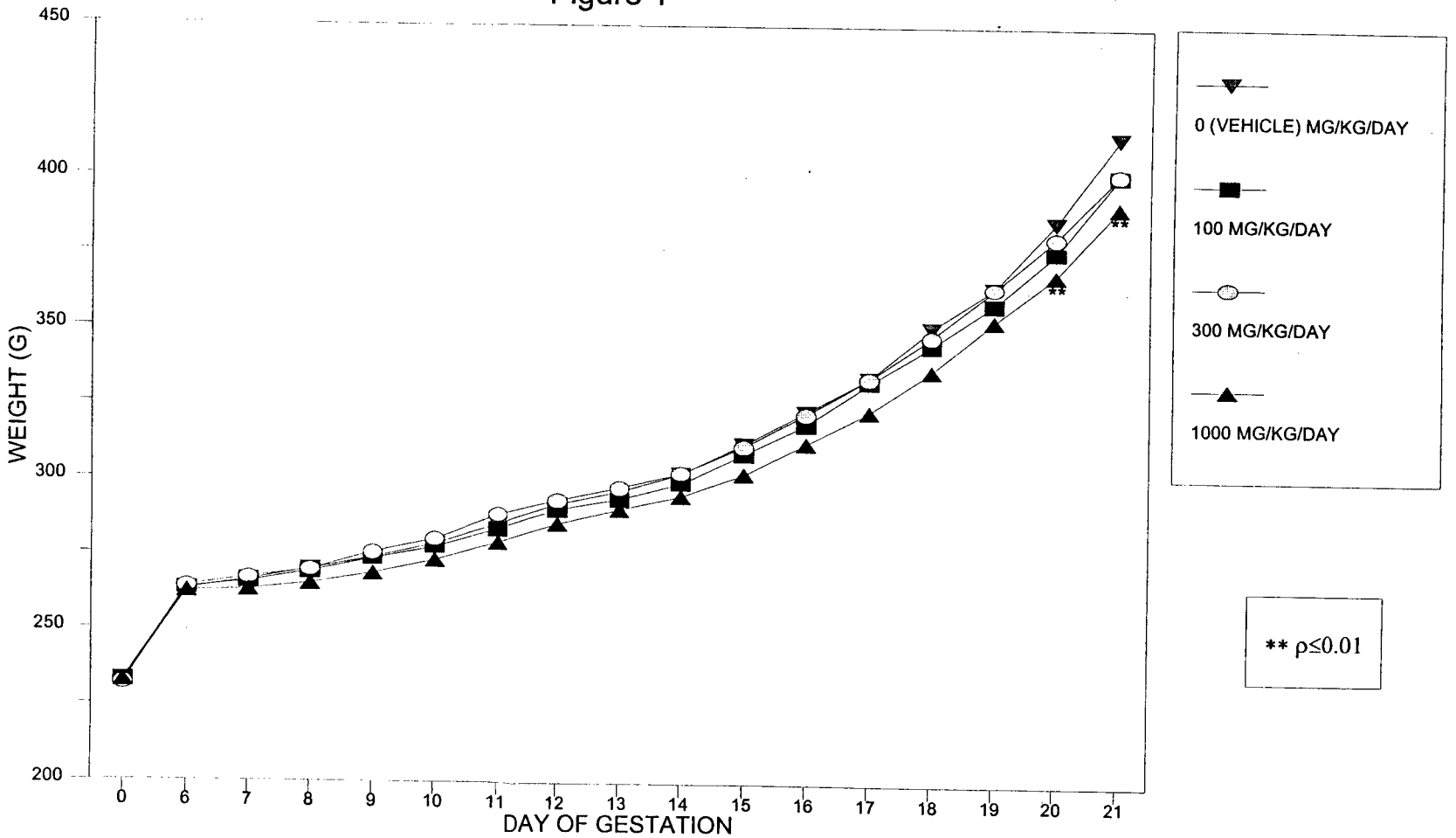
APPENDIX A

REPORT FIGURE

MATERNAL BODY WEIGHTS

Figure 1



APPENDIX B

REPORT TABLES

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 1 (PAGE 1): CLINICAL OBSERVATIONS - SUMMARY

GROUP	I	II	III	IV
DOSAGE (MG/KG/DAY)a	0 (VEHICLE)	100	300	1000
MAXIMUM POSSIBLE INCIDENCE	400/ 25	400/ 25	400/ 25	392/ 25
FOUND DEAD	0	0	0	2b,c
DELIVERED AND SACRIFICED	1d	0	1e	0
COLD TO TOUCH	0/ 0	0/ 0	0/ 0	1/ 1b
DEHYDRATION	0/ 0	0/ 0	0/ 0	1/ 1b
LOCALIZED ALOPECIA: LIMBS	26/ 3	7/ 1	15/ 1	0/ 0

STATISTICAL ANALYSES OF CLINICAL OBSERVATION DATA WERE RESTRICTED TO THE NUMBER OF RATS WITH OBSERVATIONS.
MAXIMUM POSSIBLE INCIDENCE = (DAYS x RATS)/NUMBER OF RATS EXAMINED PER GROUP ON DAYS 6 THROUGH 21 OF PRESUMED GESTATION.
N/N = TOTAL NUMBER OF OBSERVATIONS/NUMBER OF RATS WITH OBSERVATION.
a. Dosage occurred on days 6 through 20 of presumed gestation.
b. Dam 19181 was found dead on day 18 of gestation.
c. Dam 19198 was found dead on day 17 of gestation.
d. Dam 19111 delivered and was sacrificed on day 21 of gestation.
e. Dam 19157 delivered and was sacrificed on day 21 of gestation.

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TABLE 2 (PAGE 1): NECROPSY OBSERVATIONS - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
RATS EXAMINED b	N	25	25	25	25
FOUND DEAD	N	0	0	0	2c,d
DELIVERED AND SACRIFICED	N	1e	0	1f	0
APPEARED NORMAL	N	24e	25	24f	23c
ESOPHAGUS:					
PERFORATION	N	0	0	0	1d
THORACIC CAVITY:					
RED FLUID	N	0	0	0	1d

a. Dosage occurred on days 6 through 20 of presumed gestation.
b. Refer to the individual clinical observations table (Table 14) for external observations confirmed at necropsy.
c. Dam 19181 was found dead on day 18 of gestation.
d. Dam 19198 was found dead on day 17 of gestation.
e. Dam 19111 delivered and was sacrificed on day 21 of gestation.
f. Dam 19157 delivered and was sacrificed on day 21 of gestation.

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TABLE 3 (PAGE 1): MATERNAL BODY WEIGHTS - SUMMARY

GROUP			I	II	III	IV
DOSAGE (MG/KG/DAY)a			0 (VEHICLE)	100	300	1000
RATS TESTED		N	25	25	25	25
PREGNANT		N	25	22	24	22
MATERNAL BODY WEIGHT (G)						
DAY 0		MEAN±S.D.	231.7 ± 6.6	232.9 ± 6.7	232.0 ± 6.7	232.8 ± 6.9
DAY 6		MEAN±S.D.	262.8 ± 8.5	263.2 ± 9.9	263.9 ± 11.5	262.4 ± 13.0
DAY 7		MEAN±S.D.	266.2 ± 8.8	265.5 ± 9.4	266.8 ± 12.1	262.9 ± 15.3
DAY 8		MEAN±S.D.	269.8 ± 8.9	269.0 ± 10.2	269.6 ± 13.5	265.1 ± 16.5
DAY 9		MEAN±S.D.	273.8 ± 9.4	273.3 ± 9.9	275.5 ± 14.1	268.5 ± 16.7
DAY 10		MEAN±S.D.	278.4 ± 10.3	277.4 ± 10.0	280.1 ± 14.6	273.0 ± 15.0
DAY 11		MEAN±S.D.	285.2 ± 10.3	283.5 ± 10.9	288.2 ± 15.7	279.0 ± 16.7
DAY 12		MEAN±S.D.	291.9 ± 10.1	290.0 ± 11.0	293.2 ± 15.6	285.3 ± 15.9
DAY 13		MEAN±S.D.	296.2 ± 12.2	293.7 ± 10.7	297.5 ± 16.3	290.2 ± 15.4
DAY 14		MEAN±S.D.	302.2 ± 12.2	299.0 ± 12.5	302.4 ± 16.4	294.8 ± 15.5
DAY 15		MEAN±S.D.	312.2 ± 12.6	308.9 ± 12.5	311.4 ± 17.8	302.2 ± 16.4
DAY 16		MEAN±S.D.	322.9 ± 13.1	318.7 ± 14.3	322.1 ± 18.8	312.4 ± 15.8

DAY = DAY OF GESTATION
a. Dosage occurred on days 6 through 20 of gestation.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 3 (PAGE 2): MATERNAL BODY WEIGHTS - SUMMARY

GROUP DOSAGE (MG/KG/DAY)a		I 0 (VEHICLE)	II 100	III 300	IV 1000
RATS TESTED	N	25	25	25	25
PREGNANT	N	25	22	24	22
DAY 17	MEAN±S.D.	334.0 ± 15.9	332.4 ± 14.6	333.8 ± 19.5	322.8 ± 18.9
DAY 18	MEAN±S.D.	350.8 ± 16.3	344.9 ± 14.9	347.8 ± 19.9	336.5 ± 21.4 [21]b
DAY 19	MEAN±S.D.	364.3 ± 19.7	358.7 ± 15.6	364.0 ± 22.3	353.0 ± 22.4 [21]b
DAY 20	MEAN±S.D.	386.0 ± 20.9	375.9 ± 17.1	380.8 ± 22.8	368.5 ± 22.2** [21]b
DAY 21	MEAN±S.D.	414.0 ± 24.7	401.7 ± 19.9	402.0 ± 25.9	391.2 ± 23.6** [21]b
GRAVID UTERINE WEIGHTS (G)	MEAN±S.D.	108.5 ± 18.6 [23]c,d	104.9 ± 15.3	101.3 ± 11.8 [23]c	99.1 ± 11.6 [20]d
DAY 21C e	MEAN±S.D.	304.4 ± 17.0 [23]c,d	296.8 ± 18.2	300.1 ± 20.9 [23]c	291.5 ± 19.5 [20]d

DAY = DAY OF GESTATION
[ ] = NUMBER OF VALUES AVERAGED
a. Dosage occurred on days 6 through 20 of gestation.
b. Excludes values for dam 19198 which was found dead on gestation day 17.
c. Excludes values from dams that delivered on day 21 of gestation.
d. Excludes values for dams with no gravid uterine weight recorded.
e. 21C = Corrected maternal body weight (day 21 of gestation body weight minus the gravid uterine weight).
** Significantly different from the vehicle control group value ($p \leq 0.01$).

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 4 (PAGE 1): MATERNAL BODY WEIGHT CHANGES - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
RATS TESTED	N	25	25	25	25
PREGNANT	N	25	22	24	22
MATERNAL BODY WEIGHT CHANGE (G)					
DAYS 0 - 6	MEAN±S.D.	+31.1 ± 6.4	+30.3 ± 7.4	+31.8 ± 9.9	+29.6 ± 10.9
DAYS 6 - 9	MEAN±S.D.	+11.0 ± 4.2	+10.1 ± 4.7	+11.6 ± 7.0	+6.2 ± 8.8*
DAYS 9 - 12	MEAN±S.D.	+18.2 ± 3.5	+16.6 ± 5.0	+17.8 ± 5.1	+16.8 ± 7.6
DAYS 12 - 15	MEAN±S.D.	+20.3 ± 4.7	+19.0 ± 5.4	+18.2 ± 5.4	+16.9 ± 7.4
DAYS 15 - 18	MEAN±S.D.	+38.6 ± 7.1	+36.0 ± 6.8	+36.3 ± 5.0	+33.6 ± 8.8 [21]b
DAYS 18 - 21	MEAN±S.D.	+63.2 ± 11.5	+56.8 ± 8.2*	+54.2 ± 10.4**	+54.7 ± 9.0** [21]b
DAYS 6 - 21	MEAN±S.D.	+151.3± 18.8	+138.5± 15.2*	+138.2± 20.0*	+128.4± 14.4** [21]b
DAYS 0 - 21	MEAN±S.D.	+182.4± 22.5	+168.8± 18.7	+170.0± 26.0	+158.0± 22.5** [21]b
DAYS 6 - 21C e	MEAN±S.D.	+42.4 ± 13.7 [23]c,d	+33.6 ± 15.6	+36.5 ± 15.3 [23]c	+28.9 ± 11.6** [20]d
DAYS 0 - 21C e	MEAN±S.D.	+73.6 ± 15.7 [23]c,d	+63.9 ± 18.4	+67.9 ± 20.6 [23]c	+58.5 ± 19.1 [20]d

DAYS = DAYS OF GESTATION
[ ] = NUMBER OF VALUES AVERAGED
a. Dosage occurred on days 6 through 20 of gestation.
b. Excludes values for dam 19198 which was found dead on gestation day 17.
c. Excludes values from dams that delivered on day 21 of gestation.
d. Excludes values for dams with no gravid uterine weight recorded.
e. 21C = Corrected maternal body weight (day 21 of gestation body weight minus the gravid uterine weight).
* Significantly different from the vehicle control group value ($p \leq 0.05$).
** Significantly different from the vehicle control group value ($p \leq 0.01$).

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 5 (PAGE 1): MATERNAL ABSOLUTE FEED CONSUMPTION VALUES (G/DAY) - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
RATS TESTED	N	25	25	25	25
PREGNANT	N	25	22	24	22
MATERNAL FEED CONSUMPTION (G/DAY)					
DAYS 0 - 6	MEAN±S.D.	22.7 ± 2.5	22.7 ± 2.1	23.0 ± 2.6	22.2 ± 2.2
DAYS 6 - 9	MEAN±S.D.	22.5 ± 1.8	22.4 ± 2.2	23.4 ± 3.7 [23]b	21.1 ± 4.0
DAYS 9 - 12	MEAN±S.D.	23.0 ± 2.3	22.6 ± 1.2	23.7 ± 3.2	21.2 ± 3.0
DAYS 12 - 15	MEAN±S.D.	24.5 ± 2.4	24.0 ± 1.9	24.3 ± 2.4	22.9 ± 2.3
DAYS 15 - 18	MEAN±S.D.	25.6 ± 2.8	26.0 ± 2.1 [21]b	26.1 ± 2.8	24.4 ± 3.2 [21]c
DAYS 18 - 21	MEAN±S.D.	26.9 ± 3.4	24.9 ± 3.0*	24.8 ± 2.9*	23.6 ± 2.6** [21]c
DAYS 6 - 21	MEAN±S.D.	24.5 ± 2.0	24.0 ± 1.6	24.4 ± 2.5	22.7 ± 2.0** [21]c
DAYS 0 - 21	MEAN±S.D.	24.0 ± 1.9	23.6 ± 1.5	24.0 ± 2.4	22.6 ± 2.0 [21]c

DAYS = DAYS OF GESTATION
[ ] = NUMBER OF VALUES AVERAGED
a. Dosage occurred on days 6 through 20 of gestation.
b. Excludes values that were associated with spillage.
c. Excludes values for dam 19198 which was found dead on gestation day 17.
* Significantly different from the vehicle control group value ($p \leq 0.05$).
** Significantly different from the vehicle control group value ($p \leq 0.01$).

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 6 (PAGE 1): MATERNAL RELATIVE FEED CONSUMPTION VALUES (G/KG/DAY) - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
RATS TESTED	N	25	25	25	25
PREGNANT	N	25	22	24	22
MATERNAL FEED CONSUMPTION (G/KG/DAY)					
DAYS 0 - 6	MEAN±S.D.	91.8 ± 8.7	91.6 ± 8.3	92.5 ± 9.6	89.6 ± 7.2
DAYS 6 - 9	MEAN±S.D.	83.7 ± 5.6	83.5 ± 7.2	86.5 ± 10.4 [23]b	79.4 ± 12.4
DAYS 9 - 12	MEAN±S.D.	81.2 ± 6.6	80.3 ± 4.2	83.3 ± 7.7	76.7 ± 8.3*
DAYS 12 - 15	MEAN±S.D.	81.5 ± 6.3	80.7 ± 5.3	80.4 ± 5.5	78.2 ± 6.5
DAYS 15 - 18	MEAN±S.D.	77.7 ± 8.1	79.6 ± 5.1 [21]b	79.2 ± 6.0	76.6 ± 8.8 [21]c
DAYS 18 - 21	MEAN±S.D.	71.0 ± 8.0	67.2 ± 6.7	66.2 ± 5.8*	65.2 ± 6.5** [21]c
DAYS 6 - 21	MEAN±S.D.	78.2 ± 5.0	77.3 ± 3.8	78.1 ± 4.6	74.5 ± 4.2** [21]c
DAYS 0 - 21	MEAN±S.D.	77.8 ± 4.5	77.3 ± 3.5	77.9 ± 4.3	75.1 ± 4.0 [21]c

DAYS = DAYS OF GESTATION
[ ] = NUMBER OF VALUES AVERAGED
a. Dosage occurred on days 6 through 20 of gestation.
b. Excludes values that were associated with spillage.
c. Excludes values for dam 19198 which was found dead on gestation day 17.
* Significantly different from the vehicle control group value ($p \leq 0.05$).
** Significantly different from the vehicle control group value ($p \leq 0.01$).

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 7 (PAGE 1): CAESAREAN-SECTIONING OBSERVATIONS - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
RATS TESTED	N	25	25	25	25
PREGNANT	N(%)	25(100.0)	22(88.0)	24(96.0)	22(88.0)
FOUND DEAD	N(%)	0(0.0)	0(0.0)	0(0.0)	1(4.5)
DELIVERED	N(%)	1(4.0)	0(0.0)	1(4.2)	0(0.0)
RATS PREGNANT AND CAESAREAN-SECTIONED ON DAY 21 OF GESTATION	N	24	22	23	21
CORPORA LUTEA	MEAN±S.D.	18.6 ± 3.2	17.9 ± 3.2	15.9 ± 2.4**	17.6 ± 2.4
IMPLANTATIONS	MEAN±S.D.	15.3 ± 2.8	15.2 ± 2.3	15.0 ± 1.9	15.7 ± 1.7
LITTER SIZES	MEAN±S.D.	14.9 ± 2.9	14.4 ± 2.2	14.4 ± 2.2	14.8 ± 1.7
LIVE FETUSES	N	358	316	331	311
	MEAN±S.D.	14.9 ± 2.9	14.4 ± 2.2	14.4 ± 2.2	14.8 ± 1.7
DEAD FETUSES	N	0	0	0	0
RESORPTIONS	MEAN±S.D.	0.4 ± 0.7	0.8 ± 1.1	0.6 ± 0.8	0.8 ± 1.1
EARLY RESORPTIONS	N	10	18	15	18
	MEAN±S.D.	0.4 ± 0.7	0.8 ± 1.1	0.6 ± 0.8	0.8 ± 1.1
LATE RESORPTIONS	N	0	0	0	0
DAMS WITH ANY RESORPTIONS	N(%)	7(29.2)	10(45.4)	12(52.2)	10(47.6)
DAMS WITH ALL CONCEPTUSES RESORBED	N(%)	0	0	0	0
DAMS WITH VIABLE FETUSES	N(%)	24(100.0)	22(100.0)	23(100.0)	21(100.0)
PLACENTAE APPEARED NORMAL	N(%)	24(100.0)	22(100.0)	23(100.0)	21(100.0)

a. Dosage occurred on days 6 through 20 of gestation.
** Significantly different from the vehicle control group value ($p \leq 0.01$).

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TABLE 8 (PAGE 1): LITTER OBSERVATIONS (CAESAREAN-DELIVERED FETUSES) - SUMMARY

GROUP DOSAGE (MG/KG/DAY)a		I 0 (VEHICLE)	II 100	III 300	IV 1000
LITTERS WITH ONE OR MORE LIVE FETUSES	N	24	22	23	21
IMPLANTATIONS	MEAN±S.D.	15.3 ± 2.8	15.2 ± 2.3	15.0 ± 1.9	15.7 ± 1.7
LIVE FETUSES	N	358	316	331	311
	MEAN±S.D.	14.9 ± 2.9	14.4 ± 2.2	14.4 ± 2.2	14.8 ± 1.7
LIVE MALE FETUSES	N	189	154	161	156
% LIVE MALE FETUSES/LITTER	MEAN±S.D.	52.4 ± 8.9	49.0 ± 12.1	48.2 ± 13.4	50.5 ± 12.7
LIVE FETAL BODY WEIGHTS (GRAMS)/LITTER	MEAN±S.D.	5.34 ± 0.39	5.36 ± 0.31	5.17 ± 0.30	4.87 ± 0.20**
MALE FETUSES	MEAN±S.D.	5.48 ± 0.39	5.54 ± 0.35	5.30 ± 0.29	5.00 ± 0.22**
FEMALE FETUSES	MEAN±S.D.	5.18 ± 0.41	5.21 ± 0.32	5.06 ± 0.32	4.73 ± 0.21**
% RESORBED CONCEPTUSES/LITTER	MEAN±S.D.	2.8 ± 4.9	5.3 ± 8.1	4.5 ± 5.9	5.3 ± 6.7

a. Dosage occurred on days 6 through 20 of gestation.
** Significantly different from the vehicle control group value ($p<0.01$).

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TABLE 9 (PAGE 1): FETAL ALTERATIONS - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
LITTERS EVALUATED	N	24	22	23	21
FETUSES EVALUATED	N	358	316	331	311
LIVE	N	358	316	331	311
LITTERS WITH FETUSES WITH ANY ALTERATION OBSERVED	N(%)	4(16.7)	8(36.4)	3(13.0)	3(14.3)
FETUSES WITH ANY ALTERATION OBSERVED	N(%)	4(1.1)	13(4.1)**	3(0.9)	3(1.0)
% FETUSES WITH ANY ALTERATION/LITTER	MEAN±S.D.	1.2 ± 2.7	4.3 ± 6.9	0.8 ± 2.1	1.0 ± 2.4

a. Dosage occurred on days 6 through 20 of gestation.
** Significantly different from the vehicle control group value ($p \leq 0.01$).

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TABLE 10 (PAGE 1): FETAL GROSS EXTERNAL ALTERATIONS - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
LITTERS EVALUATED	N	24	22	23	21
FETUSES EVALUATED	N	358	316	331	311
LIVE	N	358	316	331	311
NO FETAL ALTERATIONS WERE IDENTIFIED AT GROSS EXTERNAL EXAMINATION					

a. Dosage occurred on days 6 through 20 gestation.

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TABLE 11 (PAGE 1): FETAL SOFT TISSUE ALTERATIONS - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
LITTERS EVALUATED	N	24	22	23	21
FETUSES EVALUATED	N	173	150	157	150
LIVE	N	173	150	157	150
EYES: FOLDED RETINA					
LITTER INCIDENCE	N(%)	0(0.0)	1(4.5)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	0(0.0)	1(0.7)	0(0.0)	0(0.0)
EYES: ABSENT EYE					
LITTER INCIDENCE	N(%)	1(4.2)	0(0.0)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	1(0.6)	0(0.0)	0(0.0)	0(0.0)
VESSELS: UMBILICAL ARTERY DESCENDED TO THE LEFT OF THE URINARY BLADDER					
LITTER INCIDENCE	N(%)	1(4.2)	2(9.1)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	1(0.6)	2(1.3)	0(0.0)	0(0.0)
VESSELS: INNOMINATE ARTERY ABSENT					
LITTER INCIDENCE	N(%)	0(0.0)	0(0.0)	0(0.0)	1(4.8)
FETAL INCIDENCE	N(%)	0(0.0)	0(0.0)	0(0.0)	1(0.7)

a. Dosage occurred on days 6 through 20 of gestation.

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TABLE 12 (PAGE 1): FETAL SKELETAL ALTERATIONS - SUMMARY
(See footnotes on the last page of this table.)

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
LITTERS EVALUATED	N	24	22	23	21
FETUSES EVALUATED	N	185	166	174	161
LIVE	N	185	166	174	161
CERVICAL VERTEBRAE: CERVICAL RIB PRESENT AT 7TH CERVICAL VERTEBRA					
LITTER INCIDENCE	N(%)	0(0.0)	2(9.1)	0(0.0)	1(4.8)
FETAL INCIDENCE	N(%)	0(0.0)	3(1.8)	0(0.0)	1(0.6)
THORACIC VERTEBRAE: CENTRUM, BIFID					
LITTER INCIDENCE	N(%)	2(8.3)	4(18.2)	3(13.0)	1(4.8)
FETAL INCIDENCE	N(%)	2(1.1)b	4(2.4)c	3(1.7)	1(0.6)
THORACIC VERTEBRAE: ARCHES, FUSED					
LITTER INCIDENCE	N(%)	1(4.2)	0(0.0)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	1(0.5)b	0(0.0)	0(0.0)	0(0.0)
THORACIC VERTEBRAE: HEMIVERTEBRA					
LITTER INCIDENCE	N(%)	1(4.2)	0(0.0)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	1(0.5)b	0(0.0)	0(0.0)	0(0.0)
THORACIC VERTEBRAE: CENTRUM, UNILATERAL OSSIFICATION					
LITTER INCIDENCE	N(%)	1(4.2)	0(0.0)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	1(0.5)b	0(0.0)	0(0.0)	0(0.0)
THORACIC VERTEBRAE: CENTRUM, NOT OSSIFIED					
LITTER INCIDENCE	N(%)	1(4.2)	0(0.0)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	1(0.5)b	0(0.0)	0(0.0)	0(0.0)
RIBS: FUSED					
LITTER INCIDENCE	N(%)	0(0.0)	1(4.5)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	0(0.0)	1(0.6)c	0(0.0)	0(0.0)

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TABLE 12 (PAGE 2): FETAL SKELETAL ALTERATIONS - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
LITTERS EVALUATED	N	24	22	23	21
FETUSES EVALUATED	N	185	166	174	161
LIVE	N	185	166	174	161
STERNAL CENTRA: SUMMARIZATION (Includes fused and asymmetric sternal centra):					
LITTER INCIDENCE	N(%)	0(0.0)	1(4.5)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	0(0.0)	1(0.6)	0(0.0)	0(0.0)
STERNAL CENTRA: FUSED					
LITTER INCIDENCE	N(%)	0(0.0)	1(4.5)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	0(0.0)	1(0.6)d	0(0.0)	0(0.0)
STERNAL CENTRA: ASYMMETRIC					
LITTER INCIDENCE	N(%)	0(0.0)	1(4.5)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	0(0.0)	1(0.6)d	0(0.0)	0(0.0)
PELVIS: PUBIS, INCOMPLETELY OSSIFIED					
LITTER INCIDENCE	N(%)	0(0.0)	1(4.5)	0(0.0)	0(0.0)
FETAL INCIDENCE	N(%)	0(0.0)	1(0.6)	0(0.0)	0(0.0)

a. Dosage occurred on days 6 through 20 of gestation.
b. Fetus 19120-5 had other skeletal alterations.
c. Fetus 19138-9 had other skeletal alterations.
d. Fetus 19140-12 had other skeletal alterations.

