FINAL REPORT

Contents:	Volume 1 of 2 Text, Summary Tables, and Appendices A-F
Study Title:	An Oral (Gavage) 14-Day and Pilot Prenatal Developmental Toxicity Study of Naphthenic Acid in Rats
Study Number:	WIL-402010
Study Director:	[redacted]
Data Requirements:	Not Applicable
Study Initiation Date:	11 May 2010
Study Completion Date:	8 December 2010
Performing Laboratory:	