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TABLE 13 (PAGE 1): FETAL OSSIFICATION SITES - CAESAREAN-DELIVERED LIVE FETUSES (DAY 21 OF GESTATION) - SUMMARY

GROUP		I	II	III	IV
DOSAGE (MG/KG/DAY)a		0 (VEHICLE)	100	300	1000
LITTERS EXAMINED	N	24	22	23	21
FETUSES EXAMINED	N	185	166	174	161
OSSIFICATION SITES PER FETUS PER LITTER					
HYOID	MEAN±S.D.	1.00 ± 0.00	1.00 ± 0.00	0.99 ± 0.04	0.98 ± 0.05
VERTEBRAE					
CERVICAL	MEAN±S.D.	7.00 ± 0.00	7.00 ± 0.00	7.00 ± 0.00	7.00 ± 0.00
THORACIC	MEAN±S.D.	13.08 ± 0.13	13.03 ± 0.06	13.07 ± 0.12	13.08 ± 0.17
LUMBAR	MEAN±S.D.	5.92 ± 0.13	5.95 ± 0.08	5.92 ± 0.12	5.91 ± 0.17
SACRAL	MEAN±S.D.	3.00 ± 0.00	3.00 ± 0.00	3.00 ± 0.00	3.00 ± 0.00
CAUDAL	MEAN±S.D.	7.75 ± 0.92	7.64 ± 0.90	7.65 ± 0.70	7.10 ± 0.58
RIBS (PAIRS)	MEAN±S.D.	13.05 ± 0.08	13.02 ± 0.04	13.06 ± 0.10	13.06 ± 0.11
STERNUM					
MANUBRIUM	MEAN±S.D.	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00
STERNAL CENTERS	MEAN±S.D.	3.98 ± 0.06	3.98 ± 0.07	4.00 ± 0.02	3.98 ± 0.05
XIPHOID	MEAN±S.D.	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00
FORELIMB b					
CARPALS	MEAN±S.D.	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
METACARPALS	MEAN±S.D.	4.00 ± 0.02	3.97 ± 0.09	4.00 ± 0.00	4.00 ± 0.00
DIGITS	MEAN±S.D.	5.00 ± 0.00	5.00 ± 0.00	5.00 ± 0.00	5.00 ± 0.00
PHALANGES	MEAN±S.D.	8.37 ± 0.74	8.35 ± 0.71	8.37 ± 0.64	8.27 ± 0.64
HINDLIMB b					
TARSALS	MEAN±S.D.	0.04 ± 0.16	0.03 ± 0.08	0.02 ± 0.06	0.00 ± 0.00
METATARSALS	MEAN±S.D.	4.85 ± 0.21	4.80 ± 0.27	4.81 ± 0.28	4.60 ± 0.31**
DIGITS	MEAN±S.D.	5.00 ± 0.00	5.00 ± 0.00	5.00 ± 0.00	5.00 ± 0.00
PHALANGES	MEAN±S.D.	6.57 ± 1.27	6.52 ± 1.11	6.27 ± 1.10	5.65 ± 0.72**

a. Dosage occurred on days 6 through 20 of gestation.
b. Calculated as average per limb.

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TABLE 14 (PAGE 1): CLINICAL OBSERVATIONS - INDIVIDUAL DATA

GROUP I		VEHICLE	0 MG/KG/DAY
RAT #		DESCRIPTION	
19101		NO ADVERSE FINDINGS	
19102		NO ADVERSE FINDINGS	
19103	DG(14- 19)	LOCALIZED ALOPECIA: LIMBS	
19104		NO ADVERSE FINDINGS	
19105		NO ADVERSE FINDINGS	
19106		NO ADVERSE FINDINGS	
19107		NO ADVERSE FINDINGS	
19108		NO ADVERSE FINDINGS	
19109	DG(9- 21)	LOCALIZED ALOPECIA: LIMBS a	
19110		NO ADVERSE FINDINGS	
19111	DG(21)	DELIVERED AND SACRIFICED	
19112		NO ADVERSE FINDINGS	
19113		NO ADVERSE FINDINGS	
19114		NO ADVERSE FINDINGS	
19115	DG(15- 21)	LOCALIZED ALOPECIA: LIMBS a	
19116		NO ADVERSE FINDINGS	
19117		NO ADVERSE FINDINGS	
19118		NO ADVERSE FINDINGS	
19119		NO ADVERSE FINDINGS	
19120		NO ADVERSE FINDINGS	
19121		NO ADVERSE FINDINGS	
19122		NO ADVERSE FINDINGS	
19123		NO ADVERSE FINDINGS	
19124		NO ADVERSE FINDINGS	
19125		NO ADVERSE FINDINGS	

DG = DAY OF PRESUMED GESTATION
a. Observation confirmed at necropsy.

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TABLE 14 (PAGE 2): CLINICAL OBSERVATIONS - INDIVIDUAL DATA

GROUP II		LOW DOSAGE	100 MG/KG/DAY
RAT #		DESCRIPTION	
19126		NO ADVERSE FINDINGS	
19127		NO ADVERSE FINDINGS	
19128		NO ADVERSE FINDINGS	
19129		NO ADVERSE FINDINGS	
19130		NO ADVERSE FINDINGS	
19131		NO ADVERSE FINDINGS	
19132		NO ADVERSE FINDINGS	
19133		NO ADVERSE FINDINGS	
19134		NO ADVERSE FINDINGS	
19135		NO ADVERSE FINDINGS	
19136		NO ADVERSE FINDINGS	
19137		NO ADVERSE FINDINGS	
19138		NO ADVERSE FINDINGS	
19139		NO ADVERSE FINDINGS	
19140		NO ADVERSE FINDINGS	
19141		NO ADVERSE FINDINGS	
19142		NO ADVERSE FINDINGS	
19143		NO ADVERSE FINDINGS	
19144		NO ADVERSE FINDINGS	
19145		NO ADVERSE FINDINGS	
19146		NO ADVERSE FINDINGS	
19147		NO ADVERSE FINDINGS	
19148	DG(15- 21)	LOCALIZED ALOPECIA: LIMBS a	
19149		NO ADVERSE FINDINGS	
19150		NO ADVERSE FINDINGS	

DG = DAY OF PRESUMED GESTATION
a. Observation confirmed at necropsy.

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TABLE 14 (PAGE 3): CLINICAL OBSERVATIONS - INDIVIDUAL DATA

GROUP III		MIDDLE DOSAGE	300 MG/KG/DAY
RAT #		DESCRIPTION	
19151		NO ADVERSE FINDINGS	
19152		NO ADVERSE FINDINGS	
19153		NO ADVERSE FINDINGS	
19154		NO ADVERSE FINDINGS	
19155		NO ADVERSE FINDINGS	
19156		NO ADVERSE FINDINGS	
19157	DG(21)	DELIVERED AND SACRIFICED	
19158		NO ADVERSE FINDINGS	
19159		NO ADVERSE FINDINGS	
19160		NO ADVERSE FINDINGS	
19161		NO ADVERSE FINDINGS	
19162		NO ADVERSE FINDINGS	
19163		NO ADVERSE FINDINGS	
19164		NO ADVERSE FINDINGS	
19165		NO ADVERSE FINDINGS	
19166		NO ADVERSE FINDINGS	
19167		NO ADVERSE FINDINGS	
19168		NO ADVERSE FINDINGS	
19169		NO ADVERSE FINDINGS	
19170		NO ADVERSE FINDINGS	
19171		NO ADVERSE FINDINGS	
19172		NO ADVERSE FINDINGS	
19173	DG(7- 21)	LOCALIZED ALOPECIA: LIMBS a	
19174		NO ADVERSE FINDINGS	
19175		NO ADVERSE FINDINGS	

DG = DAY OF PRESUMED GESTATION
a. Observation confirmed at necropsy.

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TABLE 14 (PAGE 4): CLINICAL OBSERVATIONS - INDIVIDUAL DATA

GROUP IV		HIGH DOSAGE 1000 MG/KG/DAY
RAT #		DESCRIPTION
19176		NO ADVERSE FINDINGS
19177		NO ADVERSE FINDINGS
19178		NO ADVERSE FINDINGS
19179		NO ADVERSE FINDINGS
19180		NO ADVERSE FINDINGS
19181	DG(17)	COLD TO TOUCH
	DG(17)	DEHYDRATION a
	DG(18)	FOUND DEAD
19182		NO ADVERSE FINDINGS
19183		NO ADVERSE FINDINGS
19184		NO ADVERSE FINDINGS
19185		NO ADVERSE FINDINGS
19186		NO ADVERSE FINDINGS
19187		NO ADVERSE FINDINGS
19188		NO ADVERSE FINDINGS
19189		NO ADVERSE FINDINGS
19190		NO ADVERSE FINDINGS
19191		NO ADVERSE FINDINGS
19192		NO ADVERSE FINDINGS
19193		NO ADVERSE FINDINGS
19194		NO ADVERSE FINDINGS
19195		NO ADVERSE FINDINGS
19196		NO ADVERSE FINDINGS
19197		NO ADVERSE FINDINGS
19198	DG(17)	FOUND DEAD
19199		NO ADVERSE FINDINGS
19200		NO ADVERSE FINDINGS

DG = DAY OF PRESUMED GESTATION
a. Observation confirmed at necropsy.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 15 (PAGE 1): NECROPSY OBSERVATIONS - INDIVIDUAL DATA

GROUP DOSAGE (MG/KG/DAY)	RAT NUMBER	DAY OF NECROPSY	PREGNANCY STATUS	DOSAGES ADMINISTERED	OBSERVATIONS a
I					
0 (VEHICLE)	19101	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19102	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19103	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19104	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19105	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19106	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19107	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19108	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19109	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19110	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19111	DG 21	P	15	DELIVERED ON DAY 21 OF GESTATION. UTERINE CONTENTS: 16 IMPLANTATION SITES (2 DELIVERED PUPS, 13 FETUSES AND 1 EARLY RESORPTION IN UTERO).b ALL TISSUES APPEARED NORMAL.
	19112	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19113	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19114	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19115	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19116	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19117	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19118	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19119	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19120	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19121	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19122	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19123	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19124	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19125	DG 21	P	15	ALL TISSUES APPEARED NORMAL.

DG = DAY OF PRESUMED GESTATION
P = PREGNANT NP = NOT PREGNANT
a. Refer to the individual clinical observations table (Table 14) for external observations confirmed at necropsy.
b. Refer to table 20 for gross, soft tissue and skeletal examinations.

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IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 15 (PAGE 2): NECROPSY OBSERVATIONS - INDIVIDUAL DATA

GROUP DOSAGE (MG/KG/DAY)	RAT NUMBER	DAY OF NECROPSY	PREGNANCY STATUS	DOSAGES ADMINISTERED	OBSERVATIONS a
II 100	19126	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19127	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19128	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19129	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19130	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19131	DG 21	NP	15	ALL TISSUES APPEARED NORMAL.
	19132	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19133	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19134	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19135	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19136	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19137	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19138	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19139	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19140	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19141	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19142	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19143	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19144	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19145	DG 21	NP	15	ALL TISSUES APPEARED NORMAL.
	19146	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19147	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19148	DG 21	NP	15	ALL TISSUES APPEARED NORMAL.
	19149	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19150	DG 21	P	15	ALL TISSUES APPEARED NORMAL.

DG = DAY OF PRESUMED GESTATION
P = PREGNANT NP = NOT PREGNANT
a. Refer to the individual clinical observations table (Table 14) for external observations confirmed at necropsy.

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TABLE 15 (PAGE 3): NECROPSY OBSERVATIONS - INDIVIDUAL DATA

GROUP DOSAGE (MG/KG/DAY)	RAT NUMBER	DAY OF NECROPSY	PREGNANCY STATUS	DOSAGES ADMINISTERED	OBSERVATIONS a
III					
300	19151	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19152	DG 21	NP	15	ALL TISSUES APPEARED NORMAL.
	19153	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19154	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19155	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19156	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19157	DG 21	P	15	DELIVERED ON DAY 21 OF GESTATION. UTERINE CONTENTS: 17 IMPLANTATION SITES (1 DELIVERED PUP AND 16 FETUSES IN UTERO).b ALL TISSUES APPEARED NORMAL.
	19158	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19159	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19160	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19161	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19162	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19163	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19164	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19165	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19166	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19167	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19168	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19169	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19170	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19171	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19172	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19173	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19174	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19175	DG 21	P	15	ALL TISSUES APPEARED NORMAL.

DG = DAY OF PRESUMED GESTATION
P = PREGNANT NP = NOT PREGNANT
a. Refer to the individual clinical observations table (Table 14) for external observations confirmed at necropsy.
b. Refer to table 20 for gross, soft tissue and skeletal examinations.

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TABLE 15 (PAGE 4): NECROPSY OBSERVATIONS - INDIVIDUAL DATA

GROUP DOSAGE (MG/KG/DAY)	RAT NUMBER	DAY OF NECROPSY	PREGNANCY STATUS	DOSAGES ADMINISTERED	OBSERVATIONS a
IV					
1000	19176	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19177	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19178	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19179	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19180	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19181	DG 18	NP	12	FOUND DEAD ON DAY 18 OF GESTATION. (DEATH OCCURRED PRIOR TO DOSAGE). ALL TISSUES APPEARED NORMAL.
	19182	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19183	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19184	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19185	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19186	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19187	DG 21	NP	15	ALL TISSUES APPEARED NORMAL.
	19188	DG 21	NP	15	ALL TISSUES APPEARED NORMAL.
	19189	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19190	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19191	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19192	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19193	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19194	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19195	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19196	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19197	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19198	DG 17	P	12	FOUND DEAD ON DAY 17 OF GESTATION. (DEATH OCCURRED 7 MINUTES AFTER DOSAGE). ESOPHAGUS: PERFORATION (0.1 CM IN DIAMETER). THORACIC CAVITY: RED SUBSTANCE (3 ML) UTERINE CONTENTS: 16 IMPLANTATION SITES (15 FETUSES AND 1 EARLY RESORPTION IN UTERO).b ALL OTHER TISSUES APPEARED NORMAL.
	19199	DG 21	P	15	ALL TISSUES APPEARED NORMAL.
	19200	DG 21	P	15	ALL TISSUES APPEARED NORMAL.

DG = DAY OF PRESUMED GESTATION
P = PREGNANT NP = NOT PREGNANT
a. Refer to the individual clinical observations table (Table 14) for external observations confirmed at necropsy.
b. Refer to table 20 for gross, soft tissue and skeletal examinations.

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TABLE 16 (PAGE 1): MATERNAL BODY WEIGHTS - INDIVIDUAL DATA

RAT #		GROUP I			VEHICLE			0 MG/KG/DAY						
	PREGNANCY STATUS	DAY 0	6	7	8	9	10	11	12	13	14	15	16	17
19101	P	224.	264.	267.	270.	273.	276.	283.	292.	294.	301.	311.	324.	342.
19102	P	237.	259.	260.	265.	269.	275.	281.	289.	291.	294.	305.	318.	330.
19103	P	228.	264.	264.	261.	271.	275.	283.	287.	297.	297.	307.	315.	326.
19104	P	223.	253.	258.	264.	271.	274.	282.	291.	290.	295.	308.	320.	332.
19105	P	232.	263.	265.	271.	274.	281.	284.	296.	298.	304.	313.	332.	349.
19106	P	228.	266.	270.	274.	279.	285.	290.	293.	297.	306.	312.	329.	337.
19107	P	240.	277.	279.	286.	288.	296.	303.	307.	314.	323.	333.	343.	355.
19108	P	231.	255.	256.	261.	263.	276.	281.	284.	290.	290.	303.	316.	318.
19109	P	221.	241.	246.	250.	252.	256.	263.	271.	273.	280.	287.	297.	306.
19110	P	236.	269.	273.	272.	279.	285.	290.	297.	301.	308.	318.	331.	343.
19111	P	242.	264.	266.	264.	273.	278.	284.	291.	293.	301.	307.	320.	329.
19112	P	224.	258.	267.	270.	271.	274.	282.	284.	291.	298.	305.	323.	333.
19113	P	238.	263.	268.	273.	280.	281.	291.	295.	300.	305.	312.	329.	341.
19114	P	230.	275.	280.	284.	288.	294.	305.	310.	317.	318.	329.	334.	352.
19115	P	231.	258.	268.	270.	276.	279.	284.	291.	296.	302.	311.	318.	333.
19116	P	220.	252.	258.	266.	269.	269.	278.	280.	280.	292.	307.	312.	316.
19117	P	238.	274.	281.	285.	290.	295.	302.	310.	317.	321.	333.	341.	350.
19118	P	226.	258.	255.	260.	263.	269.	275.	280.	284.	289.	302.	309.	312.
19119	P	228.	253.	257.	261.	261.	267.	273.	280.	287.	291.	303.	315.	315.
19120	P	234.	258.	261.	266.	266.	271.	270.	289.	286.	289.	302.	311.	320.
19121	P	232.	268.	277.	275.	281.	291.	294.	301.	307.	315.	326.	339.	354.
19122	P	232.	264.	264.	265.	270.	268.	277.	285.	287.	292.	296.	302.	316.
19123	P	243.	275.	278.	286.	289.	297.	300.	310.	325.	329.	343.	354.	371.
19124	P	240.	267.	267.	273.	269.	273.	286.	294.	296.	313.	316.	318.	332.
19125	P	234.	271.	271.	273.	279.	274.	288.	291.	293.	302.	316.	323.	339.

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAY = DAY OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).

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TABLE 16 (PAGE 2): MATERNAL BODY WEIGHTS - INDIVIDUAL DATA

RAT #		GROUP I		VEHICLE		0 MG/KG/DAY
PREGNANCY STATUS	DAY 18	19	20	21	GRAVID UTERINE WEIGHT (G)	
19101	P	365.	378.	401.	429.	136.05
19102	P	344.	361.	378.	411.	106.33
19103	P	343.	353.	382.	412.	111.83
19104	P	347.	358.	379.	402.	89.53
19105	P	353.	375.	404.	431.	113.66
19106	P	353.	365.	382.	416.	108.74
19107	P	374.	379.	405.	449.	a
19108	P	337.	347.	366.	402.	113.60
19109	P	320.	329.	345.	366.	87.54
19110	P	363.	386.	414.	444.	128.47
19111	P	343.	354.	374.	405.b	108.44c
19112	P	355.	366.	391.	420.	121.15
19113	P	357.	368.	385.	419.	106.85
19114	P	378.	387.	404.	446.	116.38
19115	P	353.	363.	388.	381.	117.87
19116	P	338.	360.	373.	403.	88.26
19117	P	359.	379.	398.	420.	94.09
19118	P	335.	320.	358.	387.	105.74
19119	P	330.	346.	363.	385.	87.37
19120	P	336.	354.	371.	398.	98.50
19121	P	373.	388.	414.	448.	133.60
19122	P	325.	339.	354.	376.	57.00
19123	P	383.	409.	433.	464.	129.47
19124	P	352.	370.	390.	417.	119.07
19125	P	355.	373.	399.	420.	123.61

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAY = DAY OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).
a. Gravid uterine weight not recorded.
b. Dam 19111 delivered on day 21 of gestation.
c. Uterine weight taken including the two delivered pups (pups weighed outside the uterus); value was excluded from group averages and statistical analyses.

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TABLE 16 (PAGE 3): MATERNAL BODY WEIGHTS - INDIVIDUAL DATA

RAT #		GROUP II			LOW DOSAGE			100 MG/KG/DAY					
	PREGNANCY STATUS	DAY 0	6	7	8	9	10	11	12	13	14	15	16	17
19126	P	220.	251.	258.	260.	257.	271.	274.	280.	293.	298.	308.	315.	330.
19127	P	234.	269.	276.	281.	286.	285.	294.	297.	306.	309.	324.	330.	347.
19128	P	221.	259.	263.	268.	277.	270.	282.	282.	290.	286.	301.	314.	326.
19129	P	224.	258.	259.	265.	272.	277.	285.	290.	296.	305.	310.	324.	338.
19130	P	230.	250.	251.	256.	259.	261.	264.	277.	278.	279.	286.	298.	312.
19131	NP	228.	231.	233.	234.	228.	236.	238.	239.	233.	241.	245.	244.	238.
19132	P	232.	270.	267.	258.	267.	272.	280.	289.	292.	294.	310.	320.	330.
19133	P	232.	260.	265.	270.	271.	279.	284.	295.	296.	302.	311.	326.	336.
19134	P	238.	255.	257.	263.	263.	270.	271.	284.	282.	291.	301.	318.	330.
19135	P	230.	252.	256.	263.	269.	274.	281.	285.	290.	295.	305.	312.	332.
19136	P	233.	276.	278.	288.	286.	296.	302.	305.	310.	319.	331.	341.	358.
19137	P	241.	277.	267.	270.	280.	283.	292.	300.	303.	306.	314.	329.	349.
19138	P	240.	264.	268.	269.	272.	275.	282.	289.	293.	301.	308.	313.	333.
19139	P	232.	261.	266.	267.	270.	275.	283.	283.	292.	296.	303.	310.	318.
19140	P	236.	264.	266.	269.	272.	274.	287.	290.	298.	302.	314.	324.	338.
19141	P	242.	284.	287.	290.	297.	303.	305.	319.	319.	328.	337.	355.	355.
19142	P	236.	258.	262.	263.	269.	271.	275.	284.	283.	284.	298.	305.	309.
19143	P	224.	255.	260.	262.	269.	272.	273.	277.	281.	286.	299.	303.	316.
19144	P	237.	265.	266.	273.	274.	278.	283.	290.	288.	295.	296.	307.	326.
19145	NP	228.	241.	244.	243.	238.	244.	249.	250.	244.	248.	251.	244.	246.
19146	P	225.	255.	260.	262.	267.	273.	275.	283.	289.	291.	301.	308.	317.
19147	P	239.	276.	281.	284.	283.	291.	297.	304.	306.	313.	318.	326.	346.
19148	NP	224.	248.	255.	248.	251.	255.	258.	248.	246.	245.	250.	245.	247.
19149	P	235.	254.	252.	254.	265.	265.	270.	274.	276.	283.	295.	297.	314.
19150	P	243.	278.	277.	282.	288.	288.	299.	302.	300.	314.	326.	336.	353.

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAY = DAY OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).

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TABLE 16 (PAGE 4): MATERNAL BODY WEIGHTS - INDIVIDUAL DATA

RAT #		GROUP II		LOW DOSAGE		100 MG/KG/DAY
PREGNANCY STATUS		DAY 18	19	20	21	GRAVID UTERINE WEIGHT (G)
19126	P	349.	362.	382.	411.	101.40
19127	P	356.	376.	394.	424.	109.77
19128	P	339.	349.	367.	390.	97.44
19129	P	345.	361.	372.	407.	86.13
19130	P	315.	329.	343.	369.	92.20
19131	NP	245.	250.	244.	246.	-----
19132	P	345.	354.	375.	398.	127.44
19133	P	353.	366.	385.	421.	113.72
19134	P	349.	361.	392.	411.	117.40
19135	P	332.	359.	364.	398.	110.21
19136	P	366.	382.	406.	420.	112.53
19137	P	365.	373.	388.	415.	113.84
19138	P	342.	356.	368.	392.	86.10
19139	P	328.	334.	350.	364.	61.36
19140	P	352.	366.	375.	406.	111.03
19141	P	369.	382.	403.	436.	93.85
19142	P	328.	346.	358.	382.	102.05
19143	P	334.	348.	365.	393.	117.48
19144	P	342.	358.	375.	403.	117.92
19145	NP	247.	247.	252.	253.	-----
19146	P	331.	342.	360.	384.	91.47
19147	P	357.	370.	389.	421.	113.43
19148	NP	251.	248.	250.	254.	-----
19149	P	325.	335.	360.	368.	107.03
19150	P	366.	382.	398.	425.	124.49

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAY = DAY OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).

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TABLE 16 (PAGE 5): MATERNAL BODY WEIGHTS - INDIVIDUAL DATA

RAT #		GROUP III			MIDDLE DOSAGE		300 MG/KG/DAY						
PREGNANCY STATUS	DAY 0	6	7	8	9	10	11	12	13	14	15	16	17
19151	P	224.	249.	252.	252.	251.	265.	274.	276.	281.	288.	300.	308.	322.
19152	NP	225.	252.	254.	254.	256.	260.	263.	262.	255.	254.	255.	252.	253.
19153	P	222.	268.	270.	276.	273.	282.	288.	288.	298.	305.	318.	327.	345.
19154	P	243.	271.	268.	263.	266.	270.	281.	283.	284.	290.	297.	304.	315.
19155	P	234.	266.	270.	275.	276.	287.	293.	305.	310.	316.	318.	332.	346.
19156	P	242.	262.	268.	263.	270.	278.	284.	288.	294.	298.	308.	316.	325.
19157	P	228.	269.	272.	270.	278.	280.	290.	294.	295.	302.	311.	324.	337.
19158	P	238.	280.	288.	290.	294.	299.	310.	316.	320.	329.	345.	360.	370.
19159	P	236.	262.	262.	270.	270.	278.	285.	292.	295.	301.	309.	319.	329.
19160	P	232.	267.	260.	265.	271.	270.	283.	286.	290.	294.	300.	314.	326.
19161	P	230.	268.	276.	281.	291.	296.	312.	316.	319.	329.	339.	350.	364.
19162	P	223.	243.	252.	252.	258.	264.	265.	274.	275.	279.	285.	302.	306.
19163	P	220.	251.	250.	254.	264.	268.	274.	279.	278.	288.	290.	298.	305.
19164	P	229.	280.	286.	292.	301.	307.	314.	321.	322.	322.	331.	348.	355.
19165	P	228.	260.	267.	270.	274.	282.	289.	297.	299.	298.	313.	320.	328.
19166	P	232.	256.	262.	265.	273.	278.	285.	288.	297.	299.	309.	318.	336.
19167	P	228.	257.	265.	268.	273.	277.	288.	292.	302.	307.	313.	332.	335.
19168	P	241.	271.	266.	272.	280.	280.	287.	290.	294.	299.	312.	319.	330.
19169	P	239.	275.	278.	284.	292.	295.	303.	308.	315.	320.	331.	347.	358.
19170	P	224.	248.	242.	247.	253.	260.	260.	268.	272.	275.	284.	294.	304.
19171	P	235.	245.	258.	262.	269.	261.	276.	277.	291.	284.	294.	304.	323.
19172	P	233.	284.	292.	299.	304.	315.	322.	327.	337.	338.	349.	355.	371.
19173	P	240.	278.	276.	280.	292.	292.	303.	302.	303.	308.	317.	323.	339.
19174	P	231.	256.	258.	252.	262.	264.	270.	279.	281.	287.	291.	298.	313.
19175	P	237.	267.	264.	269.	277.	275.	282.	292.	288.	301.	311.	319.	329.

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAY = DAY OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).

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TABLE 16 (PAGE 6): MATERNAL BODY WEIGHTS - INDIVIDUAL DATA

RAT #		GROUP III		MIDDLE DOSAGE		300 MG/KG/DAY
PREGNANCY STATUS	DAY 18	19	20	21	GRAVID UTERINE WEIGHT (G)	
19151 P	335.	349.	367.	391.	99.24	
19152 NP	252.	257.	259.	263.	-----	
19153 P	352.	375.	392.	436.	109.01	
19154 P	320.	337.	352.	367.	90.83	
19155 P	358.	381.	394.	417.	120.07	
19156 P	338.	349.	364.	388.	74.51	
19157 P	354.	367.	386.	417.a	113.46b	
19158 P	388.	409.	417.	437.	98.49	
19159 P	344.	361.	385.	389.	101.74	
19160 P	342.	362.	379.	397.	115.40	
19161 P	370.	387.	400.	430.	98.97	
19162 P	320.	330.	347.	366.	90.93	
19163 P	324.	337.	353.	376.	94.62	
19164 P	369.	388.	409.	421.	108.14	
19165 P	347.	362.	386.	395.	103.27	
19166 P	348.	365.	393.	413.	114.38	
19167 P	353.	374.	390.	413.	112.35	
19168 P	354.	376.	385.	413.	110.86	
19169 P	366.	384.	404.	438.	115.11	
19170 P	316.	331.	339.	361.	93.25	
19171 P	337.	345.	371.	385.	97.65	
19172 P	391.	403.	424.	450.	107.27	
19173 P	350.	367.	374.	386.	86.25	
19174 P	323.	330.	344.	363.	79.82	
19175 P	348.	367.	383.	400.	107.15	

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAY = DAY OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).
a. Dam 19157 delivered on day 21 of gestation.
b. Uterine weight taken including the one delivered pup (pup weighed outside the uterus); value was excluded from group averages and statistical analyses.

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TABLE 16 (PAGE 7): MATERNAL BODY WEIGHTS - INDIVIDUAL DATA

RAT #		GROUP IV			HIGH DOSAGE			1000 MG/KG/DAY					
PREGNANCY STATUS	DAY 0	6	7	8	9	10	11	12	13	14	15	16	17
19176 P	233.	265.	266.	266.	272.	278.	282.	285.	291.	298.	302.	315.	327.
19177 P	242.	278.	282.	284.	290.	285.	286.	293.	307.	312.	321.	332.	353.
19178 P	222.	238.	241.	242.	250.	257.	242.	254.	262.	266.	276.	285.	286.
19179 P	228.	260.	264.	268.	272.	280.	269.	279.	281.	290.	301.	310.	328.
19180 P	220.	257.	264.	266.	271.	272.	270.	277.	283.	294.	302.	308.	320.
19181 NP	232.	262.	256.	246.	244.	251.	256.	254.	253.	259.	253.	261.	242.
19182 P	236.	279.	286.	294.	289.	300.	308.	316.	317.	317.	323.	338.	355.
19183 P	237.	267.	267.	275.	279.	283.	290.	294.	301.	306.	316.	323.	336.
19184 P	237.	275.	276.	281.	289.	282.	300.	301.	304.	317.	322.	333.	344.
19185 P	231.	268.	266.	274.	265.	268.	278.	287.	295.	301.	309.	328.	325.
19186 P	221.	242.	251.	250.	255.	268.	272.	277.	273.	280.	282.	294.	308.
19187 NP	224.	231.	234.	230.	232.	233.	232.	231.	234.	232.	233.	236.	236.
19188 NP	226.	258.	261.	262.	263.	266.	271.	269.	268.	265.	262.	266.	262.
19189 P	229.	264.	269.	274.	284.	284.	295.	305.	308.	295.	306.	316.	318.
19190 P	228.	268.	267.	274.	272.	278.	290.	300.	302.	312.	312.	324.	339.
19191 P	232.	264.	262.	256.	253.	256.	267.	271.	277.	277.	290.	304.	315.
19192 P	238.	255.	250.	248.	246.	246.	257.	263.	272.	275.	280.	291.	302.
19193 P	240.	270.	261.	269.	273.	281.	283.	291.	290.	295.	299.	308.	315.
19194 P	231.	256.	258.	255.	261.	271.	271.	280.	282.	288.	298.	307.	321.
19195 P	234.	260.	266.	245.	255.	257.	264.	273.	285.	285.	292.	298.	308.
19196 P	241.	268.	272.	274.	277.	285.	290.	292.	296.	299.	312.	325.	334.
19197 P	239.	232.	234.	235.	234.	245.	263.	265.	266.	276.	275.	288.	292.
19198 P	224.	254.	225.	239.	245.	254.	262.	270.	279.	279.	288.	296.	306.
19199 P	234.	266.	272.	277.	283.	281.	294.	296.	300.	303.	306.	318.	318.
19200 P	244.	286.	285.	286.	293.	295.	304.	308.	313.	321.	337.	331.	352.

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAY = DAY OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).

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TABLE 16 (PAGE 8): MATERNAL BODY WEIGHTS - INDIVIDUAL DATA

RAT #		GROUP IV		HIGH DOSAGE		1000 MG/KG/DAY
PREGNANCY STATUS	DAY 18	19	20	21	GRAVID UTERINE WEIGHT (G)	
19176	P	340.	354.	373.	395.	98.76
19177	P	370.	379.	401.	432.	108.20
19178	P	301.	316.	330.	350.	74.22
19179	P	340.	361.	372.	400.	96.73
19180	P	336.	353.	363.	390.	96.86
19181	NP	FOUND DEAD ON DAY 18 OF GESTATION.				-----
19182	P	368.	383.	401.	416.	97.35
19183	P	347.	367.	381.	404.	a
19184	P	361.	383.	399.	413.	105.22
19185	P	341.	358.	379.	413.	105.29
19186	P	325.	338.	356.	369.	109.11
19187	NP	242.	236.	238.	247.	-----
19188	NP	258.	249.	259.	273.	-----
19189	P	338.	356.	371.	400.	100.95
19190	P	356.	374.	395.	404.	112.90
19191	P	328.	339.	358.	386.	91.49
19192	P	312.	320.	335.	346.	82.96
19193	P	333.	342.	351.	375.	87.86
19194	P	327.	346.	361.	381.	94.12
19195	P	318.	341.	353.	373.	107.11
19196	P	345.	371.	377.	404.	119.73
19197	P	284.	301.	327.	354.	98.99
19198	P	FOUND DEAD ON DAY 17 OF GESTATION.				-----
19199	P	337.	355.	364.	388.	81.41
19200	P	360.	377.	391.	422.	112.41

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAY = DAY OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).
a. Gravid uterine weight not recorded.

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TABLE 17 (PAGE 1): MATERNAL FEED CONSUMPTION VALUES - INDIVIDUAL DATA

RAT #	GROUP I	VEHICLE			0 MG/KG/DAY		
PREGNANCY STATUS	DAYS 0 - 6	6 - 9	9 - 12	12 - 15	15 - 18	18 - 20	20 - 21
19101 P	137.	61.	63.	69.	79.	52.	24.
19102 P	125.	65.	67.	71.	74.	54.	29.
19103 P	142.	56.	70.	67.	69.	50.	30.
19104 P	138.	70.	69.	73.	78.	52.	24.
19105 P	152.	77.	79.	84.	94.	61.	30.
19106 P	143.	70.	73.	75.	81.	56.	27.
19107 P	195.	76.	75.	83.	72.	54.	34.
19108 P	120.	61.	67.	62.	68.	49.	27.
19109 P	119.	61.	63.	68.	67.	32.	22.
19110 P	130.	63.	64.	71.	75.	56.	33.
19111 P	138.	64.	65.	65.	68.	54.	27.a
19112 P	133.	70.	64.	67.	75.	48.	26.
19113 P	136.	70.	67.	69.	76.	51.	29.
19114 P	143.	71.	72.	71.	72.	53.	32.
19115 P	126.	67.	66.	74.	65.	44.	10.
19116 P	126.	69.	62.	71.	86.	61.	28.
19117 P	146.	73.	81.	79.	73.	57.	27.
19118 P	134.	67.	69.	69.	64.	45.	30.
19119 P	121.	61.	67.	70.	74.	52.	24.
19120 P	134.	67.	60.	78.	84.	61.	26.
19121 P	142.	74.	84.	83.	85.	58.	30.
19122 P	136.	65.	66.	80.	88.	63.	28.
19123 P	128.	75.	84.	93.	96.	68.	30.
19124 P	136.	70.	68.	77.	78.	57.	28.
19125 P	128.	63.	58.	70.	82.	51.	24.

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAYS = DAYS OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).
a. Dam delivered on day 21 of gestation.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 17 (PAGE 2): MATERNAL FEED CONSUMPTION VALUES - INDIVIDUAL DATA

RAT #	GROUP II	LOW DOSAGE	100 MG/KG/DAY				
PREGNANCY STATUS	DAYS 0 - 6	6 - 9	9 - 12	12 - 15	15 - 18	18 - 20	20 - 21
19126 P	134.	59.	68.	82.	84.	58.	28.
19127 P	155.	81.	71.	80.	86.	61.	28.
19128 P	139.	70.	59.	64.	79.	52.	21.
19129 P	127.	71.	73.	81.	88.	58.	31.
19130 P	128.	65.	62.	66.	67.	38.	24.
19131 NP	108.	51.	56.	53.	51.	38.	15.
19132 P	140.	52.	65.	68.	75.	41.	23.
19133 P	128.	65.	68.	73.	77.	51.	30.
19134 P	122.	64.	60.	68.	82.	51.	23.
19135 P	173.	68.	70.	72.	72.	53.	27.
19136 P	152.	70.	67.	76.	78.	50.	17.
19137 P	133.	56.	70.	66.	84.	47.	25.
19138 P	135.	69.	68.	71.	74.	48.	24.
19139 P	131.	63.	70.	73.	66.	44.	20.
19140 P	128.	64.	69.	68.	77.	47.	21.
19141 P	147.	75.	68.	84.	90.	60.	28.
19142 P	130.	63.	69.	69.	a	52.	24.
19143 P	134.	73.	67.	70.	76.	49.	18.
19144 P	129.	69.	66.	63.	80.	50.	25.
19145 NP	114.	55.	58.	60.	58.	38.	15.
19146 P	119.	66.	66.	70.	75.	52.	26.
19147 P	151.	76.	74.	76.	72.	52.	28.
19148 NP	127.	62.	61.	53.	50.	36.	19.
19149 P	124.	67.	70.	73.	75.	43.	17.
19150 P	140.	70.	68.	75.	84.	53.	27.

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAYS = DAYS OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).
a. Spilled feed precluded the calculation of this value.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 17 (PAGE 3): MATERNAL FEED CONSUMPTION VALUES - INDIVIDUAL DATA

RAT #	GROUP III	MIDDLE DOSAGE	300 MG/KG/DAY				
PREGNANCY STATUS	DAYS 0 - 6	6 - 9	9 - 12	12 - 15	15 - 18	18 - 20	20 - 21
19151 P	132.	65.	71.	78.	81.	56.	25.
19152 NP	121.	58.	51.	47.	48.	37.	16.
19153 P	150.	65.	64.	77.	86.	61.	31.
19154 P	126.	53.	61.	64.	59.	46.	21.
19155 P	146.	73.	73.	77.	78.	52.	25.
19156 P	124.	58.	64.	72.	72.	50.	20.
19157 P	150.	73.	63.	71.	76.	36.	27.b
19158 P	152.	80.	76.	82.	95.	56.	21.
19159 P	131.	a	71.	72.	83.	52.	15.
19160 P	147.	61.	71.	80.	71.	53.	22.
19161 P	140.	78.	80.	84.	81.	56.	27.
19162 P	125.	65.	61.	61.	70.	45.	19.
19163 P	126.	64.	61.	58.	60.	50.	23.
19164 P	172.	99.	94.	75.	89.	61.	17.
19165 P	124.	69.	76.	69.	77.	56.	16.
19166 P	136.	69.	73.	72.	80.	54.	27.
19167 P	153.	66.	73.	71.	78.	52.	25.
19168 P	127.	63.	65.	71.	80.	60.	24.
19169 P	154.	82.	82.	82.	86.	53.	28.
19170 P	131.	55.	65.	61.	68.	38.	16.
19171 P	99.	72.	61.	66.	83.	54.	22.
19172 P	158.	90.	93.	84.	86.	56.	25.
19173 P	152.	80.	82.	76.	84.	57.	18.
19174 P	120.	61.	67.	68.	73.	44.	16.
19175 P	132.	71.	63.	76.	80.	52.	24.

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAYS = DAYS OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).
a. Spilled feed precluded the calculation of this value.
b. Dam delivered on day 21 of gestation.

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TABLE 17 (PAGE 4): MATERNAL FEED CONSUMPTION VALUES - INDIVIDUAL DATA

RAT #	GROUP IV	HIGH DOSAGE				1000 MG/KG/DAY	
PREGNANCY STATUS	DAYS 0 - 6	6 - 9	9 - 12	12 - 15	15 - 18	18 - 20	20 - 21
19176 P	122.	62.	56.	58.	69.	48.	22.
19177 P	141.	69.	56.	76.	85.	58.	25.
19178 P	117.	65.	52.	63.	62.	47.	20.
19179 P	122.	72.	57.	66.	89.	56.	23.
19180 P	145.	77.	58.	78.	87.	58.	23.
19181 NP	137.	43.	49.	55.	FOUND DEAD ON DAY 18 OF GESTATION.		
19182 P	152.	76.	77.	77.	86.	53.	16.
19183 P	127.	68.	69.	74.	78.	50.	23.
19184 P	143.	69.	58.	81.	85.	51.	22.
19185 P	145.	64.	60.	77.	70.	46.	29.
19186 P	110.	60.	63.	56.	68.	41.	16.
19187 NP	112.	49.	44.	49.	52.	32.	16.
19188 NP	140.	74.	64.	56.	55.	32.	18.
19189 P	152.	80.	83.	63.	72.	50.	30.
19190 P	140.	71.	70.	66.	79.	53.	14.
19191 P	140.	57.	53.	62.	71.	45.	25.
19192 P	117.	40.	54.	64.	77.	42.	15.
19193 P	133.	59.	71.	68.	71.	39.	23.
19194 P	130.	60.	66.	75.	74.	51.	21.
19195 P	129.	49.	55.	64.	69.	46.	20.
19196 P	137.	70.	73.	65.	63.	39.	21.
19197 P	111.	37.	59.	68.	58.	40.	28.
19198 P	128.	44.	67.	67.	FOUND DEAD ON DAY 17 OF GESTATION		
19199 P	137.	69.	71.	72.	70.	58.	25.
19200 P	156.	76.	75.	74.	56.	51.	26.

P = PREGNANT NP = NOT PREGNANT (VALUES EXCLUDED FROM AVERAGES)
DAYS = DAYS OF PRESUMED GESTATION
ALL WEIGHTS WERE RECORDED IN GRAMS (G).

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 18 (PAGE 1): CAESAREAN-SECTIONING OBSERVATIONS - INDIVIDUAL DATA

GROUP I VEHICLE 0 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT OVARY	LEFT OVARY	TOTAL
RAT #	M	F																		
19101	12	7	11	8	19	0	0	0	0	0	0	0	0	0	11	8	19	11	8	19
19102	8	7	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	6	9	15
19103	7	8	7	8	15	0	0	0	0	0	0	0	0	0	7	8	15	7	9	16
19104	5	7	10	2	12	0	0	0	0	0	0	0	0	0	10	2	12	10	4	14
19105	8	7	10	5	15	0	0	0	0	0	0	0	0	0	10	5	15	10	8	18
19106	8	5	9	4	13	0	0	0	1	0	1	0	0	0	10	4	14	10	4	14
19107	6	11	8	9	17	0	0	0	0	0	0	0	0	0	8	9	17	10	12	22
19108	8	6	7	7	14	0	0	0	0	1	1	0	0	0	7	8	15	8	10	18
19109	7	5	4	8	12	0	0	0	0	0	0	0	0	0	4	8	12	6	8	14
19110	8	9	9	8	17	0	0	0	0	0	0	0	0	0	9	8	17	11	9	20
19111	DELIVERED AND SACRIFICED ON DAY 21 OF GESTATION																			
19112	11	7	5	13	18	0	0	0	0	0	0	0	0	0	5	13	18	6	13	19
19113	7	8	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	8	9	17
19114	11	5	6	10	16	0	0	0	2	0	2	0	0	0	8	10	18	8	10	18
19115	12	6	12	6	18	0	0	0	0	0	0	0	0	0	12	6	18	13	6	19
19116	4	7	7	4	11	0	0	0	1	1	2	0	0	0	8	5	13	8	7	15
19117	6	6	4	8	12	0	0	0	0	0	0	0	0	0	4	8	12	10	9	19
19118	7	9	10	6	16	0	0	0	0	1	1	0	0	0	10	7	17	11	12	23
19119	6	6	7	5	12	0	0	0	2	0	2	0	0	0	9	5	14	11	6	17
19120	6	8	6	8	14	0	0	0	0	0	0	0	0	0	6	8	14	8	10	18
19121	11	8	9	10	19	0	0	0	0	0	0	0	0	0	9	10	19	12	15	27
19122	4	3	7	0	7	0	0	0	0	0	0	0	0	0	7	0	7	10	12	22
19123	8	8	9	7	16	0	0	0	0	0	0	0	0	0	9	7	16	9	9	18
19124	9	8	8	9	17	0	0	0	0	1	1	0	0	0	8	10	18	8	15	23
19125	10	8	9	9	18	0	0	0	0	0	0	0	0	0	9	9	18	9	12	21

M = MALE F = FEMALE
PLACENTAE APPEARED NORMAL UNLESS NOTED OTHERWISE.

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TABLE 18 (PAGE 2): CAESAREAN-SECTIONING OBSERVATIONS - INDIVIDUAL DATA

GROUP II LOW DOSAGE 100 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT OVARY	LEFT OVARY	TOTAL
RAT #	M	F																		
19126	4	9	7	6	13	0	0	0	0	0	0	0	0	0	7	6	13	7	6	13
19127	7	8	5	10	15	0	0	0	1	1	2	0	0	0	6	11	17	7	11	18
19128	4	9	5	8	13	0	0	0	0	1	1	0	0	0	5	9	14	6	9	15
19129	7	4	6	5	11	0	0	0	0	0	0	0	0	0	6	5	11	8	7	15
19130	7	6	9	4	13	0	0	0	0	0	0	0	0	0	9	4	13	10	8	18
19131	NOT PREGNANT																			
19132	10	5	9	6	15	0	0	0	1	0	1	0	0	0	10	6	16	12	10	22
19133	5	10	8	7	15	0	0	0	1	0	1	0	0	0	9	7	16	10	7	17
19134	9	7	11	5	16	0	0	0	0	0	0	0	0	0	11	5	16	11	6	17
19135	9	7	11	5	16	0	0	0	0	0	0	0	0	0	11	5	16	11	5	16
19136	5	9	8	6	14	0	0	0	0	0	0	0	0	0	8	6	14	11	9	20
19137	7	10	11	6	17	0	0	0	1	0	1	0	0	0	12	6	18	12	12	24
19138	7	6	9	4	13	0	0	0	0	0	0	0	0	0	9	4	13	12	9	21
19139	6	2	6	2	8	0	0	0	3	1	4	0	0	0	9	3	12	10	4	14
19140	8	7	8	7	15	0	0	0	1	1	2	0	0	0	9	8	17	10	9	19
19141	6	7	7	6	13	0	0	0	0	0	0	0	0	0	7	6	13	7	6	13
19142	5	8	9	4	13	0	0	0	0	0	0	0	0	0	9	4	13	10	6	16
19143	10	7	8	9	17	0	0	0	3	0	3	0	0	0	11	9	20	11	13	24
19144	10	7	10	7	17	0	0	0	0	1	1	0	0	0	10	8	18	10	11	21
19145	NOT PREGNANT																			
19146	5	8	9	4	13	0	0	0	2	0	2	0	0	0	11	4	15	11	4	15
19147	6	10	9	7	16	0	0	0	0	0	0	0	0	0	9	7	16	11	8	19
19148	NOT PREGNANT																			
19149	8	8	10	6	16	0	0	0	0	0	0	0	0	0	10	6	16	10	9	19
19150	9	8	9	8	17	0	0	0	0	0	0	0	0	0	9	8	17	9	8	17

M = MALE F = FEMALE
PLACENTAE APPEARED NORMAL UNLESS NOTED OTHERWISE.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 18 (PAGE 3): CAESAREAN-SECTIONING OBSERVATIONS - INDIVIDUAL DATA

GROUP III MIDDLE DOSAGE 300 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT OVARY	LEFT OVARY	TOTAL
RAT #	M	F																		
19151	5	9	9	5	14	0	0	0	2	0	2	0	0	0	11	5	16	11	7	18
19152	NOT PREGNANT																			
19153	11	4	5	10	15	0	0	0	1	0	1	0	0	0	6	10	16	6	10	16
19154	5	7	7	5	12	0	0	0	0	0	0	0	0	0	7	5	12	7	5	12
19155	9	10	10	9	19	0	0	0	0	0	0	0	0	0	10	9	19	12	9	21
19156	4	5	5	4	9	0	0	0	2	1	3	0	0	0	7	5	12	8	5	13
19157	DELIVERED AND SACRIFICED ON DAY 21 OF GESTATION																			
19158	4	11	8	7	15	0	0	0	0	0	0	0	0	0	8	7	15	8	7	15
19159	6	9	7	8	15	0	0	0	0	0	0	0	0	0	7	8	15	9	8	17
19160	9	8	12	5	17	0	0	0	0	1	1	0	0	0	12	6	18	12	6	18
19161	4	9	10	3	13	0	0	0	0	1	1	0	0	0	10	4	14	10	4	14
19162	7	6	10	3	13	0	0	0	0	1	1	0	0	0	10	4	14	10	5	15
19163	7	6	4	9	13	0	0	0	1	0	1	0	0	0	5	9	14	5	10	15
19164	6	10	14	2	16	0	0	0	0	0	0	0	0	0	14	2	16	14	2	16
19165	12	3	5	10	15	0	0	0	0	0	0	0	0	0	5	10	15	5	10	15
19166	10	7	9	8	17	0	0	0	0	0	0	0	0	0	9	8	17	9	9	18
19167	6	10	7	9	16	0	0	0	0	0	0	0	0	0	7	9	16	7	9	16
19168	7	8	6	9	15	0	0	0	1	0	1	0	0	0	7	9	16	7	9	16
19169	10	7	10	7	17	0	0	0	0	1	1	0	0	0	10	8	18	13	8	21
19170	5	8	6	7	13	0	0	0	0	1	1	0	0	0	6	8	14	6	9	15
19171	7	6	12	1	13	0	0	0	1	0	1	0	0	0	13	1	14	13	1	14
19172	10	5	7	8	15	0	0	0	0	0	0	0	0	0	7	8	15	7	8	15
19173	6	6	9	3	12	0	0	0	0	1	1	0	0	0	9	4	13	11	7	18
19174	4	8	4	8	12	0	0	0	0	0	0	0	0	0	4	8	12	4	8	12
19175	7	8	6	9	15	0	0	0	0	0	0	0	0	0	6	9	15	6	9	15

M = MALE F = FEMALE
PLACENTAE APPEARED NORMAL UNLESS NOTED OTHERWISE.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 18 (PAGE 4): CAESAREAN-SECTIONING OBSERVATIONS - INDIVIDUAL DATA

GROUP IV HIGH DOSAGE 1000 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT HORN	LEFT HORN	TOTAL	RIGHT OVARY	LEFT OVARY	TOTAL
RAT #	M	F																		
19176	7	8	11	4	15	0	0	0	0	0	0	0	0	0	11	4	15	12	6	18
19177	9	8	7	10	17	0	0	0	0	1	1	0	0	0	7	11	18	7	11	18
19178	7	4	6	5	11	0	0	0	3	0	3	0	0	0	9	5	14	9	7	16
19179	7	6	8	5	13	0	0	0	0	0	0	0	0	0	8	5	13	8	6	14
19180	4	10	8	6	14	0	0	0	1	1	2	0	0	0	9	7	16	9	7	16
19181	FOUND DEAD ON DAY 18 OF GESTATION																			
19182	10	5	7	8	15	0	0	0	1	0	1	0	0	0	8	8	16	9	11	20
19183	7	7	7	7	14	0	0	0	1	1	2	0	0	0	8	8	16	10	9	19
19184	4	11	11	4	15	0	0	0	0	0	0	0	0	0	11	4	15	11	5	16
19185	10	5	8	7	15	0	0	0	0	0	0	0	0	0	8	7	15	8	7	15
19186	8	8	8	8	16	0	0	0	1	1	2	0	0	0	9	9	18	9	10	19
19187	NOT PREGNANT																			
19188	NOT PREGNANT																			
19189	9	6	9	6	15	0	0	0	0	3	3	0	0	0	9	9	18	15	9	24
19190	9	7	5	11	16	0	0	0	0	0	0	0	0	0	5	11	16	5	11	16
19191	6	8	7	7	14	0	0	0	0	0	0	0	0	0	7	7	14	11	9	20
19192	8	5	5	8	13	0	0	0	1	0	1	0	0	0	6	8	14	8	9	17
19193	9	5	8	6	14	0	0	0	0	0	0	0	0	0	8	6	14	10	8	18
19194	8	5	4	9	13	0	0	0	0	0	0	0	0	0	4	9	13	4	9	13
19195	9	7	8	8	16	0	0	0	0	0	0	0	0	0	8	8	16	10	8	18
19196	6	12	10	8	18	0	0	0	0	0	0	0	0	0	10	8	18	10	8	18
19197	8	8	7	9	16	0	0	0	1	0	1	0	0	0	8	9	17	9	9	18
19198	FOUND DEAD ON DAY 17 OF GESTATION																			
19199	4	9	11	2	13	0	0	0	0	2	2	0	0	0	11	4	15	12	5	17
19200	7	11	12	6	18	0	0	0	0	0	0	0	0	0	12	6	18	13	6	19

M = MALE F = FEMALE
PLACENTAE APPEARED NORMAL UNLESS NOTED OTHERWISE.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 19 (PAGE 1): LITTER OBSERVATIONS (CAESAREAN-DELIVERED FETUSES) - INDIVIDUAL DATA

GROUP I VEHICLE 0 MG/KG/DAY

	NUMBER OF LIVE FETUSES			AVERAGE FETAL BODY WEIGHT (G)			---- CONCEPTUSES ------ RESORBED		
RAT #	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	N	N	%
19101	12	7	19	5.73	5.32	5.58	19	0	0.0
19102	8	7	15	5.50	5.22	5.37	15	0	0.0
19103	7	8	15	5.34	5.16	5.24	15	0	0.0
19104	5	7	12	5.46	5.13	5.26	12	0	0.0
19105	8	7	15	5.65	5.31	5.49	15	0	0.0
19106	8	5	13	6.29	5.88	6.14	14	1	7.1
19107	6	11	17	5.41	5.16	5.25	17	0	0.0
19108	8	6	14	6.12	5.89	6.02	15	1	6.7
19109	7	5	12	5.12	4.95	5.05	12	0	0.0
19110	8	9	17	5.50	5.51	5.50	17	0	0.0
19111	DELIVERED AND SACRIFICED ON DAY 21 OF GESTATION								
19112	11	7	18	5.07	4.61	4.89	18	0	0.0
19113	7	8	15	5.32	5.00	5.15	15	0	0.0
19114	11	5	16	5.37	5.30	5.35	18	2	11.1
19115	12	6	18	4.96	4.57	4.83	18	0	0.0
19116	4	7	11	5.94	5.62	5.74	13	2	15.4
19117	6	6	12	5.64	5.42	5.53	12	0	0.0
19118	7	9	16	4.96	4.64	4.78	17	1	5.9
19119	6	6	12	5.39	5.18	5.29	14	2	14.3
19120	6	8	14	5.50	5.03	5.23	14	0	0.0
19121	11	8	19	5.45	5.04	5.28	19	0	0.0
19122	4	3	7	6.09	5.59	5.88	7	0	0.0
19123	8	8	16	5.76	5.71	5.74	16	0	0.0
19124	9	8	17	4.73	4.30	4.53	18	1	5.6
19125	10	8	18	5.10	4.86	4.99	18	0	0.0

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 19 (PAGE 2): LITTER OBSERVATIONS (CAESAREAN-DELIVERED FETUSES) - INDIVIDUAL DATA

GROUP II LOW DOSAGE 100 MG/KG/DAY

	NUMBER OF LIVE FETUSES			AVERAGE FETAL BODY WEIGHT (G)			---- CONCEPTUSES ------ RESORBED		
RAT #	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	N	N	%
19126	4	9	13	6.01	5.50	5.65	13	0	0.0
19127	7	8	15	5.60	5.32	5.46	17	2	11.8
19128	4	9	13	5.71	5.34	5.45	14	1	7.1
19129	7	4	11	5.98	5.52	5.81	11	0	0.0
19130	7	6	13	5.46	5.18	5.33	13	0	0.0
19131	NOT PREGNANT								
19132	10	5	15	5.34	5.31	5.33	16	1	6.2
19133	5	10	15	6.02	5.53	5.69	16	1	6.2
19134	9	7	16	5.76	5.32	5.57	16	0	0.0
19135	9	7	16	5.24	4.76	5.03	16	0	0.0
19136	5	9	14	6.10	5.74	5.87	14	0	0.0
19137	7	10	17	5.26	4.78	4.98	18	1	5.6
19138	7	6	13	4.81	4.47	4.65	13	0	0.0
19139	6	2	8	5.56	5.38	5.52	12	4	33.3
19140	8	7	15	5.40	5.25	5.33	17	2	11.8
19141	6	7	13	5.54	5.05	5.28	13	0	0.0
19142	5	8	13	6.13	5.75	5.89	13	0	0.0
19143	10	7	17	5.32	5.14	5.25	20	3	15.0
19144	10	7	17	5.20	4.97	5.10	18	1	5.6
19145	NOT PREGNANT								
19146	5	8	13	5.36	5.09	5.19	15	2	13.3
19147	6	10	16	5.18	5.02	5.08	16	0	0.0
19148	NOT PREGNANT								
19149	8	8	16	5.24	4.89	5.06	16	0	0.0
19150	9	8	17	5.58	5.24	5.42	17	0	0.0

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 19 (PAGE 3): LITTER OBSERVATIONS (CAESAREAN-DELIVERED FETUSES) - INDIVIDUAL DATA

GROUP III MIDDLE DOSAGE 300 MG/KG/DAY

	NUMBER OF LIVE FETUSES			AVERAGE FETAL BODY WEIGHT (G)			---- CONCEPTUSES ------ RESORBED		
RAT #	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	N	N	%
19151	5	9	14	5.08	5.07	5.07	16	2	12.5
19152	NOT PREGNANT								
19153	11	4	15	5.30	5.09	5.25	16	1	6.2
19154	5	7	12	5.60	5.37	5.46	12	0	0.0
19155	9	10	19	4.77	4.52	4.64	19	0	0.0
19156	4	5	9	6.09	5.99	6.03	12	3	25.0
19157	DELIVERED AND SACRIFICED ON DAY 21 OF GESTATION								
19158	4	11	15	4.98	4.78	4.83	15	0	0.0
19159	6	9	15	5.32	4.78	4.99	15	0	0.0
19160	9	8	17	5.15	4.94	5.05	18	1	5.6
19161	4	9	13	5.62	5.31	5.40	14	1	7.1
19162	7	6	13	5.18	4.79	5.00	14	1	7.1
19163	7	6	13	5.30	5.30	5.30	14	1	7.1
19164	6	10	16	4.95	4.70	4.79	16	0	0.0
19165	12	3	15	5.13	5.02	5.11	15	0	0.0
19166	10	7	17	5.21	4.85	5.06	17	0	0.0
19167	6	10	16	5.47	5.12	5.25	16	0	0.0
19168	7	8	15	5.63	5.40	5.51	16	1	6.2
19169	10	7	17	5.24	4.94	5.12	18	1	5.6
19170	5	8	13	5.11	5.07	5.08	14	1	7.1
19171	7	6	13	5.48	5.37	5.43	14	1	7.1
19172	10	5	15	5.28	5.05	5.20	15	0	0.0
19173	6	6	12	5.30	4.83	5.06	13	1	7.7
19174	4	8	12	5.01	4.75	4.84	12	0	0.0
19175	7	8	15	5.67	5.23	5.44	15	0	0.0

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 19 (PAGE 4): LITTER OBSERVATIONS (CAESAREAN-DELIVERED FETUSES) - INDIVIDUAL DATA

GROUP IV HIGH DOSAGE 1000 MG/KG/DAY

	NUMBER OF LIVE FETUSES			AVERAGE FETAL BODY WEIGHT (G)			---- CONCEPTUSES ------ RESORBED		
RAT #	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	N	N	%
19176	7	8	15	5.19	4.77	4.97	15	0	0.0
19177	9	8	17	4.85	4.42	4.65	18	1	5.6
19178	7	4	11	4.98	4.61	4.84	14	3	21.4
19179	7	6	13	5.13	5.12	5.13	13	0	0.0
19180	4	10	14	5.17	4.84	4.93	16	2	12.5
19181	FOUND DEAD ON DAY 18 OF GESTATION								
19182	10	5	15	4.72	4.70	4.71	16	1	6.2
19183	7	7	14	5.01	4.56	4.79	16	2	12.5
19184	4	11	15	5.23	4.95	5.02	15	0	0.0
19185	10	5	15	5.42	5.06	5.30	15	0	0.0
19186	8	8	16	5.34	5.04	5.20	18	2	11.1
19187	NOT PREGNANT								
19188	NOT PREGNANT								
19189	9	6	15	5.06	4.88	4.99	18	3	16.7
19190	9	7	16	5.10	4.64	4.90	16	0	0.0
19191	6	8	14	4.80	4.82	4.82	14	0	0.0
19192	8	5	13	4.80	4.76	4.78	14	1	7.1
19193	9	5	14	4.69	4.38	4.58	14	0	0.0
19194	8	5	13	5.27	4.88	5.12	13	0	0.0
19195	9	7	16	4.79	4.53	4.67	16	0	0.0
19196	6	12	18	4.97	4.70	4.79	18	0	0.0
19197	8	8	16	4.90	4.64	4.77	17	1	5.9
19198	FOUND DEAD ON DAY 17 OF GESTATION								
19199	4	9	13	4.95	4.56	4.68	15	2	13.3
19200	7	11	18	4.66	4.56	4.60	18	0	0.0

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 20 (PAGE 1): FETAL SEX, VITAL STATUS AND BODY WEIGHT - INDIVIDUAL DATA

GROUP I VEHICLE 0 MG/KG/DAY

RAT #	CLs	FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
19101	11/ 8		MA	MA	FA	MA	MA	FA	MA	FA	FA	MA	FA / MA		FA	MA	MA	MA	MA	FA	MA				
			5.95	5.61	5.43	5.69	5.79	5.50	5.85	5.22	5.33	6.00	5.27	6.00	5.17	5.49	5.44	6.10	5.28	5.36	5.53				
19102	6/ 9		MA	MA	FA	FA	FA	FA / FA		FA	FA	MA	MA	MA	MA	MA	MA								
			5.93	5.33	5.19	5.27	5.40	5.40	4.95	5.23	5.12	5.27	5.49	5.39	5.52	5.43	5.64								
19103	7/ 9		MA	FA	MA	FA	MA	MA	MA / FA		MA	MA	FA	FA	FA	FA	FA								
			5.39	5.31	5.32	5.53	5.46	5.52	5.44	4.86	4.85	5.41	4.91	5.04	5.49	5.09	5.06								
19104	10/ 4		FA	FA	FA	FA	MA	MA	MA	FA	FA	MA / FA		MA											
			4.84	4.89	5.30	5.50	5.43	5.33	5.57	4.90	5.07	5.47	5.40	5.48											
19105	10/ 8		MA	FA	MA	FA	MA	MA	FA	FA	MA	FA / FA		MA	FA	MA	MA								
			5.78	5.27	5.41	5.21	5.37	5.56	5.07	5.50	5.74	5.48	5.33	6.07	5.31	5.51	5.75								
19106	10/ 4		MA	MA	MA	MA	MA	E	FA	MA	FA	FA / MA		MA	FA	FA									
			6.17	6.49	6.61	6.39	6.27		5.76	6.36	5.62	6.06	6.20	5.86	5.95	6.02									
19107	10/12		FA	MA	FA	MA	FA	MA	MA	FA / FA		FA	MA	FA	FA	FA	FA	FA	MA						
			4.79	5.13	5.58	5.59	5.22	5.76	5.13	5.18	4.70	5.18	5.49	5.48	5.18	5.15	5.16	5.13	5.35						
19108	8/10		FA	MA	MA	MA	MA	FA	MA / FA		E	FA	MA	FA	FA	MA	MA								
			6.22	5.85	6.47	6.14	6.03	5.99	6.23	5.64		5.94	5.95	5.93	5.61	6.43	5.84								
19109	6/ 8		FA	MA	MA	MA / MA		FA	FA	FA	MA	MA	MA	FA											
			5.05	4.91	5.46	5.17	4.95	4.84	4.98	5.28	4.78	5.43	5.13	4.60											
19110	11/ 9		MA	FA	MA	FA	FA	MA	MA	FA	FA / FA		MA	MA	FA	MA	FA	FA	MA						
			5.82	5.23	5.57	5.46	5.66	5.11	5.32	5.19	5.49	6.01	5.29	5.38	5.41	5.51	5.53	5.62	5.97						
19111		DELIVERED AND SACRIFICED ON DAY 21 OF GESTATION																							
19112	6/13		MA	MA	MA	MA	MA / FA		FA	FA	MA	MA	MA	FA	MA	FA	FA	MA	FA	MA					
			4.96	5.29	4.87	5.09	5.30	4.12	4.11	4.80	5.14	5.16	4.95	4.81	4.72	4.89	4.55	4.94	5.02	5.34					
19113	8/ 9		FA	FA	MA	MA	MA	FA / FA		MA	FA	FA	FA	MA	MA	FA	MA								
			5.47	4.96	5.91	5.83	5.23	5.15	5.08	4.83	5.21	4.43	4.52	5.15	5.20	5.15	5.12								

M = MALE F = FEMALE A = ALIVE E = EARLY RESORPTION "/" DENOTES POSITION OF CERVIX
CLs = CORPORA LUTEA/OVARY FETAL BODY WEIGHTS WERE RECORDED IN GRAMS (G).

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 20 (PAGE 2): FETAL SEX, VITAL STATUS AND BODY WEIGHT - INDIVIDUAL DATA

GROUP I VEHICLE 0 MG/KG/DAY

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
RAT # CLs																				
19114 8/10	FA	MA	MA	MA	E	MA	E	MA / MA	MA	MA	FA	MA	FA	FA	FA	MA	MA			
	5.44	5.62	5.59	5.37		6.00		4.69	5.35	4.86	5.14	5.00	5.52	5.43	5.36	5.26	5.45	5.53		
19115 13/ 6	MA	MA	MA	MA	MA	MA	MA	FA	FA	FA	FA	FA / MA	MA	MA	MA	MA	FA			
	5.43	4.89	5.06	4.86	4.52	5.32	4.95	4.34	4.43	4.49	4.54	4.80	4.96	5.09	4.85	4.96	4.62	4.82		
19116 8/ 7	FA	MA	E	FA	FA	MA	MA	FA / FA	FA	E	MA	FA								
	5.67	5.70		5.78	5.46	6.05	5.92	5.55	5.76	5.46		6.09	5.68							
19117 10/ 9	FA	FA	MA	FA / MA	MA	FA	MA	MA	FA	MA	FA									
	5.30	5.63	5.16	5.64	5.97	5.54	5.39	5.64	5.56	5.14	5.94	5.41								
19118 11/12	MA	FA	FA	MA	MA	MA	FA	FA	FA	FA / MA	MA	E	FA	FA	MA	FA				
	5.15	4.85	5.12	5.44	4.81	4.83	4.57	4.88	4.53	3.86	4.12	4.94		4.95	4.35	5.40	4.64			
19119 11/ 6	E	FA	E	MA	FA	FA	MA	MA	MA / FA	FA	MA	MA	FA							
		5.07		5.16	5.11	4.92	5.42	5.45	5.66	5.38	5.27	5.31	5.34	5.35						
19120 8/10	FA	MA	MA	FA	FA	MA / FA	FA	FA	FA	MA	MA	FA	FA	MA						
	5.34	5.41	5.70	4.85	4.04	5.78	5.55	5.13	4.86	5.51	5.34	5.10	5.34	5.28						
19121 12/15	MA	FA	FA	MA	FA	MA	FA	MA	FA / MA	FA	FA	MA	MA	MA	FA	MA	MA	MA		
	5.46	4.80	5.05	5.77	5.22	5.39	5.56	5.83	5.35	5.21	4.65	4.84	5.36	5.32	5.33	4.83	5.29	5.62	5.38	
19122 10/12	FA	MA	FA	FA	MA	MA	MA /													
	5.37	6.23	5.84	5.57	6.03	6.25	5.86													
19123 9/ 9	FA	MA	FA	FA	MA	MA	FA	MA	MA / FA	FA	MA	MA	MA	FA	FA					
	5.67	5.85	5.79	5.56	5.97	5.57	5.64	5.32	6.10	5.52	5.84	5.57	5.80	5.94	5.80	5.86				
19124 8/15	MA	MA	FA	MA	FA	MA	MA	MA / FA	E	FA	MA	MA	MA	FA	FA	FA	FA			
	4.92	5.00	5.58	4.45	4.49	4.71	4.03	4.71	2.65		4.81	5.30	4.34	5.09	4.48	4.31	4.23	3.87		
19125 9/12	MA	MA	MA	FA	FA	MA	MA	FA	MA / FA	MA	FA	FA	FA	MA	MA	FA	MA			
	5.08	5.06	4.92	4.86	4.95	5.13	5.18	4.67	5.38	4.80	4.83	4.94	4.84	5.04	5.06	4.80	4.82	5.51		

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PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 20 (PAGE 3): FETAL SEX, VITAL STATUS AND BODY WEIGHT - INDIVIDUAL DATA

GROUP II — LOW DOSAGE — 100 MG/KG/DAY

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
RAT # CLs																				
19126 7/ 6	MA	FA	FA	MA	MA	MA	FA / FA		FA	FA	FA	FA	FA							
	5.95	5.69	5.69	6.15	6.30	5.64	5.33	5.57	5.57	5.37	5.59	5.48	5.18							
19127 7/11	FA	FA	E	FA	MA	MA / FA		E	MA	FA	MA	MA	MA	FA	FA	FA	MA			
	5.24	5.51		5.81	5.57	5.56	4.29		5.61	5.19	5.55	5.45	5.47	5.64	5.27	5.65	6.02			
19128 6/ 9	FA	MA	MA	FA	FA / MA		FA	FA	MA	FA	FA	E	FA	FA						
	5.37	5.74	5.66	5.19	5.55	5.50	5.64	4.97	5.94	4.87	5.41		5.46	5.59						
19129 8/ 7	MA	MA	FA	MA	FA	FA / MA		MA	MA	MA	FA									
	6.22	6.38	5.76	5.98	5.75	5.05	5.44	5.92	5.94	5.96	5.52									
19130 10/ 8	MA	FA	FA	MA	MA	MA	FA	MA	MA / FA		FA	MA	FA							
	5.66	5.42	5.19	5.42	5.33	5.66	5.10	5.50	5.28	5.05	5.04	5.35	5.28							
19131	NOT PREGNANT																			
19132 12/10	MA	MA	FA	E	MA	MA	FA	FA	FA	MA / MA		MA	FA	MA	MA	MA				
	5.38	5.33	5.27		5.20	5.57	5.54	4.88	5.60	5.54	5.49	5.02	5.25	5.12	5.14	5.56				
19133 10/ 7	FA	MA	E	FA	FA	FA	FA	FA	FA / FA		MA	MA	MA	FA	FA	MA				
	5.50	5.73		5.96	5.23	5.44	5.62	5.30	5.72	5.33	5.73	6.56	6.10	5.51	5.69	5.97				
19134 11/ 6	MA	FA	MA	FA	FA	MA	MA	MA	MA	MA	FA / FA		FA	MA	FA	MA				
	5.40	5.10	5.75	4.99	5.44	5.69	5.66	5.95	6.27	5.59	5.54	5.67	5.03	5.96	5.45	5.57				
19135 11/ 5	FA	MA	MA	FA	FA	FA	MA	FA	MA	MA	MA / FA		FA	MA	MA	MA				
	3.00	5.08	5.28	5.09	5.05	5.14	5.61	4.99	5.38	4.99	4.11	4.81	5.24	5.80	5.40	5.55				
19136 11/ 9	MA	MA	FA	MA	FA	FA	FA	MA / FA		FA	FA	MA	FA	FA						
	6.11	6.12	5.25	6.03	5.75	5.76	5.87	6.11	6.00	5.54	5.84	6.15	6.10	5.60						
19137 12/12	FA	E	MA	FA	FA	MA	FA	FA	MA	FA	MA	FA / MA		FA	MA	FA	MA	FA		
	4.70		5.21	3.63	5.14	5.51	4.76	4.95	4.81	4.63	5.04	5.21	5.61	4.47	5.30	5.12	5.38	5.17		
19138 12/ 9	FA	FA	FA	MA	FA	MA	FA	MA	MA / MA		FA	MA	MA							
	4.49	4.12	4.60	5.02	4.77	4.95	4.23	5.03	3.04	4.98	4.61	5.16	5.49							

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PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS)
IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 20 (PAGE 4): FETAL SEX, VITAL STATUS AND BODY WEIGHT - INDIVIDUAL DATA

GROUP II		LOW DOSAGE									100 MG/KG/DAY										
	FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
RAT #	CLs																				
19139	10/ 4	MA	FA	E	MA	E	MA	MA	MA	E / FA		E	MA								
		5.27	5.11		5.70		5.67	5.41	5.63		5.64		5.69								
19140	10/ 9	MA	MA	FA	FA	MA	MA	E	FA	MA / FA		FA	MA	E	MA	FA	MA	FA			
		5.10	5.71	5.34	5.32	5.96	5.72		5.29	5.22	5.05	5.27	4.65		5.62	5.11	5.25	5.35			
19141	7/ 6	FA	FA	MA	FA	FA	FA	FA / MA		MA	FA	MA	MA	MA							
		5.19	5.20	5.59	3.80	5.08	5.22	5.51	5.11	5.66	5.34	5.54	5.45	5.91							
19142	10/ 6	FA	FA	MA	FA	FA	MA	FA	MA	FA / MA		FA	MA	FA							
		5.82	5.85	6.21	5.61	5.75	6.28	5.32	5.93	6.13	5.99	6.02	6.23	5.47							
19143	11/13	MA	E	E	MA	MA	MA	MA	MA	MA	E	FA / FA		FA	FA	MA	FA	MA	FA	FA	MA
		5.11			5.73	5.53	5.47	4.94	5.00	5.68		5.38	5.36	5.18	5.18	5.58	4.75	4.91	5.15	5.02	5.29
19144	10/11	MA	MA	MA	MA	MA	FA	FA	FA	MA	FA / FA		FA	MA	MA	MA	MA	E	FA		
		5.33	5.36	5.21	5.14	4.76	4.80	4.90	4.70	5.40	4.90	4.92	5.19	5.13	5.26	5.37	5.05		5.36		
19145		NOT PREGNANT																			
19146	11/ 4	FA	E	FA	MA	FA	MA	FA	FA	MA	MA	E / FA		FA	FA	FA	MA				
		4.74		5.14	4.84	5.30	5.58	5.19	4.91	5.59	5.48		4.98	5.18	5.25	5.32					
19147	11/ 8	FA	FA	FA	MA	FA	FA	MA	FA	MA / FA		MA	MA	FA	MA	FA	FA				
		5.44	5.01	4.46	5.15	4.90	5.33	5.36	4.78	5.09	4.73	4.98	5.12	5.41	5.39	4.96	5.19				
19148		NOT PREGNANT																			
19149	10/ 9	FA	MA	FA	FA	FA	MA	MA	FA	MA	MA / MA		FA	FA	MA	FA	MA				
		4.58	5.25	4.16	5.16	4.96	5.31	5.13	5.02	5.22	4.89	5.56	5.44	4.78	5.35	5.00	5.22				
19150	9/ 8	FA	MA	FA	MA	MA	MA	FA	MA	FA / FA		MA	MA	FA	FA	MA	MA	FA			
		5.32	5.67	5.21	5.51	5.17	5.46	4.85	5.88	5.20	4.80	5.99	5.36	5.74	5.26	5.50	5.64	5.52			

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PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 20 (PAGE 5): FETAL SEX, VITAL STATUS AND BODY WEIGHT - INDIVIDUAL DATA

GROUP III MIDDLE DOSAGE 300 MG/KG/DAY

RAT #	CLs	FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
19151	11/ 7		FA	FA	FA	FA	FA	MA	MA	E	E	MA	MA / FA		FA	MA	FA	FA				
			5.02	4.81	4.68	4.83	5.20	4.86	4.98			5.01	5.39	5.22	5.14	5.14	5.38	5.33				
19152			NOT PREGNANT																			
19153	6/10		E	MA	FA	MA	MA	FA / MA		MA	MA	MA	MA	MA	FA	MA	MA	FA				
				5.66	5.06	5.01	5.39	5.12	5.07	5.46	4.92	5.68	5.27	4.84	5.03	5.53	5.53	5.14				
19154	7/ 5		FA	FA	FA	FA	FA	FA	MA / MA		FA	MA	MA	MA								
			5.55	4.99	5.74	5.56	5.37	5.28	5.64	5.51	5.10	5.26	5.67	5.91								
19155	12/ 9		MA	FA	FA	MA	MA	MA	FA	FA	MA	FA / FA		MA	MA	FA	MA	MA	FA	FA	FA	
			4.79	4.71	4.71	4.84	4.72	4.78	4.49	4.45	4.47	4.16	4.63	4.85	4.74	4.76	4.94	4.84	4.73	4.15	4.44	
19156	8/ 5		FA	FA	MA	E	E	MA	FA / MA		MA	FA	FA	E								
			5.80	5.90	6.04			6.18	6.29	5.94	6.20	5.58	6.36									
19157			DELIVERED AND SACRIFICED ON DAY 21 OF GESTATION																			
19158	8/ 7		FA	FA	FA	FA	FA	FA	FA	FA / MA		FA	MA	FA	MA	FA	MA					
			4.68	4.34	4.69	4.69	4.78	4.96	5.08	5.13	4.96	4.66	4.98	4.55	4.83	5.01	5.13					
19159	9/ 8		FA	FA	FA	FA	MA	MA	FA / MA		FA	FA	MA	MA	FA	FA	MA					
			4.61	5.00	4.71	4.60	5.37	5.43	4.83	5.22	4.66	4.60	4.98	5.49	5.02	4.95	5.40					
19160	12/ 6		FA	MA	MA	MA	MA	MA	FA	MA	FA	FA	MA	FA / FA		MA	E	FA	MA	FA		
			4.79	5.41	5.03	4.80	5.70	5.06	5.08	4.72	4.80	4.61	4.96	5.22	4.78	5.42		5.22	5.27	4.99		
19161	10/ 4		FA	MA	FA	FA	FA	FA	MA	FA	MA	FA / MA		FA	E	FA						
			4.73	5.11	5.04	5.47	5.05	5.03	5.86	5.41	5.55	5.68	5.95	5.58		5.77						
19162	10/ 5		MA	FA	FA	MA	FA	MA	FA	MA	FA	FA / E		MA	MA	MA						
			4.98	4.93	4.81	5.28	4.49	4.97	4.65	5.31	5.24	4.61		5.45	4.92	5.33						
19163	5/10		FA	MA	MA	E	FA / MA		FA	FA	MA	MA	FA	MA	MA	FA						
			5.69	5.35	5.33		5.37	5.41	5.25	5.17	5.20	5.30	5.06	5.46	5.08	5.27						

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PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS)
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TABLE 20 (PAGE 6): FETAL SEX, VITAL STATUS AND BODY WEIGHT - INDIVIDUAL DATA

GROUP III MIDDLE DOSAGE 300 MG/KG/DAY

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
RAT # CLs																				
19164 14/ 2	FA	MA	FA	FA	FA	MA	FA	FA	MA	MA	FA	MA	FA	FA / MA		FA				
	4.19	4.96	4.35	4.51	4.50	4.86	4.97	5.00	5.19	4.86	4.64	4.74	4.64	5.11	5.07	5.07				
19165 5/10	MA	FA	MA	MA	MA / MA		MA	MA	MA	MA	FA	MA	MA	MA	FA					
	5.82	5.05	5.11	5.42	5.28	4.86	5.09	4.97	4.97	5.21	4.88	5.09	4.84	4.86	5.14					
19166 9/ 9	FA	FA	FA	MA	MA	MA	FA	FA	FA / MA		MA	FA	MA	MA	MA	MA	MA			
	4.70	4.88	4.95	5.16	5.32	5.36	4.80	5.11	4.62	5.39	4.96	4.91	4.94	5.02	5.39	5.12	5.45			
19167 7/ 9	FA	MA	MA	MA	FA	FA	FA / FA		FA	FA	MA	FA	FA	FA	MA	MA				
	5.57	5.52	5.06	5.72	5.14	5.25	5.02	5.09	5.16	4.91	5.49	5.20	4.79	5.03	5.60	5.42				
19168 7/ 9	MA	FA	MA	E	MA	FA	FA / FA		FA	MA	MA	MA	FA	FA	MA	FA				
	5.44	5.18	5.73		5.81	5.31	5.52	5.44	5.39	5.34	5.89	5.51	5.22	5.48	5.70	5.70				
19169 13/ 8	MA	FA	MA	MA	MA	FA	FA	FA	MA	MA / FA		MA	FA	MA	E	MA	MA	FA		
	4.86	4.82	5.03	5.35	5.40	5.10	4.94	4.90	5.16	5.51	4.89	5.26	4.81	5.17		5.31	5.39	5.16		
19170 6/ 9	MA	FA	FA	FA	MA	FA / FA		MA	FA	FA	E	FA	MA	MA						
	4.96	5.51	5.08	5.21	5.14	5.22	5.01	4.92	4.86	4.75		4.92	5.25	5.28						
19171 13/ 1	MA	FA	MA	MA	MA	MA	FA	FA	E	FA	FA	FA	MA / MA							
	5.72	5.42	5.18	5.66	5.32	5.65	5.36	5.65		5.33	5.06	5.40	5.26	5.59						
19172 7/ 8	MA	MA	MA	MA	FA	FA	FA / MA		MA	MA	FA	MA	MA	FA	MA					
	5.13	5.19	5.36	4.94	4.87	5.19	5.03	5.14	5.27	5.53	4.99	5.29	5.46	5.18	5.49					
19173 11/ 7	FA	FA	MA	FA	FA	MA	FA	MA	MA / FA		MA	E	MA							
	4.72	4.62	5.12	4.83	5.00	5.02	4.85	5.41	5.64	4.94	5.13		5.49							
19174 4/ 8	FA	FA	MA	MA / FA		FA	MA	FA	MA	FA	FA	FA								
	4.91	4.93	4.84	5.07	4.64	4.76	5.08	5.02	5.06	4.33	4.76	4.62								
19175 6/ 9	FA	FA	MA	MA	MA	MA / MA		FA	FA	MA	FA	FA	MA	FA	FA					
	4.92	5.48	5.42	5.76	5.75	5.64	5.73	5.04	5.28	5.66	5.31	5.40	5.75	5.27	5.13					

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TABLE 20 (PAGE 7): FETAL SEX, VITAL STATUS AND BODY WEIGHT - INDIVIDUAL DATA

GROUP IV	HIGH DOSAGE	1000 MG/KG/DAY																		
FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
RAT # CLs																				
19176 12/ 6	FA	FA	MA	MA	MA	FA	FA	MA	FA	FA	FA / MA		MA	MA	FA					
	4.39	4.90	5.12	5.09	4.89	4.69	4.42	4.98	4.77	4.75	4.78	5.61	5.58	5.08	5.46					
19177 7/11	FA	MA	MA	FA	FA	FA	MA / FA		MA	MA	MA	FA	MA	E	FA	MA	FA	MA		
	4.48	4.86	5.01	4.43	4.33	4.50	5.10	4.37	4.82	4.87	4.68	4.31	4.60		4.64	4.90	4.26	4.85		
19178 9/ 7	MA	MA	FA	E	MA	E	FA	E	MA / MA		FA	FA	MA	MA						
	4.79	5.11	4.86		4.88		4.82		5.21	4.89	4.48	4.29	4.99	4.98						
19179 8/ 6	FA	MA	MA	FA	MA	FA	MA	FA / MA		MA	FA	FA	MA							
	4.99	5.43	5.32	5.39	5.39	4.96	4.21	5.10	4.86	5.48	5.28	5.03	5.24							
19180 9/ 7	FA	FA	E	FA	FA	FA	FA	FA	MA / FA		MA	E	FA	MA	MA	FA				
	3.43	5.06		4.92	5.19	4.85	5.14	5.19	5.32	4.74	4.85		4.80	5.12	5.38	5.03				
19181	FOUND DEAD ON DAY 18 OF GESTATION																			
19182 9/11	MA	MA	FA	MA	E	MA	MA	MA / MA		MA	FA	FA	MA	MA	FA	FA				
	4.75	4.89	4.51	4.86		4.85	4.64	4.85	4.69	4.60	4.82	4.39	4.66	4.44	4.85	4.91				
19183 10/ 9	MA	E	FA	MA	MA	MA	MA	FA / FA		E	MA	FA	FA	MA	FA	FA				
	5.27		4.86	5.13	4.91	4.95	5.16	4.42	4.67		5.01	4.08	4.55	4.67	4.53	4.81				
19184 11/ 5	MA	FA	MA	MA	FA	FA	FA	FA	FA	MA	FA / FA		FA	FA	FA					
	5.47	4.65	5.10	5.12	4.99	4.99	5.00	5.06	4.89	5.22	5.05	4.69	4.95	4.99	5.19					
19185 8/ 7	FA	FA	FA	MA	MA	MA	MA	MA / MA		FA	MA	MA	FA	MA	MA					
	4.88	4.84	5.06	5.47	5.46	5.08	5.28	5.31	5.50	4.97	5.36	5.41	5.55	5.76	5.56					
19186 9/10	FA	MA	MA	FA	FA	FA	MA	E	MA / FA		MA	MA	MA	FA	FA	FA	E	MA		
	4.95	5.36	5.03	5.14	4.89	4.54	5.41		5.09	5.67	5.41	5.75	5.69	5.45	4.99	4.73		5.02		
19187	NOT PREGNANT																			
19188	NOT PREGNANT																			

M = MALE F = FEMALE A = ALIVE E = EARLY RESORPTION L = LATE RESORPTION "/" DENOTES POSITION OF CERVIX
CLs = CORPORA LUTEA/OVARY FETAL BODY WEIGHTS WERE RECORDED IN GRAMS (G).

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 20 (PAGE 8): FETAL SEX, VITAL STATUS AND BODY WEIGHT - INDIVIDUAL DATA

GROUP IV HIGH DOSAGE 1000 MG/KG/DAY

RAT #	CLs	FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
19189	15/ 9		FA	FA	MA	MA	MA	FA	FA	MA	MA / E		MA	MA	MA	FA	MA	E	E	FA		
			4.88	4.72	5.24	4.91	4.57	4.44	4.80	4.69	5.17		5.50	5.13	5.14	4.98	5.17			5.46		
19190	5/11		MA	MA	MA	FA	MA / FA		FA	MA	FA	MA	FA	FA	FA	MA	MA	MA				
			4.76	5.29	5.19	4.87	5.39	4.68	4.91	4.84	3.69	5.11	4.83	4.83	4.71	5.09	5.13	5.11				
19191	11/ 9		FA	FA	FA	FA	FA	MA	MA / FA		MA	MA	FA	MA	MA	FA						
			4.97	4.87	5.09	4.48	4.79	4.55	4.85	4.86	5.06	5.33	5.15	4.46	4.58	4.38						
19192	8/ 9		FA	E	MA	MA	MA	MA / FA		MA	FA	FA	MA	FA	MA	MA						
			5.00		5.13	4.69	4.85	4.99	4.49	4.90	4.91	4.87	4.56	4.51	4.60	4.69						
19193	10/ 8		MA	FA	MA	MA	FA	FA	MA	MA / MA		FA	FA	MA	MA	MA						
			4.81	4.75	4.95	4.88	4.44	3.77	4.51	4.62	4.37	4.45	4.48	4.79	4.56	4.69						
19194	4/ 9		MA	MA	FA	FA / FA		FA	MA	MA	MA	MA	MA	FA	MA							
			5.28	5.56	5.02	4.92	4.98	4.92	5.33	5.00	5.34	5.19	4.91	4.55	5.56							
19195	10/ 8		FA	FA	FA	MA	MA	FA	MA	MA / MA		FA	MA	MA	FA	FA	MA	MA				
			3.79	4.68	4.45	4.50	4.91	4.56	4.79	5.15	4.88	4.52	4.41	4.80	4.63	5.08	5.01	4.63				
19196	10/ 8		MA	FA	MA	MA	FA	FA	FA	MA	MA	FA / FA		FA	FA	FA	FA	MA	FA	FA		
			4.88	4.56	4.50	4.99	4.85	5.02	4.76	5.01	5.15	5.33	4.70	4.55	4.23	4.50	4.42	5.31	4.42	5.11		
19197	9/ 9		MA	FA	FA	FA	MA	FA	MA	E / MA		MA	MA	MA	FA	FA	FA	FA	MA			
			4.90	4.25	4.88	4.67	5.00	4.46	4.88		4.89	4.83	4.60	4.78	4.80	4.70	4.72	4.62	5.34			
19198			FOUND DEAD ON DAY 17 OF GESTATION																			
19199	12/ 5		FA	FA	MA	MA	FA	MA	MA	FA	FA	FA	FA / E		E	FA	FA					
			4.57	4.32	4.77	4.76	4.61	5.60	4.68	4.60	4.39	4.74	4.26			5.04	4.56					
19200	13/ 6		FA	MA	MA	FA	FA	FA	MA	MA	FA	FA	MA	FA / MA		FA	FA	FA	FA	MA		
			4.59	4.36	4.22	4.43	4.64	4.80	4.47	4.92	4.44	4.00	4.98	4.76	5.02	4.53	4.74	4.34	4.88	4.64		

M = MALE F = FEMALE A = ALIVE E = EARLY RESORPTION "/" DENOTES POSITION OF CERVIX
CLs = CORPORA LUTEA/OVARY FETAL BODY WEIGHTS WERE RECORDED IN GRAMS (G).

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 1): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP I VEHICLE 0 MG/KG/DAY

RAT NUMBER	SPECIMENS WITH ANY ALTERATIONS N(%)	GROSS EXTERNAL EXAMINATION N/N	DESCRIPTION	SOFT TISSUE EXAMINATION N/N	DESCRIPTION	SKELETAL EXAMINATION N/N	DESCRIPTION
19101	0(0.0)	0/19		0/ 9		0/10	
19102	0(0.0)	0/15		0/ 7		0/ 8	
19103	0(0.0)	0/15		0/ 7		0/ 8	
19104	0(0.0)	0/12		0/ 6		0/ 6	
19105	0(0.0)	0/15		0/ 7		0/ 8	
19106	0(0.0)	0/13		0/ 6		0/ 7	
19107	0(0.0)	0/17		0/ 8		0/ 9	
19108	0(0.0)	0/14		0/ 7		0/ 7	
19109	1(8.3)	0/12		1/ 6	FETUS 2 VESSELS: UMBILICAL ARTERY DESCENDED TO THE LEFT OF THE URINARY BLADDER	0/ 6	
19110	0(0.0)	0/17		0/ 8		0/ 9	
19111	DELIVERED AND SACRIFICED ON DAY 21 OF GESTATION a						
19112	0(0.0)	0/18		0/ 9		0/ 9	
19113	0(0.0)	0/15		0/ 7		0/ 8	
19114	0(0.0)	0/16		0/ 8		0/ 8	
19115	0(0.0)	0/18		0/ 9		0/ 9	
19116	0(0.0)	0/11		0/ 5		0/ 6	

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

a. Dam 19111 delivered 2 pups and had 13 fetuses and 1 early resorption in utero. At gross external, soft tissue and skeletal examination all pups and fetuses appeared normal.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 2): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP I VEHICLE 0 MG/KG/DAY

RAT NUMBER	SPECIMENS WITH ANY ALTERATIONS N(%)	GROSS EXTERNAL EXAMINATION N/N	GROSS EXTERNAL EXAMINATION DESCRIPTION	SOFT TISSUE EXAMINATION N/N	SOFT TISSUE EXAMINATION DESCRIPTION	SKELETAL EXAMINATION N/N	SKELETAL EXAMINATION DESCRIPTION
19117	0(0.0)	0/12		0/ 6		0/ 6	
19118	1(6.2)	0/16		1/ 8	FETUS 10 EYES: ABSENT EYE, left	0/ 8	
19119	0(0.0)	0/12		0/ 6		0/ 6	
19120	1(7.1)	0/14		0/ 7		1/ 7	FETUS 5 THORACIC VERTEBRAE: CENTRUM, BIFID, 11th; ARCHES, FUSED, left 13th and 14th; HEMIVERTEBRA, left 14th, arch and centrum with attached rib; CENTRUM, UNILATERAL OSSIFICATION, left 14th; CENTRUM, NOT OSSIFIED, 13th
19121	0(0.0)	0/19		0/ 9		0/10	
19122	0(0.0)	0/ 7		0/ 3		0/ 4	
19123	1(6.2)	0/16		0/ 8		1/ 8	FETUS 11 THORACIC VERTEBRAE: CENTRUM, BIFID, 10th
19124	0(0.0)	0/17		0/ 8		0/ 9	
19125	0(0.0)	0/18		0/ 9		0/ 9	

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 3): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP II	LOW DOSAGE		100 MG/KG/DAY			
	SPECIMENS WITH ANY ALTERATIONS	GROSS EXTERNAL EXAMINATION		SOFT TISSUE EXAMINATION		SKELETAL EXAMINATION	
RAT NUMBER	N(%)	N/N	DESCRIPTION	N/N	DESCRIPTION	N/N	DESCRIPTION
19126	0(0.0)	0/13		0/ 6		0/ 7	
19127	0(0.0)	0/15		0/ 7		0/ 8	
19128	0(0.0)	0/13		0/ 6		0/ 7	
19129	0(0.0)	0/11		0/ 5		0/ 6	
19130	1(7.7)	0/13		0/ 6		1/ 7	FETUS 9 THORACIC VERTEBRAE: CENTRUM, BIFID, 13th
19131	NOT PREGNANT						
19132	0(0.0)	0/15		0/ 7		0/ 8	
19133	0(0.0)	0/15		0/ 7		0/ 8	
19134	0(0.0)	0/16		0/ 8		0/ 8	
19135	0(0.0)	0/16		0/ 8		0/ 8	
19136	0(0.0)	0/14		0/ 7		0/ 7	
19137	0(0.0)	0/17		0/ 8		0/ 9	
19138	2(15.4)	0/13		1/ 6	FETUS 2 VESSELS: UMBILICAL ARTERY DESCENDED TO THE LEFT OF THE URINARY BLADDER	1/ 7	FETUS 9 THORACIC VERTEBRAE: CENTRUM, BIFID, 4th; RIBS: FUSED, right 4th and 5th, proximally

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 4): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP II	LOW DOSAGE	100 MG/KG/DAY				
	SPECIMENS WITH ANY ALTERATIONS	GROSS EXTERNAL EXAMINATION		SOFT TISSUE EXAMINATION		SKELETAL EXAMINATION	
RAT NUMBER	N(%)	N/N	DESCRIPTION	N/N	DESCRIPTION	N/N	DESCRIPTION
19139	2(25.0)	0/ 8		0/ 4		2/ 4	FETUS 7 PELVIS: PUBIS, INCOMPLETELY OSSIFIED, right FETUS 10 THORACIC VERTEBRAE: CENTRUM, BIFID, 11th
19140	1(6.7)	0/15		0/ 7		1/ 8	FETUS 12 STERNAL CENTRA: FUSED, 1st and 2nd; ASYMMETRIC, 1st - 3rd
19141	0(0.0)	0/13		0/ 6		0/ 7	
19142	0(0.0)	0/13		0/ 6		0/ 7	
19143	1(5.9)	0/17		1/ 8	FETUS 19 EYES: FOLDED RETINA, right	0/ 9	
19144	2(11.8)	0/17		0/ 8		2/ 9	FETUS 1 CERVICAL VERTEBRAE: CERVICAL RIB PRESENT AT 7TH CERVICAL VERTEBRA, left FETUS 11 CERVICAL VERTEBRAE: CERVICAL RIB PRESENT AT 7TH CERVICAL VERTEBRA, left
19145	NOT PREGNANT						

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 5): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP II	LOW DOSAGE		100 MG/KG/DAY			
	SPECIMENS WITH ANY ALTERATIONS	GROSS EXTERNAL EXAMINATION		SOFT TISSUE EXAMINATION		SKELETAL EXAMINATION	
RAT NUMBER	N(%)	N/N	DESCRIPTION	N/N	DESCRIPTION	N/N	DESCRIPTION
19146	2(15.4)	0/13		0/ 6		2/ 7	FETUS 8 THORACIC VERTEBRAE: CENTRUM, BIFID, 12th FETUS 13 CERVICAL VERTEBRAE: CERVICAL RIB PRESENT AT 7TH CERVICAL VERTEBRA, left
19147	1(6.2)	0/16		1/ 8	FETUS 10 VESSELS: UMBILICAL ARTERY DESCENDED TO THE LEFT OF THE URINARY BLADDER	0/ 8	
19148	NOT PREGNANT						
19149	0(0.0)	0/16		0/ 8		0/ 8	
19150	0(0.0)	0/17		0/ 8		0/ 9	

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 6): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP III	MIDDLE DOSAGE		300 MG/KG/DAY			
	SPECIMENS WITH ANY ALTERATIONS	GROSS EXTERNAL EXAMINATION		SOFT TISSUE EXAMINATION		SKELETAL EXAMINATION
RAT NUMBER	N(%)	N/N	DESCRIPTION	N/N	DESCRIPTION	N/N	DESCRIPTION
19151	0(0.0)	0/14		0/ 7		0/ 7	
19152	NOT PREGNANT						
19153	0(0.0)	0/15		0/ 7		0/ 8	
19154	0(0.0)	0/12		0/ 6		0/ 6	
19155	0(0.0)	0/19		0/ 9		0/10	
19156	0(0.0)	0/ 9		0/ 4		0/ 5	
19157	DELIVERED AND SACRIFICED ON DAY 21 OF GESTATION a						
19158	0(0.0)	0/15		0/ 7		0/ 8	
19159	0(0.0)	0/15		0/ 7		0/ 8	
19160	0(0.0)	0/17		0/ 8		0/ 9	
19161	0(0.0)	0/13		0/ 6		0/ 7	
19162	0(0.0)	0/13		0/ 6		0/ 7	
19163	0(0.0)	0/13		0/ 6		0/ 7	
19164	0(0.0)	0/16		0/ 8		0/ 8	
19165	0(0.0)	0/15		0/ 7		0/ 8	
19166	1(5.9)	0/17		0/ 8		1/ 9	FETUS 9 THORACIC VERTEBRAE: CENTRUM, BIFID, 12th
19167	0(0.0)	0/16		0/ 8		0/ 8	

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

a. Dam 19157 delivered 1 pup and had 16 fetuses in utero. At gross external, soft tissue and skeletal examination the pup and all fetuses appeared normal.

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 7): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP III MIDDLE DOSAGE 300 MG/KG/DAY

RAT NUMBER	SPECIMENS WITH ANY ALTERATIONS N(%)	GROSS EXTERNAL EXAMINATION N/N	GROSS EXTERNAL EXAMINATION DESCRIPTION	SOFT TISSUE EXAMINATION N/N	SOFT TISSUE EXAMINATION DESCRIPTION	SKELETAL EXAMINATION N/N	SKELETAL EXAMINATION DESCRIPTION
19168	0(0.0)	0/15		0/ 7		0/ 8	
19169	1(5.9)	0/17		0/ 8		1/ 9	FETUS 18 THORACIC VERTEBRAE: CENTRUM, BIFID, 11th
19170	0(0.0)	0/13		0/ 6		0/ 7	
19171	0(0.0)	0/13		0/ 6		0/ 7	
19172	1(6.7)	0/15		0/ 7		1/ 8	FETUS 3 THORACIC VERTEBRAE: CENTRUM, BIFID, 11th
19173	0(0.0)	0/12		0/ 6		0/ 6	
19174	0(0.0)	0/12		0/ 6		0/ 6	
19175	0(0.0)	0/15		0/ 7		0/ 8	

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 8): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP IV	HIGH DOSAGE	1000 MG/KG/DAY				
RAT NUMBER	SPECIMENS WITH ANY ALTERATIONS N(%)	GROSS EXTERNAL EXAMINATION N/N	DESCRIPTION	SOFT TISSUE EXAMINATION N/N	DESCRIPTION	SKELETAL EXAMINATION N/N	DESCRIPTION
19176	0(0.0)	0/15		0/ 7		0/ 8	
19177	0(0.0)	0/17		0/ 8		0/ 9	
19178	0(0.0)	0/11		0/ 5		0/ 6	
19179	0(0.0)	0/13		0/ 6		0/ 7	
19180	0(0.0)	0/14		0/ 7		0/ 7	
19181	FOUND DEAD ON DAY 18 OF GESTATION (NOT PREGNANT)						
19182	1(6.7)	0/15		0/ 7		1/ 8	FETUS 3 CERVICAL VERTEBRAE: CERVICAL RIB PRESENT AT 7TH CERVICAL VERTEBRA, right
19183	1(7.1)	0/14		0/ 7		1/ 7	FETUS 4 THORACIC VERTEBRAE: CENTRUM, BIFID, 11th
19184	0(0.0)	0/15		0/ 7		0/ 8	
19185	1(6.7)	0/15		1/ 7	FETUS 8 VESSELS: INNOMINATE ARTERY ABSENT	0/ 8	
19186	0(0.0)	0/16		0/ 8		0/ 8	
19187	NOT PREGNANT						

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

PROTOCOL 418-023: ORAL (GAVAGE) DEVELOPMENTAL TOXICITY STUDY OF POTASSIUM PERFLUOROBUTANE SULFONATE (PFBS) IN RATS (SPONSOR'S STUDY NUMBER: T-7485.12)

TABLE 21 (PAGE 9): FETAL ALTERATIONS - INDIVIDUAL DATA

GROUP IV	HIGH DOSAGE	1000 MG/KG/DAY				
	SPECIMENS WITH ANY ALTERATIONS	GROSS EXTERNAL EXAMINATION		SOFT TISSUE EXAMINATION		SKELETAL EXAMINATION	
RAT NUMBER	N(%)	N/N	DESCRIPTION	N/N	DESCRIPTION	N/N	DESCRIPTION
19188	NOT PREGNANT						
19189	0(0.0)	0/15		0/ 7		0/ 8	
19190	0(0.0)	0/16		0/ 8		0/ 8	
19191	0(0.0)	0/14		0/ 7		0/ 7	
19192	0(0.0)	0/13		0/ 6		0/ 7	
19193	0(0.0)	0/14		0/ 7		0/ 7	
19194	0(0.0)	0/13		0/ 6		0/ 7	
19195	0(0.0)	0/16		0/ 8		0/ 8	
19196	0(0.0)	0/18		0/ 9		0/ 9	
19197	0(0.0)	0/16		0/ 8		0/ 8	
19198	FOUND DEAD ON DAY 17 OF GESTATION a						
19199	0(0.0)	0/13		0/ 6		0/ 7	
19200	0(0.0)	0/18		0/ 9		0/ 9	

N/N = NUMBER OF SPECIMENS WITH ALTERATIONS/NUMBER OF SPECIMENS EXAMINED

a. Dam 19198 was found dead on day 17 of gestation and had 15 fetuses and one early resorption present in utero. At gross external examination all fetuses appeared normal for early developmental age. Fetuses could not be further examined due to early developmental age.

APPENDIX C

PROTOCOL

PRIMEDICA

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905 Sheehy Drive, Building A
Horsham, PA 19044
Telephone: (215) 443-8710
Telefax: (215) 443-8587

PROTOCOL 418-023

SPONSOR'S STUDY NUMBER: T-7485.12

STUDY TITLE: Oral (Gavage) Developmental Toxicity Study of Potassium Perfluorobutane Sulfonate (PFBS) in Rats

PURPOSE: The purpose of this study is to evaluate the developmental toxicity (embryo-fetal toxicity and teratogenic potential) of Potassium Perfluorobutane Sulfonate (PFBS) administered orally via gavage to Crl:CD®(SD)IGS BR VAF/Plus® presumed pregnant female rats.

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3M Medical Department
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Telefax: (651) 733-1773

REGULATORY CITATIONS:

U.S. Environmental Protection Agency (1998). Health Effects Test Guidelines; Prenatal Developmental Toxicity Study. Office of Prevention, Pesticides and Toxic Substances (OPPTS) 870.3700, August, 1998.

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Japanese Ministry of Agriculture, Forestry and Fisheries (1985). *Guidance on Toxicology Study Data for Application of Agricultural Chemical Registration.* 59 NohSan No. 4200.

U.S. Environmental Protection Agency. Toxic Substances Control Act (TSCA); Good Laboratory Practice Standards; Final Rule. 40 CFR Part 792.

U.S. Environmental Protection Agency. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Good Laboratory Practice Standards; Final Rule. 40 CFR Part 160.

Organization for Economic Cooperation and Development (1998). The Revised OECD Principles of Good Laboratory Practices [C(97)186/Final].

Japanese Ministry of Agriculture, Forestry and Fisheries (1984). *Good Laboratory Practice Standards.* 59 NohSan No. 3850.

REGULATORY COMPLIANCE:

This study will be conducted in compliance with the Good Laboratory Practice (GLP) regulations cited above.

All changes or revisions of this protocol shall be documented, signed by the Study Director and the Sponsor, dated and maintained with the protocol.

The Testing Facility's Quality Assurance Unit (QAU) will audit the protocol, the raw data and the report, and will inspect critical phases of those portions of the study conducted at the Testing Facility in accordance with the Standard Operating Procedures of Argus Research Laboratories, Inc.

Should any portion of the study be conducted by a subcontractor or by the Sponsor, the QAU for that facility will conduct critical phase inspections and audit respective results and reports for that study portion according to the SOPs of that facility. Such critical phase inspection reports and report audits will be submitted by that facility to the Study Director. The dates of the inspections and report submissions will be incorporated into

a QAU Statement generated by that facility and provided to the Testing Facility for inclusion in the final report.

The final report will include a compliance statement signed by the Study Director that the report accurately reflects the raw data obtained during the performance of the study and that all applicable GLP regulations were followed in the conduct of the study. Should significant deviations from GLP regulations occur, each will be described in detail, together with how the deviation might affect the quality or integrity of the study.

SCHEMATIC OF STUDY DESIGN AND STUDY SCHEDULE:

See ATTACHMENT 1 to the protocol.

TEST SUBSTANCE AND VEHICLE:

Identification:

Test Substance:

Potassium Perfluorobutane Sulfonate (PFBS or T-7485). Lot number will be documented in the raw data.

The Sponsor will provide to the Testing Facility documentation or certification of the identity, composition, method of synthesis, strength and purity of the test substance.

Vehicle:

Aqueous 0.1% carboxymethylcellulose (CMC) (medium viscosity) prepared using reverse osmosis membrane processed deionized water (R.O. deionized water). Lot number will be documented in the raw data.

Neither the Sponsor nor the Study Director is aware of any potential contaminants likely to be present in the vehicle that would interfere with the results of this study. Therefore, no analyses other than those mentioned in this protocol will be conducted.

Safety Precautions:

Gloves, dust-mist/HEPA-filtered mask, appropriate eye protection and uniform/lab coat to be worn during formulation preparation and dosage. In addition, Tyvek sleeves and a half-face respirator will be worn and preparation will be conducted in a chemical fume hood when using the bulk test substance. The Material Safety Data Sheet is attached to the protocol (ATTACHMENT 2).

Storage:

Bulk Test Substance:	Room temperature.
Bulk Vehicle Components:	Room temperature.
Prepared Test Substance and Vehicle Formulations:	2°C to 8°C

All test substance shipments to the Testing Facility should be addressed to the attention of Julian Gulbinski, Manager of Formulations, at the previously cited address and telephone number.

Shipments should include information concerning storage conditions and shipping cartons should be labeled appropriately. The recipient should be notified in advance of shipment.

FORMULATION:

Frequency of Preparation:

Formulations (suspensions) will be prepared approximately every 10 days at the Testing Facility.

Detailed preparation procedures will be attached to this protocol (ATTACHMENT 3).

Adjustment for Purity:

The test substance will be considered 100% pure for the purpose of dosage calculations.

Testing Facility Reserve Samples:

The Testing Facility will reserve a 1 g sample of each lot of bulk test substance and vehicle used during the course of the study. Samples will be stored under the previously cited conditions.

ANALYSES:

Results of required analyses will be provided to the Testing Facility for inclusion in the study report.

Samples additional to those described below may be taken if deemed necessary during the course of the study.

Bulk Test Substance Sampling:

A sample (1 g) of the test substance will be taken on the last day of treatment and sent (ambient conditions) to the Sponsor for analysis.

This sample will be sent to:

James D. Johnson
Southern Research Institute
2000 Ninth Avenue South
Birmingham, Alabama 35205

Telephone: (205) 581-2715
(205) 581-2599 (lab phone)
Telefax: (205) 322-7473

The recipient will be notified in advance of sample shipment.

Analyses of Prepared Formulations:

Homogeneity:

Homogeneity analyses of the prepared formulations will not be conducted. Information is on file with the Sponsor to document the homogeneity of the test substance in the prepared vehicle over the range of concentrations to be used in this study. This information will be provided to the Study Director for inclusion in the final report.

Concentration:

Concentration of the prepared formulations will be verified during the course of this study. Duplicate samples (2 mL each) will be taken from the first and last preparation on the day prepared. One sample of each set will be shipped for analysis; the remaining samples will be retained at the Testing Facility as backup samples. Backup samples will be stored under the previously cited conditions and discarded at the Testing Facility upon the request of the Sponsor.

Stability:

Stability data for prepared formulations bracketing the range of concentrations in this study are on file with the Sponsor and will not be determined during the conduct of this study. This information will be provided to the Study Director for inclusion in the final report.

Shipping Instructions:

Samples to be analyzed will be shipped (on cold packs) to James D. Johnson, at the previously cited address.

The recipient will be notified in advance of sample shipment.

DISPOSITION:

Prepared formulations will be discarded at the Testing Facility. All remaining bulk test substance will be returned to:

Nelda Marecki, Ph.D.
3M SMMG EHS&R
3M Center
Building 236-1B-10
St. Paul, Minnesota 55144-1000

TEST SYSTEM:

Species/Strain and Reason for Selection:

The Crl:CD®(SD)IGS BR VAF/Plus® rat was selected as the Test System because: 1) it is one mammalian species accepted and widely used throughout industry for nonclinical studies of developmental toxicity (embryo-fetal toxicity/teratogenicity); 2) this strain has been demonstrated to be sensitive to developmental toxins; and 3) historical data and experience exist at the Testing Facility[1-3].

Number:

Initial population acclimated:	140 virgin female rats.
Population selected for study:	100 mated female rats (25 per dosage group).

Body Weight and Age:

Female rats will be ordered to have body weights of 200 g to 225 g each at receipt, at which time they will be expected to be at least 60 days of age. Actual body weights recorded the day after receipt will be documented in the raw data, and the weight range will be included in the final report.

Sex:

Female rats will be given the test substance. Male rats of the same source and strain will be used only as breeders and are not considered part of the Test System.

Source:

Charles River Laboratories, Inc.

The rats will be shipped in filtered cartons by air freight and/or truck from Charles River Laboratories, Inc., to the Testing Facility.

Identification:

Rats are permanently identified using Monel® self-piercing ear tags (Gey Band and Tag Co., Inc., No. MSPT 20101). Male rats are given unique permanent identification numbers upon assignment to the Testing Facility's breeder male rat population. Female rats are assigned temporary numbers at receipt and given unique permanent identification numbers when assigned to the study on the basis of day 0 of presumed gestation body weights.

ANIMAL HUSBANDRY:

All cage sizes and housing conditions are in compliance with the *Guide for the Care and Use of Laboratory Animals*[4].

Housing:

The rats will be individually housed in stainless steel, wire-bottomed cages except during the cohabitation period. During cohabitation, each pair of rats will be housed in the male rat's cage. No nesting materials will be supplied because the female rats will be sacrificed before parturition is expected.

Room Air, Temperature and Humidity:

The animal room is independently supplied with at least ten changes per hour of 100% fresh air that has been passed through 99.97% HEPA filters. Room temperature will be maintained at 64°F to 79°F (18°C to 26°C) and monitored constantly. Room humidity will also be monitored constantly and maintained at 30% to 70%.

Light:

An automatically-controlled 12-hour light:12-hour dark fluorescent light cycle will be maintained. Each dark period will begin at 1900 hours EST.

Diet:

Rats will be given Certified Rodent Diet® #5002 (PMI Nutrition International) available *ad libitum* from individual feeders.

Water:

Water will be available *ad libitum* from individual bottles attached to the cages or from an automatic watering access system. All water will be from a local source and passed through a reverse osmosis membrane before use. Chlorine will be added to the processed water as a bacteriostat; processed water is expected to contain no more than 1.2 ppm chlorine at the time of analysis. Water is analyzed monthly for possible bacterial contamination and twice annually for possible chemical contamination.

Contaminants:

Neither the Sponsor nor the Study Director is aware of any potential contaminants likely to be present in the certified diet or in the drinking water at levels that would interfere with the results of this study. Therefore, no analyses other than those routinely performed by the feed supplier or those mentioned in this protocol will be conducted.

RANDOMIZATION AND COHABITATION:

Upon arrival, male and female rats will be assigned to individual housing on the basis of computer-generated random units. After acclimation, virgin female rats will be cohabited with breeder male rats, one male rat per female rat. The cohabitation period will consist of a maximum of five days. Female rats with spermatozoa observed in a smear of the vaginal contents and/or a copulatory plug observed *in situ* will be considered to be at day 0 of presumed gestation and assigned to individual housing.

Healthy mated female rats will be assigned to dosage groups based on computer-generated (weight-ordered) randomization procedures.

ADMINISTRATION:

Route and Reason for Choice:

The oral (gavage) route was selected for use because: 1) in comparison with the dietary route, the exact dosage can be accurately administered; and 2) it is one possible route of human exposure.

Method and Frequency:

Female rats will be given the test substance once daily on days 6 through 20 of presumed gestation. Dosages will be adjusted daily for body weight changes and given at approximately the same time each day.

Rationale for Dosage Selection:

Dosages were selected on the basis of a dosage-range study (Argus Research Laboratories, Inc., Protocol 418-023P).

The highest dosage level selected should induce some overt developmental and/or maternal mortality. The intermediate dosage levels should produce minimal observed toxic effects. The lowest dosage level should not produce any evidence of either maternal or developmental toxicity.

Dosage Levels, Concentrations and Volumes:

Group	Number of Rats	Dosage (mg/kg/day)	Concentration (mg/mL)	Volume (mL/kg)	Argus Batch Number
I	25	0 (Vehicle)	0	10	B-418-023-A(Day.Month.Year)
II	25	100	10	10	B-418-023-B(Day.Month.Year)
III	25	300	30	10	B-418-023-C(Day.Month.Year)
IV	25	1000	100	10	B-418-023-D(Day.Month.Year)

The test substance will be considered 100% pure for the purpose of dosage calculations.

TESTS, ANALYSES AND MEASUREMENTS:

Viability:

All Periods: At least twice daily.

Clinical Observations and/or General Appearance:

Acclimation Period: Weekly.

Predosage Period: Day 0 of presumed gestation.

Dosage Period: Daily before dosage. Postdosage observations will be recorded approximately 60 ± 10 minutes after administration.

Day of Sacrifice: Once.

Clinical observations may be recorded more frequently than cited above, if deemed appropriate by the Study Director and/or Study Monitor.

Body Weights:

Acclimation Period: Weekly.

Predosage Period: Day 0 of presumed gestation.

Dosage Period: Daily.

Day of Sacrifice: Prior to sacrifice.

Feed Consumption Values (recorded and tabulated):

Predosage Period:	Day 0 of presumed gestation.
Dosage Period:	Days 6, 9, 12, 15, 18 and 20 of presumed gestation.
Day of Sacrifice:	Feed left recorded.

Feed consumption values may be recorded more frequently if it is necessary to replenish the feed. These intervals will not be tabulated.

Mating Performance:

Mating will be evaluated daily during the cohabitation period and confirmed by observation of spermatozoa in a smear of the vaginal contents and/or a copulatory plug observed *in situ*.

Caesarean-Sectioning Observations:

Rats will be Caesarean-sectioned on day 21 of presumed gestation. To minimize bias, Caesarean-sectioning and subsequent fetal observations will be conducted without knowledge of dosage group. The gravid uterus will be excised and weighed. The fetuses will be removed from the uterus and placed in individual containers. The rats will be examined for number and distribution of:

Corpora Lutea.

Implantation Sites.

Live and Dead Fetuses.
(A live fetus is defined as one that responds to stimuli; a dead fetus is defined as a term fetus that does not respond to stimuli and that is not markedly autolyzed; dead fetuses demonstrating marked to extreme autolysis are considered to be late resorptions.)

Early and Late Resorptions.
(A conceptus is defined as a late resorption if it is grossly evident that organogenesis has occurred; if this is not the case, the conceptus is defined as an early resorption.)

Fetal Observations:

To minimize bias, fetal observations will be conducted without knowledge of dosage group.

Gross External Alterations and Sex:

Fetuses will be examined for sex and for gross external alterations. Late resorptions and dead fetuses also will be examined for sex and for gross external alterations to the extent possible but such observations will not be included in either data summarization or statistical analyses.

Body Weights and Identification:

The body weight of each fetus will be recorded. Only body weights of live fetuses will be used to determine litter fetal body weight averages. Fetuses will be tagged with identification noting study number, litter number, uterine distribution and fixative.

Soft Tissue Examination:

Approximately one-half of the fetuses in each litter will be examined for soft tissue alterations by using a variation of the microdissection technique of Staples[5]. These fetuses will be fixed in Bouin's solution and the heads will subsequently be examined by free-hand sectioning; head sections will be stored in alcohol. The decapitated carcasses will not be retained.

Skeletal Examination:

The remaining fetuses (approximately one-half of the fetuses in each litter) will be examined for skeletal alterations (bone and cartilage) after staining with alizarin red S[6]. The fetuses will be initially fixed in alcohol; skeletal preparations will be retained in glycerin with thymol added as a preservative.

Representative photographs of fetal gross, soft tissue and skeletal alterations will be taken.

METHOD OF SACRIFICE:

Rats will be sacrificed by carbon dioxide asphyxiation. Live fetuses will be sacrificed by an intraperitoneal injection of sodium pentobarbital.

NECROPSY:

Gross lesions will be retained in neutral buffered 10% formalin for possible future evaluation. Unless specifically cited below, all other tissues will be discarded.

Scheduled Sacrifice:

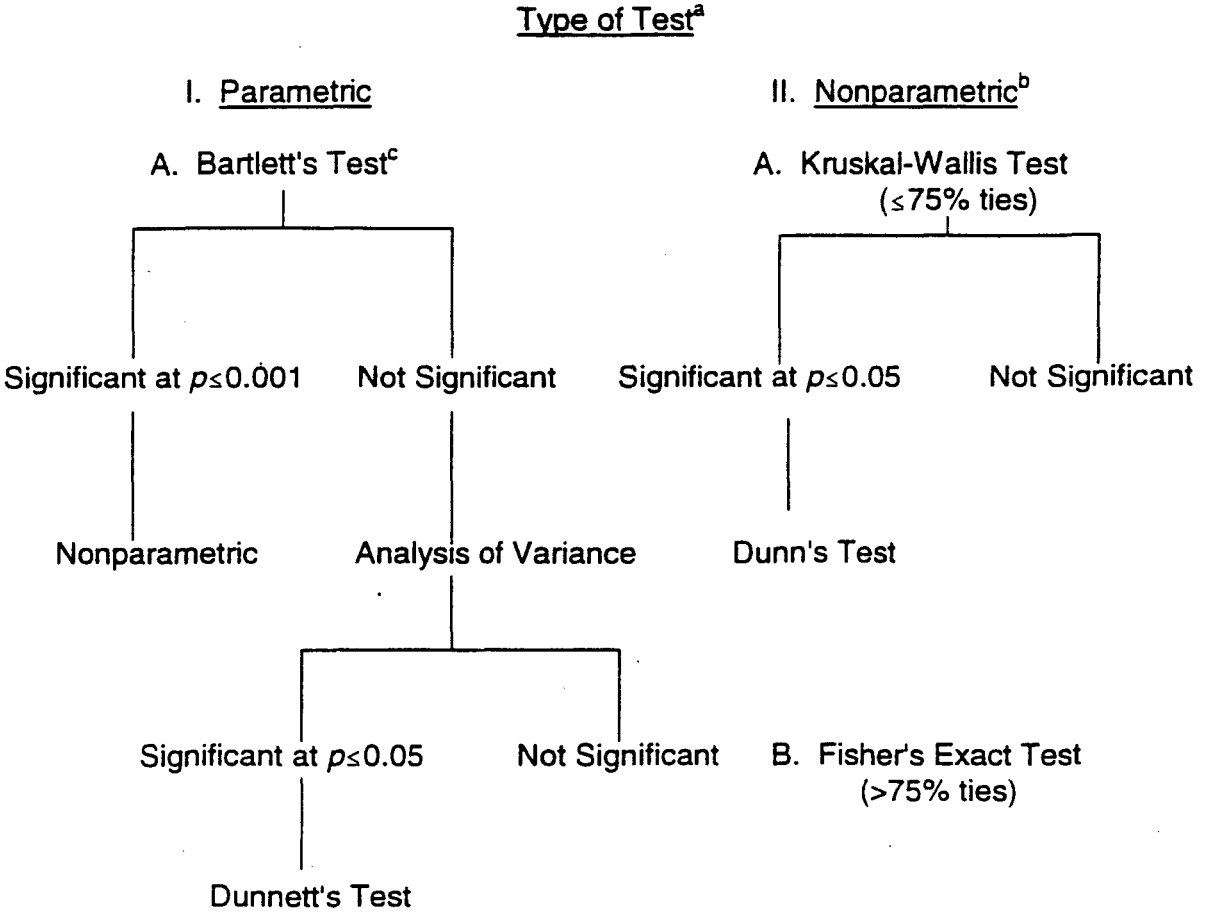
On day 21 of presumed gestation, female rats will be Caesarean-sectioned, and a gross necropsy of the thoracic, abdominal and pelvic viscera will be performed. The gravid uterus will be excised and weighed. Uteri of apparently nonpregnant rats will be examined while being pressed between glass plates to confirm the absence of implantation sites.

Rats Found Dead or Moribund:

Rats that die or are sacrificed because of moribund condition, abortion or premature delivery will be examined for the cause of death or moribund condition on the day the observation is made. The rats will be examined for gross lesions. Pregnancy status and uterine contents of female rats will be recorded. Gravid uterine weights will not be recorded if precluded by autolysis. Aborted fetuses, delivered pups and/or concepti *in uteri* will be examined to the extent possible, using the methods described for term fetuses. Uteri of apparently nonpregnant rats will be examined while being pressed between glass plates to confirm the absence of implantation sites.

PROPOSED STATISTICAL METHODS[7-13]

Averages and percentages will be calculated. Litter values will be used where appropriate. Additional procedures and/or analyses may be performed, if appropriate.



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a. Statistically significant probabilities are reported as either $p \leq 0.05$ or $p \leq 0.01$.
b. Proportion data are not included in this category.
c. Test for homogeneity of variance.

DATA ACQUISITION, VERIFICATION AND STORAGE:

Data generated during the course of this study will be recorded either by hand or using the *Primedica Argus Automated Data Collection and Management System* and the *Vivarium Temperature and Relative Humidity Monitoring System*. All data will be tabulated, summarized and/or statistically analyzed using the *Primedica Argus Automated Data Collection and Management System*, the *Vivarium Temperature and Relative Humidity Monitoring System, Microsoft Excel* [part of Microsoft Office 97 (version SR-2)] and/or *The SAS System* (version 6.12).

Records will be reviewed by the Study Director and/or appropriate management personnel within 21 days after generation. All original records will be stored in the archives of the Testing Facility. All original data will be bound and indexed. A copy of all raw data will be supplied to the Sponsor upon request. Preserved tissues will be stored at the Testing Facility at no charge for one year after mailing of the draft final report, after which time the Sponsor will be contacted to determine the disposition of these materials.

RECORDS TO BE MAINTAINED:

Protocol and Amendments.
Test Substance, Vehicle and/or Reagent Receipt, Preparation and Use.
Animal Acquisition.
Randomization Schedules.
Mating History.
Treatment (if prescribed by Staff Veterinarian).
General Comments.
Clinical Observations and/or General Appearance.
Blood Sample Collection, Processing and Shipment (if required).
Body Weights.
Feed Consumption Values.
Caesarean-Sectioning and Fetal Observations.
Gross Necropsy Observations.
Organ Weights (if required).
Photographs (if required).
Study Maintenance (room and environmental records).
Feed and Water Analyses.
Packing and/or Shipment Lists.

KEY PERSONNEL:

Executive Director of Research: Mildred S. Christian, Ph.D., Fellow, ATS
Director of Research: Alan M. Hoberman, Ph.D., DABT
Associate Director of Research and Study Director: Raymond G. York, Ph.D., DABT
Director of Laboratory Operations: John F. Barnett, B.S.
Manager of Animal Operations: Dena C. Lebo, V.M.D.
Chairperson, Institutional Animal Care and Use Committee: Theresa Woodard, D.V.M.
Director of Operations and Compliance: Barbara J. Patterson, B.A.
Director of Study Management: Valerie A. Sharper, M.S.
Consultant, Veterinary Pathology: W. Ray Brown, D.V.M., Ph.D., ACVP

FINAL REPORT:

The Study Director will provide periodic updates of study progress to the Sponsor. Draft summary tables of unaudited computer-recorded data may accompany these updates. Statistical analyses will not be performed on these interim data.

A comprehensive draft final report will be prepared on completion of the study and will be finalized following consultation with the Sponsor. The report will include the following:

Summary and Conclusion.
Experimental Design and Method.
Evaluation of Test Results.
Appendices: Figures, Summary and Individual Tables Summarizing the Above Data, Protocol and Associated Amendments and Deviations, Study Director's GLP Compliance Statement, Reports of Supporting Data (if appropriate) and QAU Statement.

The Sponsor will receive one copy of the draft report and two copies of the final report.

INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE STATEMENT:

The procedures described in this protocol have been reviewed by the Testing Facility's Institutional Animal Care and Use Committee. All procedures described in this protocol that involve study animals will be conducted in a manner to avoid or minimize discomfort, distress or pain to the animals.

The Sponsor's signature below documents the fact that information concerning the necessity for conducting this study and the fact that this is not an unnecessarily duplicative study may be obtained from the Sponsor. No alternative (*in vitro*) procedures were available for meeting the stated purposes of the study.

REFERENCES:

1. Christian, M.S. and Voytek, P.E. (1982). *In Vivo Reproductive and Mutagenicity Tests*. Environmental Protection Agency, Washington, D.C. National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

2. Christian, M.S. (1984). Reproductive toxicity and teratology evaluations of naltrexone (Proceedings of Naltrexone Symposium, New York Academy of Sciences, November 7, 1983), J. Clin. Psychiat. 45(9):7-10.

3. Lang, P.L. (1988). *Embryo and Fetal Developmental Toxicity (Teratology) Control Data in the Charles River Crl:CD®BR Rat*. Charles River Laboratories, Inc., Wilmington, MA 01887-0630. (Data base provided by Argus Research Laboratories, Inc.)

4. Institute of Laboratory Animal Resources (1996). *Guide for the Care and Use of Laboratory Animals*. National Academy Press, Washington, D.C.

5. Staples, R.E. (1974). Detection of visceral alterations in mammalian fetuses. Teratology 9(3):A37-38.

6. Modification of method of Staples, R.E. and Schnell, V.L. (1964). Refinement in rapid clearing technique in the KOH-alizarin red S method for fetal bone. Stain Technol. 39:61-63.

7. Snedecor, G.W. and Cochran, W.G. (1967). Variance test for homogeneity of the binomial distribution. *Statistical Methods*, 6th Edition, Iowa State University Press, Ames, pp. 240-241.

8. Sokal, R.R. and Rohlf, F.J. (1969). Bartlett's test of homogeneity of variances. *Biometry*, W.H. Freeman and Co., San Francisco, pp. 370-371.

9. Snedecor, G.W. and Cochran, W.G. (1967). Analysis of Variance. *Statistical Methods*, 6th Edition, Iowa State University Press, Ames, pp. 258-275.

10. Dunnett, C.W. (1955). A multiple comparison procedure for comparing several treatments with a control. J. Amer. Stat. Assoc. 50:1096-1129.

11. Sokal, R.R. and Rohlf, F.J. (1969). Kruskal-Wallis Test. *Biometry*, W.H. Freeman and Co., San Francisco, pp. 388-389.

12. Dunn, O.J. (1964). Multiple comparisons using rank sums. Technometrics 6(3):241-252.

13. Siegel, S. (1956). *Nonparametric Statistics for the Behavioral Sciences*, McGraw-Hill, New York, pp. 96-104.

PROTOCOL APPROVAL:

FOR THE TESTING FACILITY

for Alan M. Hoberman, Ph.D., DABT
Director of Research

16 Feb 01
Date

Raymond G. York, Ph.D., DABT
Associate Director of Research
Study Director

16 FEB 01
Date

Theresa Woodard, D.V.M.
Chairperson, Institutional Animal Care and
Use Committee

16 FEB 01
Date

FOR THE SPONSOR

Paul H. Lieder, Ph.D., DABT
Study Monitor and
Sponsor's Representative

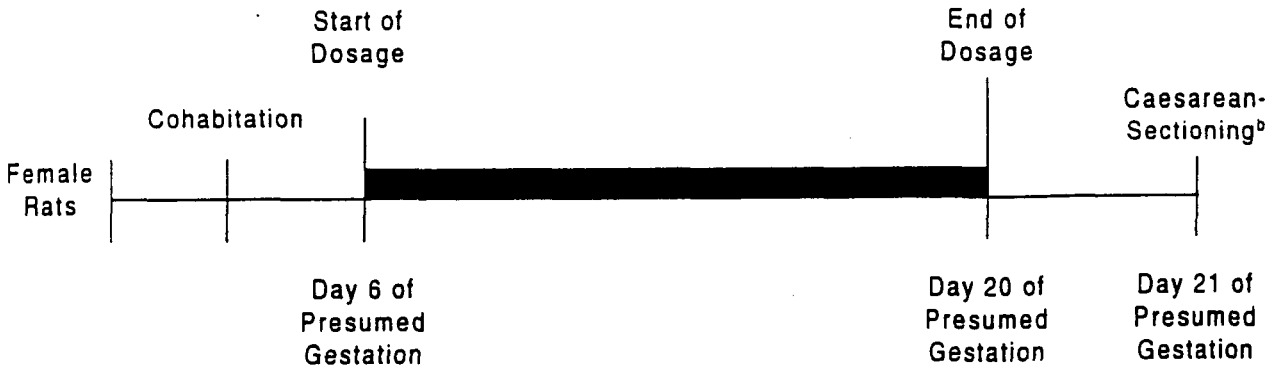
21 Feb 01
Date

ATTACHMENT 1

SCHEMATIC OF STUDY DESIGN AND STUDY SCHEDULE

STUDY SCHEMATIC

DEVELOPMENTAL TOXICITY STUDY[a]



Dosage Period.

a. For additional details see "Tests, Analyses and Measurements" section of the protocol.
b. Fetal evaluations (all fetuses – external examinations , one-half the fetuses in each litter – soft tissue or skeletal examinations).

SCHEDULE[a]

13 FEB 01	Animals Arrive - Acclimation Begins.
18 FEB 01 PM - 23 FEB 01 AM	Cohabitation Period.
19 FEB 01	First Possible Day 0 of Presumed Gestation.
23 FEB 01	Last Possible Day 0 of Presumed Gestation.
25 FEB 01 - 15 MAR 01	Dosage Period (Days 6 through 20 of presumed gestation).
12 MAR 01 - 16 MAR 01	Caesarean-Sectioning Period (Day 21 of presumed gestation).
06 JUN 01	Draft Final Report.

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a. The study initiation date is the date the Study Director signs the protocol.

ATTACHMENT 2

MATERIAL SAFETY DATA SHEET

T-7485

MATERIAL SAFETY DATA SHEET (Experimental)

3M
3M Center
St. Paul, Minnesota
55144-1000
1-800-364-3577 or (651) 737-6501 (24 hours)

DIVISION: 3M SPECIALTY MATERIALS
MATERIAL:
L-7038 DEVELOPMENTAL MATERIAL
ISSUED: December 08, 2000
SUPERSEDES: October 11, 2000
DOCUMENT: 04-4734-2

1. INGREDIENT	C.A.S. NO.	PERCENT
POTASSIUM NONAFLUOROBUTANESULFONATE.....	29420-49-3	~ 98
POTASSIUM GAMMAHYDRO OCTAFLUOROBUTANE SULFONATE.....	Unknown	~ 2

The components of this product are in compliance with the chemical notification requirements of TSCA. All applicable chemical ingredients in this material are listed on the European Inventory of Existing Chemical Substances (EINECS), or are exempt polymers whose monomers are listed on EINECS.

2. PHYSICAL DATA

BOILING POINT:..... N/A
VAPOR PRESSURE:..... N/A
VAPOR DENSITY:..... N/A
EVAPORATION RATE:..... N/A
SOLUBILITY IN WATER:..... 5 %
SPECIFIC GRAVITY:..... ca. 0.54 Water=1
Bulk Density 7-8 lb/gal
PERCENT VOLATILE:..... N/A
pH:..... 5.5 - 7.5
(5% Aqueous)
VISCOSITY:..... N/A
MELTING POINT:..... 285 C

APPEARANCE AND ODOR:
Solid, white, odorless, granular

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... Non-Flammable
FLAMMABLE LIMITS - LEL:..... N/A
FLAMMABLE LIMITS - UEL:..... N/A
AUTOIGNITION TEMPERATURE:..... N/A

EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam

SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS/CONDITIONS TO AVOID:
None known.

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur.

HAZARDOUS DECOMPOSITION PRODUCTS:
Carbon Monoxide and Carbon Dioxide, Oxides of Sulfur, Hydrogen Fluoride, Toxic Vapors, Gases or Particulates.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:
Observe precautions from other sections. Ventilate area. Collect spilled material. Use wet sweeping compound or water to avoid dusting. Clean up residue. Place in a closed container.

RECOMMENDED DISPOSAL:
Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF. Disposal alternative: Dispose of waste product in a facility permitted to accept chemical waste.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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5. ENVIRONMENTAL INFORMATION (continued)

ENVIRONMENTAL DATA:
Not determined.

REGULATORY INFORMATION:
Volatile Organic Compounds: N/D.
VOC Less H2O & Exempt Solvents: N/D.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

EPCRA HAZARD CLASS:
FIRE HAZARD: No PRESSURE: No REACTIVITY: No ACUTE: Yes CHRONIC: Yes

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6. SUGGESTED FIRST AID

EYE CONTACT:
Immediately flush eyes with large amounts of water. Get immediate medical attention.

SKIN CONTACT:
Wash affected area with soap and water.

INHALATION:
If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

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7. PRECAUTIONARY INFORMATION

EYE PROTECTION:
Avoid eye contact. The following should be worn alone or in combination, as appropriate, to prevent eye contact: Wear vented goggles. Wear safety glasses with side shields.

SKIN PROTECTION:
Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: neoprene, nitrile rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials:

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

7. PRECAUTIONARY INFORMATION (continued)

Plain Tyvek or coated Tyvek or similar disposable coverall.

RECOMMENDED VENTILATION:
Provide appropriate local exhaust when product is heated. Provide appropriate local exhaust ventilation at transfer points. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:
Avoid breathing of airborne material. Avoid breathing of dust. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: half-mask dust and mist respirator, full-face dust and mist respirator.

PREVENTION OF ACCIDENTAL INGESTION:
Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water. Wash hands after handling and before eating. Do not ingest.

RECOMMENDED STORAGE:
Store away from heat. Keep container dry. Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:
Not applicable. Nonflammable.

OTHER PRECAUTIONARY INFORMATION:
No smoking: Smoking while using this product can result in contamination of the tobacco and/or smoke and lead to the formation of the hazardous decomposition products mentioned in the Reactivity Data section of this MSDS. Store work clothes separately from other clothing, food and tobacco products.

EXPOSURE LIMITS

INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*
POTASSIUM NONAFLUOROBUTANESULFONATE.....	0.1	MG/M3	TWA	3M	Y
POTASSIUM GAMMAHYDRO OCTAFLUOROBUTANE SULFONATE.....	NONE	NONE	NONE	NONE	

* SKIN NOTATION: Listed substances indicated with 'Y' under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

EXPOSURE LIMITS (continued)

INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*

SOURCE OF EXPOSURE LIMIT DATA:
- 3M: 3M Recommended Exposure Guidelines

- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:
Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

SKIN CONTACT:
Contact with the skin during product use is not expected to result in significant irritation.

INHALATION:
Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

IF SWALLOWED:
May be harmful if swallowed.

SECTION CHANGE DATES

PHYSICAL DATA	SECTION CHANGED SINCE October 11, 2000	ISSUE
FIRE AND EXPL.	SECTION CHANGED SINCE October 11, 2000	ISSUE
ENVIRONMENTAL INFO.	SECTION CHANGED SINCE October 11, 2000	ISSUE
PRECAUTIONARY INFO.	SECTION CHANGED SINCE October 11, 2000	ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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The information in this Material Safety Data Sheet (MSDS) is believed to be correct as of the date issued. 3M MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of use or application. Given the variety of factors that can affect the use and application of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for user's method of use or application.

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ATTACHMENT 3

TEST SUBSTANCE PREPARATION PROCEDURE

ATTACHMENT 3

TEST SUBSTANCE PREPARATION PROCEDURE

Test Substance: PFBS
Vehicle: Aqueous 0.1% CMC (medium viscosity)

A. Purpose:

The purpose of this procedure is to provide a method for the preparation of dosage suspensions of PFBS for oral (gavage) administration to rats on Primedica Argus Research Laboratories, Inc., Study 418-023.

B. General Information:

1. All suspension containers will be labeled and color-coded. Each label will specify the protocol number, test substance identification, Argus batch number, concentration, dosage level, preparation date, expiration date and storage conditions.

2. Suspensions will be prepared:
   __ Daily __ Weekly __ For_ days of use
   _X_ Approximately every ten days __ By Sponsor

3. Suspensions will be prepared at a final dosage volume of _10_ mL/kg.

4. Safety:
   _X_ Nitrile or neoprene gloves, uniform/lab coat, goggles or safety glasses with side shields
   _X_ Dust-Mist Respirator if used in a chemical fume hood
   _X_ Half-Face Respirator if not used in a chemical fume hood
   ___ Full-Face Respirator/Positive Pressure Hood
   _X_ Tyvek Suit or tyvek apron and sleeves

5. Dosage suspensions adjusted for % Activity/Purity or Correction Factor:
   __ Yes _X_ No (Calculations based on 100%)
   __ % Activity __ % Purity __ Correction Factor

6. Sampling requirements: Cited in protocol

7. Storage: Cited in protocol

TEST SUBSTANCE PREPARATION PROCEDURE

NOTE: Prior to test substance preparation accurately measure the required amount of the appropriate vehicle (R.O. deionized water should be used for calibration purposes) in a graduated cylinder, pour the required amount of vehicle into a beaker. Carefully mark each beaker at the meniscus. This mark will be used during the preparation to bring the test substance slurry up to volume.

C. Dosage Suspension Preparation:

1. Weigh the required amount of test substance on a piece of weigh paper or into an appropriately sized mortar (see PREPARATION CALCULATIONS).

2. If weigh paper is used, transfer the test substance to an appropriately sized mortar. If necessary, grind the test substance into a fine powder. Slowly add a small amount of vehicle and grind. Continue to add vehicle slowly and grind the vehicle and the test substance together to form a fine slurry. Transfer the vehicle/test substance slurry to a marked beaker.

3. Rinse the mortar and pestle with additional vehicle to remove any remaining test substance. Transfer rinse to beaker.

4. Add additional vehicle to the beaker to bring volume up to the mark. Place on magnetic stir plate and agitate prior to and during administration and/or sampling.

5. Repeat steps (1) through (4) for each concentration.

Written By: Mark A. Cohen

Approved by: [signature] Date: 16 FEB 01

Clarification: ✓ No ___ Yes [see attached clarification form]

Initial/Date : [signature] 3/23/01

APPENDIX D

DEVIATIONS FROM THE PROTOCOL AND THE STANDARD OPERATING PROCEDURES OF THE TESTING FACILITY

DEVIATIONS FROM THE PROTOCOL AND THE STANDARD OPERATING PROCEDURES OF THE TESTING FACILITY

1. On 22 February 2001, 1% carboxymethylcellulose, instead of 0.1% carboxymethylcellulose, was prepared and used to make the prepared formulations that were used for dosage administration on 25 February 2001. This deviation did not adversely affect the outcome or interpretation of the study because the correct concentration of test substance was administered.

2. On 13 March 2001, day 21 of gestation, the gravid uterus was not weighed for female rats 19107 and 19183 in the 0 (Vehicle) and 1000 mg/kg/day dosage groups, respectively. This deviation did not adversely affect the outcome or interpretation of the study because sufficient data were collected to evaluate this parameter.

All deviations are documented in the raw data.

18 APR 2002

Raymond G. York, Ph.D., DABT Date
Associate Director of Research
and Study Director

APPENDIX E

CERTIFICATE OF ANALYSIS

Centre Analytical Laboratories, Inc.
3048 Research Drive State College, PA 16801 www.centrelab.com
Phone: (814) 231-8032 Fax: (814) 231-1253 or (814) 231-1580

CERTIFICATE OF ANALYSIS

Centre Analytical Laboratories COA Reference #: 023-067
3M Product: PFBS, Lot #5
Purity: 98.2%

Test Name	Specifications	Result
Purity[1]		**98.2 %**
Appearance	White, crystalline solid	Conforms
Identification NMR		Positive
Metals (ICP/MS) 1. Calcium 2. Magnesium 3. Sodium[2] 4. Potassium[2] 5. Nickel 6. Iron 7. Manganese		 1. 0.002 wt./wt.% 2. <0.001 wt./wt.% 3. 1.142 wt./wt.% 4. 8.442 wt./wt.% 5. <0.001 wt./wt.% 6. 0.002 wt./wt.% 7. <0.001 wt./wt.%
Total % Impurity (NMR)		0.9 wt./wt.%
Total % Impurity (LC/MS)		0.774 wt./wt.%
Total % Impurity (GC/MS)		None Quantified
Residual Solvents TGA		0.02 wt./wt.%
Purity by DSC		99.69%
Inorganic Anions (IC) 1. Chloride 2. Fluoride 3. Bromide 4. Nitrate 5. Nitrite 6. Phosphate 7. Sulfate		 1. <0.015 wt./wt.% 2. 0.101 wt./wt.% 3. <0.040 wt./wt.% 4. <0.009 wt./wt.% 5. <0.006 wt./wt.% 6. <0.006 wt./wt.% 7. <0.078 wt./wt.%
Organic Acids [3] (IC) 1. TFA 2. PFPA 3. HFBA 4. NFPA		 1. <0.1 wt./wt.% 2. <0.1 wt./wt.% 3. <0.1 wt./wt.% 4. <0.25 wt./wt.%
Elemental Analysis[4]: 1. Carbon 2. Hydrogen 3. Nitrogen 4. Sulfur 5. Fluorine	 Theoretical Value = 14.2% Theoretical Value = 0.0% Theoretical Value = 0% Theoretical Value = 9.5% Theoretical Value = 50.6%	 1. 10.4 wt./wt.% 2. 0.311 wt./wt.% 3. 3.94 wt./wt.% 4. 9.46 wt./wt.% 5. 38.1 wt./wt.%

Centre Analytical Laboratories, Inc.
3048 Research Drive State College, PA 16801 www.centrelab.com
Phone: (814) 231-8032 Fax: (814) 231-1253 or (814) 231-1580

CERTIFICATE OF ANALYSIS

Centre Analytical Laboratories COA Reference #: 023-067

Date of Last Analysis: 08/31/01

Expiration Date: 08/31/03

Storage Conditions: Frozen ≤-10°C

Re-assessment Date: 08/31/03

[1]Purity = 100% - (Total NMR impurities, 0.90% + Total LC/MS impurities, 0.774% + Total Metal impurities, 0.004% + Total Anion Impurities, 0.101 + Residual Solvents TGA, 0.02%)

Total impurity from all tests = 1.799%
Purity = 100% - 1.799% = 98.2%

[2]Potassium and Sodium are present as counterions and thus are excluded from the purity calculation.

[3]TFA	Trifluoroacetic acid
HFBA	Heptafluorobutyric acid
NFPA	Nonafluoropentanoic acid
PFPA	Pentafluoropropanoic acid

[4]Theoretical value calculations based on the empirical formula, $C_4F_9SO_3K^+$ (MW=338.2)

Prepared By: _____ 1/21/02
Charles Simons Date
Scientist, Centre Analytical Laboratories

Reviewed By: _____ 1/24/02
John Flaherty Date
Laboratory Manager, Centre Analytical Laboratories

APPENDIX F

ANALYTICAL REPORT

ANALYSIS OF DOSING SOLUTIONS USED AT ARGUS RESEARCH LABORATORY FOR SPONSOR'S STUDY NUMBERS T-7485.11, T-7485.12, AND T-7485.13 (ARGUS RESEARCH LABORATORY PROTOCOL NUMBERS: 418-023P, 418-023 AND 418-021)

STUDY ID: A343.1

SPONSOR STUDY NOS. T-7485.11
T-7485.12
T-7485.13

Southern Research Institute
2000 Ninth Avenue South
P.O. Box 55305
Birmingham, AL 35255-5305

SUMMARY

A total of 30 formulated dose samples including blanks and vehicles ranging in concentration from 3 to 200 mg/mL were analyzed by analytical method BACG 3533 to determine the concentration of perfluorobutanesulfonate (PFBS) in the formulated mixture. All dose formulations were found to be within ± 10% of the reported concentration except for four samples, 100 mg/mL dated 1/11/01, 100 mg/mL dated 2/23/01, 100 mg/mL date 9/4/01 and 200 mg/mL dated 1/11/01. These three samples were found to have measured concentrations of 88.9 %, 86.3 %, 76.6% and 76.8 % of target values, respectively.

KEY PERSONNEL

Raymond G. York, Ph.D., D.A.B.T.
Study Director
Argus Research Laboratories

James D. Johnson, M.S., MBA
Manager
Bioanalytical Chemistry Group

Gregory S. Gorman, Ph.D.
Staff Chemist
Bioanalytical Chemistry Group

Lara Cook, M.S.
Research Associate II
Bioanalytical Chemistry Group

1. OBJECTIVE

The objective of this study was to determine the dose concentration of PFBS in the supplied dosing solutions received from the sponsor.

2. SAFETY

All necessary procedures to ensure safety of the analysts were based on information contained in the Material Safety and Data Sheets (MSDS), provided by the producer of the test article and the study director.

3. Compliance

The study described in this final report was conducted in accordance with the EPA Good Laboratory Practice Regulations (40 CFR Part 160 and 792), OECD Principles of Good Laboratory Practice [C(97)186/Final]. For studies 418-023 and 418-023P Good Laboratory Practice Standards (1984) for MAFF 59 Nohsan No. 3850 were met. The final report accurately reflects the raw data obtained during the performance of the study. There were no adverse circumstances that affected the quality or integrity of the study.

4. EXPERIMENTAL

4.1 Analytical Procedures

The sample preparation and analysis procedures as described in the analytical method BACG 3533 were employed for all analyses. Each sample was allowed to warm to room temperature and was then vortexed well before being sampled. An aliquot was taken from each and diluted as described in the method. (Note: the 66.7 mg/mL and higher concentrated samples often were suspensions and the entire sample volume in some cases were diluted to the target range). Multiple calibration curves were prepared over a concentration range of 500 to 10,000 ng/mL and analyzed along with the samples as described in the method. The correlation coefficient for each curve was greater than 0.9982.

4.2 Results

The results of the analysis are presented in the Tables I-III corresponding to the sponsors study number at the end of the report.

5.0 Conclusion

A total of 30 dose formulation samples ranging in concentration from 3 to 200 mg/mL were analyzed by BACG 3533. All samples except for four, 100 mg/mL dated 1/11/01, 100 mg/mL dated 2/23/01, 100 mg/mL dated 9/4/01 and 200 mg/mL dated 1/11 were found to be within ± 10 % of the reported concentration.

Table I
Dose Formulation Analysis of PFBS in 0.1% CMC
Sponsor Study Number T-7485.13

Dose (mg/mL)	Target Dilution	Measured Conc. (ng/mL)	Dose Conc.(mg/mL)	% Theoretical
0 (12/25)	no dilution	not detected	------	------
0 (9/4)	no dilution	792.3[1]	0.001	------
3 (12/25)	3192	3441	3.2	108
3 (9/4)	3192	3454	3.2	108
10 (12/25)	3200	3165	9.9	98.9
10 (9/4)	3200	3408	10.7	107
30 (12/25)	3192	3239	30.4	101
30 (9/4)	3192	3165	29.7	99.2
66.7 (5/17)	3200	3139[2]	65.4	98.4
66.7 (4/18)	3200	2997[2]	61.9	92.8
100 (9/4)	3200	2451[2]	76.6	76.6
100 (12/25)	3200	3171	99.1	99.1

[1]Small amount of material detected in the undiluted sample is considered insignificant when compared to amount found in diluted samples and is believed to be the result of carry-over from a previously run standard injection.

[2]Average of two results.

Table II
Dose Formulation Analysis of PFBS in 0.1% CMC
Sponsor Study Number T-7485.12

Dose (mg/mL)	Target Dilution	Measured Conc. (ng/mL)	Dose Conc.(mg/mL)	% Theoretical
0 (2/23)	no dilution	not detected	------	------
0 (3/8)	no dilution	not detected	------	------
10 (2/23)	3200	3311	10.3	103
10 (3/8)	3200	3207	10.0	100
30 (2/23)	3192	3112	29.2	97.5
30 (3/8)	3192	3154	29.6	98.8
100 (2/23)	3200	2760	86.3	86.3
100 (3/8)	3200	3383	106	106

Table III
Dose Formulation Analysis of PFBS in 0.1% CMC
Sponsor Study Number T-7485.11

Dose (mg/mL)	Target Dilution	Measured Conc. (ng/mL)	Dose Conc.(mg/mL)	% Theoretical
0 (12/27)	no dilution	not detected	------	------
0 (1/11)	no dilution	not detected	------	------
10 (12/27)	3200	3282	10.3	103
10 (1/11)	3200	3266	10.2	102
30 (12/27)	3192	3302	31.0	103
30 (1/11)	3192	3353	31.5	105
100(1/11)	3200	2845	88.9	88.9
100 (12/27)	3200	3362	105	105
200 (12/27)	3200	3174	198	99.2
200 (1/11)	3200	2457	154	76.8

6.0 Approvals

Lara Cook, M.S.
Research Associate II
Bioanalytical Chemistry Group

1-30-02
Date

Gregory S. Gorman, Ph.D.
Staff Chemist
Bioanalytical Chemistry Group

1-30-02
Date

Tina Rogers, Ph.D.
Director
Safety Assessment Department

1/30/02
Date

Raymond G. York, Ph.D., D.A.B.T.
Study Director
Argus Research Laboratories

13 FEB 2002
Date

Quality Assurance Statement

Final Report On

Analysis of Dosing Solutions Used at Argus Research Laboratory for Sponsor's Study Numbers T-7485.11, T-7485.12, and T-7485.13 (Argus Research Laboratory Protocol Numbers: 418-023P, 418-023, and 418-021)

A343.1

Listed below are the phases and/or procedures performed by Southern Research Institute that were inspected and audited by the Quality Assurance Unit during the study described in the report. Findings were reported to the study director and management periodically.

Phases/Procedures	*Inspection/ Audit Date*	*Date Management Notified*	*Date Study Director Notified*[1]
Protocol Review	5/14/01	5/14/01	1/18/02
Dose Formulation Concentration Analysis	5/14/01	6/14/01	1/18/02
Data Audit and Draft Report Review	12/3/01-12/6/01; 1/14/02-1/17/02	1/18/02	1/18/02
Final Report	1/30/02	1/30/02	1/30/02

[1] The study director is off-site.

C.L. Marsh, Manager, Quality Assurance/Quality Control

1/30/02
Date

APPENDIX G

ENVIRONMENTAL AND HUSBANDRY REPORTS

ARGUS

Temperature and Relative Humidity Report
Location: Room 03

Protocol Number: 418023

Range of Dates: 13-Feb-2001 08:00 to 23-Feb-2001 16:59

	Temperature		Relative Humidity	
Target Range:	64°F to 79°F		30% to 70%	
Species: Rat				
Total Number of Days:	11		11	
Total Number of Hours:	248.75		248.75	
Total Number of Data Points:	249		249	
Mean (± SD):	70.8	(± 1.3)	36.6	(± 3.2)
Maximum:	73.1		50.2	
Median:	71.0		35.7	
Minimum:	66.5		31.2	
Number of Points in Range (%):	249	(100.0)	249	(100.0)
Number of Points High (%):	0	(0.0)	0	(0.0)
Number of Points Low (%):	0	(0.0)	0	(0.0)

Report Generated: 15-Mar-2001 at 14:44

COMMENTS: _____

REVIEWED BY: _____ **DATE:** 3·20·01

ARGUS

Temperature and Relative Humidity Report
Location: Room 20

Protocol Number: 418023

Range of Dates: 23-Feb-2001 16:00 to 15-Mar-2001 16:59

	Temperature		Relative Humidity	
Target Range:	64°F to 79°F		30% to 70%	
Species: Rat				
Total Number of Days:	21		21	
Total Number of Hours:	478.5		478.5	
Total Number of Data Points:	477		477	
Mean (± SD):	71.1	(± 0.4)	51.4	(± 6.3)
Maximum:	72.0		65.7	
Median:	71.1		52.0	
Minimum:	69.8		31.0	
Number of Points in Range (%):	477	(100.0)	477	(100.0)
Number of Points High (%):	0	(0.0)	0	(0.0)
Number of Points Low (%):	0	(0.0)	0	(0.0)

Report Generated: 15-Mar-2001 at 14:46

COMMENTS: _____

REVIEWED BY: _____ **DATE:** 3-20-01

Certified Papers Retrieval

LabDiet PMI NUTRITION

Return to Certified Analysis Retrieval

Product Code: 5002M
Product Desc: CERTIFIED RODENT DIET MEAL
Lab Number: L0025623-1
Lot Code: OCT 03 00 3A
Entered: 10/5/00

Assay	Analysis	Units
PROTEIN	21.5	%
FAT (ACID HYDRO.)	5.64	%
FIBER (CRUDE)	5	%
ARSENIC	LESS THAN 0.2	PPM
CADMIUM	0.083	PPM
CALCIUM	1.07	%
LEAD	0.147	PPM
MERCURY	LESS THAN 0.025	PPM
PHOSPHORUS	0.748	%
SELENIUM	0.361	PPM

ORGANOPHOSPHATES	PPM	ORGANOPHOSPHATES	PPM
Diazinon	LESS THAN 0.02	Disulfoton	LESS THAN 0.02
Ethion	LESS THAN 0.02	Malathion	LESS THAN 0.02
Methyl Parathion	LESS THAN 0.02	Parathion	LESS THAN 0.02
Thimet	LESS THAN 0.02	Thiodan	LESS THAN 0.02
Trithion	LESS THAN 0.02		

PESTICIDES AND PCB	PPM	PESTICIDES AND PCB	PPM
Aldrin	LESS THAN 0.02	Alpha-BHC	LESS THAN 0.02
Beta-BHC	LESS THAN 0.02	Chlordane	LESS THAN 0.02
DDE	LESS THAN 0.02	DDT	LESS THAN 0.02
Delta-BHC	LESS THAN 0.02	Dieldrin	LESS THAN 0.02
Endrin	LESS THAN 0.02	HCB	LESS THAN 0.02
Heptachlor	LESS THAN 0.02	Heptachlor Epoxide	LESS THAN 0.02
Lindane	LESS THAN 0.02	Methoxychlor	LESS THAN 0.02
Mirex	LESS THAN 0.02	PCB	LESS THAN 0.15

REVIEWED BY: Ellen Anderson 12/21/00 DATE

EXACT COPY TB 3-26-01

Aflatoxin	Aflatoxins	LESS THAN 5 PPB

No notes.

For additional information, please contact:
1) Michael J. Murphy at (314) 982-2383 -- for assay methodology
2) Dr. Dorrance Haught at (314) 768-4362 -- for nutritional interpretation
3) Richmond, IN Manufacturing Plant at (765) 962-9561 -- all other questions

The term "Less Than" is used to signify the lower limit of quantitation of the procedure under the conditions employed. The use of the term "Less Than" does not imply that traces of analyte were present.

Ellis Anderson 12/21/00

REVIEWED BY: DATE

EXACT COPY
TB 3-26-01

LabDiet PMI NUTRITION

Product Code: 5002
Product Desc: CERTIFIED RODENT DIET
Lab Number: L0027511-2
Lot Code: NOV 07 00 2B
Entered: 11/9/00

Assay	Analysis	Units
PROTEIN	21.2	%
FAT (ACID HYDRO.)	5.45	%
FIBER (CRUDE)	4.34	%
ARSENIC	LESS THAN 0.2	PPM
CADMIUM	0.071	PPM
CALCIUM	1.02	%
LEAD	0.208	PPM
MERCURY	LESS THAN 0.025	PPM
PHOSPHORUS	0.643	%
SELENIUM	0.359	PPM

ORGANOPHOSPHATES	PPM	ORGANOPHOSPHATES	PPM
Diazinon	LESS THAN 0.02	Disulfoton	LESS THAN 0.02
[redacted]	LESS THAN 0.02	Malathion	LESS THAN 0.02
Methyl Parathion	LESS THAN 0.02	Parathion	LESS THAN 0.02
Thimet	LESS THAN 0.02	Thiodan	LESS THAN 0.02
Trithion	LESS THAN 0.02		

PESTICIDES AND PCB	PPM	PESTICIDES AND PCB	PPM
Aldrin	LESS THAN 0.02	Alpha-BHC	LESS THAN 0.02
Beta-BHC	LESS THAN 0.02	Chlordane	LESS THAN 0.02
DDE	LESS THAN 0.02	DDT	LESS THAN 0.02
Delta-BHC	LESS THAN 0.02	Dieldrin	LESS THAN 0.02
Endrin	LESS THAN 0.02	HCB	LESS THAN 0.02
Heptachlor	LESS THAN 0.02	Heptachlor Epoxide	LESS THAN 0.02
Lindane	LESS THAN 0.02	Methoxychlor	LESS THAN 0.02
Mirex	LESS THAN 0.02	PCB	LESS THAN 0.15

Aflatoxin	Aflatoxins	LESS THAN 5 PPB

Edna Anderson 12/6/00
REVIEWED BY: DATE

No notes.

EXACT COPY
TB 3-20-01

[redacted]itional information, please contact:
1) Michael J. Murphy at (314) 982-2383 – for assay methodology
2) Dr. Dorrance Haught at (314) 768-4362 – for nutritional interpretation
3) Richmond, IN Manufacturing Plant at (765) 962-9561 – all other questions

http://www.labdiet.com/certified/pwa_spc002.asp

Sample No.: L0028475-2 Received: 11/30/00 Reported: 12/14/00

Site: RHI
Locator: 5002
Project: CERT.

CERTIFIED RODENT DIET MEAL
LOT NUMBER DEC 01 00 1B

Assay / Analyte		Result	Units
Protein, Kjeldahl (N x 6.25)	**PRKR**		
Protein		20.8	%
Fat	**FTEE/FTAH**		
Fat		5.92	%
Fiber, crude	**FIBR**		
Fiber, Crude		3.99	%
Arsenic	**ASF**		
Arsenic		<0.200	ppm
Cadmium	**CDF**		
Cadmium		0.053	ppm
Calcium	**CAF**		
Calcium		0.977	%
Lead	**PB**		
Lead		0.139	ppm
Mercury	**HGSP**		
Mercury		<0.025	ppm
Phosphorus	**PF**		
Phosphorus		0.659	%
Selenium	**SE**		
Selenium		0.159	ppm

For additional information, please contact:
(1) For assay methodology - Customer Services, 314-982-1310
(2) For Nutritional Interpretation - Dr. Dorrance Haught, 314-768-4362
(3) All other questions - Richmond, IN Manufacturing Plant, 765-962-9561.

The term "Less Than" is used to signify the lower limit of quantitation of the procedure under the conditions employed. The use of the term "Less Than" does not imply that traces of Analyte were present. Samples submitted to Ralston Analytical Laboratories for routine analysis will be retained for a minimum of thirty (30) days after the report of analysis is issued. Extended storage requirements must be brought to the attention of Ralston Analytical Laboratories prior to or at the time of sample submission.

Eric Anderson 3/7/01
REVIEWED BY: DATE

EXACT COPY
TO 3-30-01

Locator: 5002
Project: CERT.

CERTIFIED RODENT DIET MEAL
LOT NUMBER DEC 01 00 1B

Assay / Analyte		Result	Units
Organophosphate pesticides	**ORGP**		
Diazinon		<0.0200	ppm
Disulfoton		<0.0200	ppm
Ethion		<0.0200	ppm
Malathion		<0.0200	ppm
Methyl Parathion		<0.0200	ppm
Parathion		<0.0200	ppm
Thimet		<0.0200	ppm
Thiodan		<0.0200	ppm
Trithion		<0.0200	ppm
Organochlorine pest.&PCB's	**RSPB**		
Heptachlor Epoxide		<0.0200	ppm
Heptachlor		<0.0200	ppm
DDE		<0.0200	ppm
Lindane		<0.0200	ppm
Endrin		<0.0200	ppm
Mirex		<0.0200	ppm
Alpha-BHC		<0.0200	ppm
Delta-BHC		<0.0200	ppm
Aldrin		<0.0200	ppm
Dieldrin		<0.0200	ppm
DDT		<0.0200	ppm
Chlordane		<0.0200	ppm
Methoxychlor		<0.0200	ppm
Beta-BHC		<0.0200	ppm
HCB		<0.0200	ppm
PCB		<0.150	ppm
Aflatoxin screen	**AFTC**		
Aflatoxins		<5.00	ppb

For additional information, please contact:
(1) For assay methodology - Customer Services, 314-982-1310
(2) For Nutritional Interpretation - Dr. Dorrance Haught, 314-768-4362
(3) All other questions - Richmond, IN Manufacturing Plant, 765-962-9561.

The term "Less Than" is used to signify the lower limit of quantitation of the procedure under the conditions employed. The use of the term "Less Than" does not imply that traces of Analyte were present. Samples submitted to Ralston Analytical Laboratories for routine analysis will be retained for a minimum of thirty (30) days after the report of analysis is issued. Extended storage requirements must be brought to the attention of Ralston Analytical Laboratories prior to or at the time of sample submission.

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ID 3-26-01

Ellis Anderson 3/7/01
REVIEWED BY: DATE

Analysis Report

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3402290

Collected:06/20/2000 09:30 by EA

Account Number: 02423

Submitted: 06/20/2000 17:00
Reported: 07/18/00 at 05:50 AM
Discard: 8/18/00
Point #1 Analytical Lab Grab Water Sample
905 Sheehy Bldg. B

Primedica Argus
905 Sheehy Drive, Ste. A
Horsham PA 19044-1297

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MP 5/3/01

P1---

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
00224	Chloride	16887-00-6	< 2.0	2.0	mg/l	5
00228	Sulfate	14808-79-8	< 5.0	5.0	mg/l	5
00368	Nitrate Nitrogen	14797-55-8	< 0.50	0.50	mg/l	5
01504	Fluoride	16984-48-8	< 0.50	0.50	mg/l	5
01506	Nitrite Nitrogen	14797-65-0	< 0.50	0.50	mg/l	5
07322	Ortho-phosphate	14265-44-2	< 5.0	5.0	mg/l	5
01505	Bromide	n.a.	< 2.5	2.5	mg/l	5
00178	Pesticides/PCB's in Water					
00453	Gamma BHC - Lindane	58-89-9	< 0.0096	0.0096	ug/l	1
00454	Heptachlor	76-44-8	< 0.0096	0.0096	ug/l	1
00455	Aldrin	309-00-2	< 0.0096	0.0096	ug/l	1
00469	Dieldrin	60-57-1	< 0.0096	0.0096	ug/l	1
00477	Endrin	72-20-8	< 0.0096	0.0096	ug/l	1
00478	DDT	50-29-3	< 0.0096	0.0096	ug/l	1
00638	Endrin Aldehyde	7421-93-4	< 0.096	0.096	ug/l	1
01902	Alpha BHC	319-84-6	< 0.0096	0.0096	ug/l	1
01903	Beta BHC	319-85-7	< 0.0096	0.0096	ug/l	1
01904	Delta BHC	319-86-8	< 0.0096	0.0096	ug/l	1
01905	Heptachlor Epoxide	1024-57-3	< 0.0096	0.0096	ug/l	1
01906	DDE	72-55-9	< 0.0096	0.0096	ug/l	1
01907	DDD	72-54-8	< 0.0096	0.0096	ug/l	1
01908	Chlordane	57-74-9	< 0.29	0.29	ug/l	1
01909	Toxaphene	8001-35-2	< 3.8	3.8	ug/l	1
01910	Endosulfan I	959-98-8	< 0.0096	0.0096	ug/l	1
01911	Endosulfan II	33213-65-9	< 0.0096	0.0096	ug/l	1
01912	Endosulfan Sulfate	1031-07-8	< 0.029	0.029	ug/l	1
01913	PCB-1016	12674-11-2	< 1.0	1.0	ug/l	1
01914	PCB-1221	11104-28-2	< 1.0	1.0	ug/l	1
01915	PCB-1232	11141-16-5	< 1.0	1.0	ug/l	1
01916	PCB-1242	53469-21-9	< 1.0	1.0	ug/l	1
01917	PCB-1248	12672-29-6	< 1.0	1.0	ug/l	1
01918	PCB-1254	11097-69-1	< 1.0	1.0	ug/l	1
01919	PCB-1260	11096-82-5	< 1.0	1.0	ug/l	1

Sufficient sample volume was not available to perform a MS/MSD for this analysis. Therefore, a LCS/LCSD was performed to demonstrate precision and

Reviewed by D. Hubbard 7-26-00

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Lancaster Laboratories
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

See reverse side for explanation of symbols and abbreviations.

Analysis Repor

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3402290

Collected:06/20/2000 09:30 by EA

Account Number: 02423

Submitted: 06/20/2000 17:00
Reported: 07/18/00 at 05:50 AM
Discard: 8/18/00
Point #1 Analytical Lab Grab Water Sample
905 Sheehy Bldg. B

Primedica Argus
905 Sheehy Drive, Ste. A
Horsham PA 19044-1297

P1---

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
	accuracy at a batch level.					
	The beta-BHC and endosulfan sulfate recoveries are outside the QC limits for the LCSD. Since the recoveries were high and no beta-BHC or endosulfan sulfate was detected in the sample, the results were reported.					
01856	Herbicides in Water					
01857	2,4-D	94-75-7	< 0.48	0.48	ug/l	1
01858	2,4,5-TP	93-72-1	< 0.048	0.048	ug/l	1
05286	2,4,5-T	93-76-5	< 0.048	0.048	ug/l	1
05287	Dalapon	75-99-0	< 1.2	1.2	ug/l	1
05288	Dinoseb	88-85-7	< 0.24	0.24	ug/l	1
05289	Dicamba	1918-00-9	< 0.29	0.29	ug/l	1
05290	MCPP	93-65-2	< 190.	190.	ug/l	1
05291	MCPA	94-74-6	< 190.	190.	ug/l	1
05292	2,4-DP (Dichlorprop)	120-36-5	< 0.48	0.48	ug/l	1
05293	2,4-DB	94-82-6	< 0.48	0.48	ug/l	1
08103	Pentachlorophenol	87-86-5	< 0.05	0.05	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

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Reviewed by D. Lebo
7-26-00

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Lancaster Laboratories
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

See reverse side for explanation of symbols and abbreviations.

Analysis Report

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3542351

Collected:01/26/2001 08:40 by EA

Account Number: 02423

Submitted: 01/26/2001 16:00
Reported: 02/06/01 at 05:22 AM
Discard: 3/9/01
905 Formulation Lab Point #2 Grab Water Sample
Semi-Annual

Primedica Argus
57 Union Street
Worcester MA 01608

905-2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
00224	Chloride	16887-00-6	< 2.0	2.0	mg/l	5
00228	Sulfate	14808-79-8	< 5.0	5.0	mg/l	5
00368	Nitrate Nitrogen	14797-55-8	< 0.50	0.50	mg/l	5
01504	Fluoride	16984-48-8	< 0.50	0.50	mg/l	5
01505	Nitrite Nitrogen	14797-65-0	< 0.50	0.50	mg/l	5
07322	Ortho-phosphate	14265-44-2	< 5.0	5.0	mg/l	5
01505	Bromide	n.a.	< 2.5	2.5	mg/l	5
00178	Pesticides/PCB's in Water					
00453	Gamma BHC - Lindane	58-89-9	< 0.0096	0.0096	ug/l	1
00454	Heptachlor	76-44-8	< 0.0096	0.0096	ug/l	1
00455	Aldrin	309-00-2	< 0.0096	0.0096	ug/l	1
00469	Dieldrin	60-57-1	< 0.0096	0.0096	ug/l	1
00477	Endrin	72-20-8	< 0.0096	0.0096	ug/l	1
00478	DDT	50-29-3	< 0.0096	0.0096	ug/l	1
00533	Endrin Aldehyde	7421-93-4	< 0.096	0.096	ug/l	1
01902	Alpha BHC	319-84-6	< 0.0096	0.0096	ug/l	1
01903	Beta BHC	319-85-7	< 0.0096	0.0096	ug/l	1
01904	Delta BHC	319-86-8	< 0.0096	0.0096	ug/l	1
01905	Heptachlor Epoxide	1024-57-3	< 0.0096	0.0096	ug/l	1
01906	DDE	72-55-9	< 0.0096	0.0096	ug/l	1
01907	DDD	72-54-8	< 0.0096	0.0096	ug/l	1
01908	Chlordane	57-74-9	< 0.29	0.29	ug/l	1
01909	Toxaphene	8001-35-2	< 3.8	3.8	ug/l	1
01910	Endosulfan I	959-98-8	< 0.0096	0.0096	ug/l	1
01911	Endosulfan II	33213-65-9	< 0.0096	0.0096	ug/l	1
01912	Endosulfan Sulfate	1031-07-8	< 0.029	0.029	ug/l	1
01913	PCB-1016	12674-11-2	< 1.0	1.0	ug/l	1
01914	PCB-1221	11104-28-2	< 1.0	1.0	ug/l	1
01915	PCB-1232	11141-16-5	< 1.0	1.0	ug/l	1
01916	PCB-1242	53469-21-9	< 1.0	1.0	ug/l	1
01917	PCB-1248	12672-29-6	< 1.0	1.0	ug/l	1
01918	PCB-1254	11097-69-1	< 1.0	1.0	ug/l	1
01919	PCB-1260	11096-82-5	< 1.0	1.0	ug/l	1

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

TD 3-20-01

D. Lutz 2/16/01

Analysis Report

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3542351

Collected:01/26/2001 08:40 by EA

Account Number: 02423

Submitted: 01/26/2001 16:00
Reported: 02/06/01 at 05:22 AM
Discard: 3/9/01
905 Formulation Lab Point #2 Grab Water Sample
Semi-Annual

Primedica Argus
57 Union Street
Worcester MA 01608

905-2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
01856	Herbicides in Water					
01857	2,4-D	94-75-7	< 0.48	0.48	ug/l	1
01858	2,4,5-TP	93-72-1	< 0.048	0.048	ug/l	1
05286	2,4,5-T	93-76-5	< 0.048	0.048	ug/l	1
05287	Dalapon	75-99-0	< 1.2	1.2	ug/l	1
05288	Dinoseb	88-85-7	< 0.24	0.24	ug/l	1
05289	Dicamba	1918-00-9	< 0.29	0.29	ug/l	1
05290	MCPP	93-65-2	< 190.	190.	ug/l	1
05291	MCPA	94-74-6	< 190.	190.	ug/l	1
05292	2,4-DP (Dichlorprop)	120-36-5	< 0.48	0.48	ug/l	1
05293	2,4-DB	94-82-6	< 0.48	0.48	ug/l	1
08103	Pentachlorophenol	87-86-5	< 0.05	0.05	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

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D. Lebo
2/16/01

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Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

2216 Rev. 9/11/00

ANALYTICAL LABORATORIES, INC.
P.O. Box 319
CHALFONT, PA 18914
(215) 723-6466

SAMPLE ANALYSIS REPORT

Customer: **Argus Research, Inc.**
905 Sheehy Dr., Bldg. A
Horsham, PA 19044
Attn. Dena Lebo
Attn: **215-443-8710**
FAX #:

Sample number: **2337-01A**
Date sampled : **02/14/01**
Time sampled : **1515**
Date received: **02/14/01**
Sampled by : **EM**

Sample source: **Chem. Lab** (D) DL
905 F Sheehy Drive 2/20/01

ANALYTICAL RESULTS

Water Safety Classification: No Coliform bacteria were detected. Therefore, the water supply, at the time of sampling, meets the EPA and DEP drinking water standards for this parameter.

Parameter	MCL	Result
Coliform Bacteria, counts/100 ml	< 1	< 1
Noncoliform Bacteria, counts/100 ml		< 1
Total Chlorine, mg/l		< 0.1

D. Lebo
2/20/01

All results which are outside the "Maximum Contaminant Level" (MCL) established under the "Safe Drinking Water Act" are marked by asterisks (**).

Symbol key:
< - less than
TNTC - too numerous to count (> 200)
mg/l - milligram/liter

PA DEP #09-332

Maryann E. Fedock/ President

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MF 5/3/01

ANALYTICAL LABORATORIES, INC.
P.O. Box 319
CHALFONT, PA 18914
(215) 723-6466

SAMPLE ANALYSIS REPORT

Customer: **Argus Research, Inc.**
905 Sheehy Dr., Bldg. A
Horsham, PA 19044
Attn. Dena Lebo
Attn: **215-443-8710**
FAX #:

Sample number: **2337-01C**
Date sampled : **02/14/01**
Time sampled : **1515**
Date received: **02/14/01**
Sampled by : **BM**

Sample source: **Rm. 5** (A) on 2/20/01
905 Sheehy Drive

ANALYTICAL RESULTS

Water Safety Classification: No Coliform bacteria were detected. Therefore, the water supply, at the time of sampling, meets the EPA and DEP drinking water standards for this parameter.

Parameter	MCL	Result
Coliform Bacteria, counts/100 ml	< 1	< 1
Noncoliform Bacteria, counts/100 ml		< 1
Total Chlorine, mg/l		0.1

D. Lebo
2/20/01

All results which are outside the "Maximum Contaminant Level" (MCL) established under the "Safe Drinking Water Act" are marked by asterisks (**).

Symbol key:
< - less than
TNTC - too numerous to count (> 200)
mg/l - milligram/liter

PA DEP #09-332

Maryann E. Fedock/ President

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[illegible]

ANALYTICAL LABORATORIES, INC.
P.O. Box 319
CHALFONT, PA 18914
(215) 723-6466

SAMPLE ANALYSIS REPORT

Customer: **Argus Research, Inc.**
905 Sheehy Dr., Bldg. A
Horsham, PA 19044
Attn. Dena Lebo
Attn: **215-443-8710**
FAX #:

Sample number: **2337-01D**
Date sampled : **02/14/01**
Time sampled : **1515**
Date received: **02/14/01**
Sampled by : **KM**

Sample source: **Analytical**
905 Sheehy Drive @ DL 2/20/01

ANALYTICAL RESULTS

Water Safety Classification: No Coliform bacteria were detected. Therefore, the water supply, at the time of sampling, meets the EPA and DEP drinking water standards for this parameter.

Parameter	MCL	Result
Coliform Bacteria, counts/100 ml	< 1	< 1
Noncoliform Bacteria, counts/100 ml		< 1
Total Chlorine, mg/l		< 0.1

D Lebo 2/20/01

All results which are outside the "Maximum Contaminant Level" (MCL) established under the "Safe Drinking Water Act" are marked by asterisks (**).

Symbol key:
< - less than
TNTC - too numerous to count (> 200)
mg/l - milligram/liter

PA DEP #09-332

Maryann E. Fedock
Maryann E. Fedock/ President

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ANALYTICAL LABORATORIES, INC.
P.O. Box 319
CHALFONT, PA 18914
(215) 723-6466

SAMPLE ANALYSIS REPORT

Customer: Argus Research, Inc.
905 Sheehy Dr., Bldg. A
Horsham, PA 19044
Attn. Dena Lebo
Attn: 215-443-8710
FAX #:

Sample number: 4135-01B
Date sampled : 03/07/01
Time sampled : 1430
Date received: 03/08/01
Sampled by : FO

Sample source: Chem. Lab
905 F Sheehy Drive D 3/20/01

ANALYTICAL RESULTS

Water Safety Classification: No Coliform bacteria were detected. Therefore, the water supply, at the time of sampling, meets the EPA and DEP drinking water standards for this parameter.

Parameter	MCL	Result
Coliform Bacteria, counts/100 ml	< 1	< 1
Noncoliform Bacteria, counts/100 ml		< 1
Total Chlorine, mg/l		< 0.1

D. Lebo
3/20/01

All results which are outside the "Maximum Contaminant Level" (MCL) established under the "Safe Drinking Water Act" are marked by asterisks (**).

Symbol key:
< - less than
TNTC - too numerous to count (> 200)
mg/l - milligram/liter

PA DEP #09-332

Maryann E. Fedock/ President

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MF 5/3/01

ANALYTICAL LABORATORIES, INC.
P.O. Box 319
CHALFONT, PA 18914
(215) 723-6466

SAMPLE ANALYSIS REPORT

Customer: **Argus Research, Inc.**
905 Sheehy Dr., Bldg. A
Horsham, PA 19044
Attn. Dena Lebo
Attn: 215-443-8710
FAX #:

Sample number: **4135-01C**
Date sampled : **03/07/01**
Time sampled : **1430**
Date received: **03/08/01**
Sampled by : **FO**

Sample source: **Analytical** Laboratory D Da 3/20/01

ANALYTICAL RESULTS

Water Safety Classification: No Coliform bacteria were detected. Therefore, the water supply, at the time of sampling, meets the EPA and DEP drinking water standards for this parameter.

Parameter	MCL	Result
Coliform Bacteria, counts/100 ml	< 1	< 1
Noncoliform Bacteria, counts/100 ml		< 1
Total Chlorine, mg/l		< 0.1

D. Lebo
3/20/01

All results which are outside the "Maximum Contaminant Level" (MCL) established under the "Safe Drinking Water Act" are marked by asterisks (**).

Symbol key:
< - less than
TNTC - too numerous to count (> 200)
mg/l - milligram/liter

PA DEP #09-332

Maryann E. Fedock
Maryann E. Fedock/ President

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MF 5/3/01

ANALYTICAL LABORATORIES, INC.
P.O. Box 319
CHALFONT, PA 18914
(215) 723-6466

SAMPLE ANALYSIS REPORT

Customer: Argus Research, Inc.
905 Sheehy Dr., Bldg. A
Horsham, PA 19044
Attn. Dena Lebo
Attn: 215-443-8710
FAX #:

Sample number: 4135-01D
Date sampled : 03/07/01
Time sampled : 1430
Date received: 03/08/01
Sampled by : PO

Sample source: Room #5

ANALYTICAL RESULTS

Water Safety Classification: No Coliform bacteria were detected. Therefore, the water supply, at the time of sampling, meets the EPA and DEP drinking water standards for this parameter.

Parameter	MCL	Result
Coliform Bacteria, counts/100 ml	< 1	< 1
Noncoliform Bacteria, counts/100 ml		< 1
Total Chlorine, mg/l ①		1.5

① In-house value for room 5 on 3/6/01 was 0.3 PPM. Dw 3/20/01

D Lebo
3/20/01

All results which are outside the "Maximum Contaminant Level" (MCL) established under the "Safe Drinking Water Act" are marked by asterisks (**).

Symbol key:
< - less than
TNTC - too numerous to count (> 200)
mg/l - milligram/liter

PA DEP #09-332

Maryann E Fedock
Maryann E. Fedock/ President

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JB 3-20-01

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	**BMQL**	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	**MPN**	Most Probable Number
IU	International Units	**CP Units**	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	**NTU**	nephelometric turbidity units
C	degrees Celsius	**F**	degrees Fahrenheit
Cal	(diet) calories	**lb.**	pound(s)
meq	milliequivalents	**kg**	kilogram(s)
g	gram(s)	**mg**	milligram(s)
ug	microgram(s)	**l**	liter(s)
ml	milliliter(s)	**ul**	microliter(s)
m3	cubic meter(s)	**fib >5 um/ml**	fibers greater than 5 microns in length per ml

< less than - The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture.

U.S. EPA data qualifiers:

Organic Qualifiers

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike sample not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	Correlation coefficient for MSA <0.995

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL LANCASTER LABORATORIES BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF LANCASTER LABORATORIES AND (B) WHETHER LANCASTER LABORATORIES HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Lancaster Laboratories which includes any conditions that vary from the Standard Terms and Conditions of Lancaster Laboratories and we hereby object to any conflicting terms contained in any acceptance or order submitted by client.

APPENDIX H

QUALITY ASSURANCE STATEMENT

PRIMEDICA

Argus Research Laboratories, Inc.
905 Sheehy Drive, Building A
Horsham, PA 19044
Telephone: (215) 443-8710
Telefax: (215) 443-8587

QUALITY ASSURANCE STATEMENT

Argus Protocol: 418-023

Sponsor's Study Number: T-7485.12

Study Director: Raymond G. York, Ph.D., DABT

The protocol, critical phases, raw data and final report were inspected by the Quality Assurance Unit (QAU), to assure conformance with:

U.S. Environmental Protection Agency. Toxic Substances Control Act (TSCA) Good Laboratory Practice Standards; Final Rule. 40 CFR Part 792.

U.S. Environmental Protection Agency. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Good Laboratory Practice Standards; Final Rule. 40 CFR Part 160.

Organization for Economic Cooperation and Development (1998). The Revised OECD Principles of Good Laboratory Practices [C(97)186/Final].

Japanese Ministry of Agriculture, Forestry and Fisheries (1984). *Good Laboratory Practice Standards*. 59 NohSan No. 3850.

The undersigned indicate that the report is an accurate representation of the raw data. Data provided by the Sponsor or a subcontractor were not audited by the Primedica Argus Quality Assurance Unit.

The QAU inspection and report audit dates are listed below:

Inspection Phase	Inspection Date(s)	Date(s) Findings Submitted to Study Director	Date(s) Findings Submitted to Management
Protocol	03 FEB 01	03 FEB 01	03 FEB 01
	16 FEB 01	16 FEB 01	16 FEB 01
Test Substance Preparation	08 MAR 01	08 MAR 01	08 MAR 01
Test Substance Administration	08 MAR 01	26 MAR 01	26 MAR 01
Caesarean-Sectioning	15 MAR 01	17 MAR 01	17 MAR 01
In-Life Data	02, 12 and 14 APR 01	14 APR 01	14 APR 01
Formulations Data	17 APR 01 & 05 MAY 01	06 MAY 01	06 MAY 01
Report Text	22-24, 26 MAY 01	26 MAY 01	26 MAY 01
	31 MAY 01	31 MAY 01	31 MAY 01
Report Tables	25-31 MAY 01	31 MAY 01	31 MAY 01
Revised Report	23 JAN 02	23 JAN 02	23 JAN 02

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Matthew J. Vaneman, B.S. Date
Manager, Regulatory Compliance

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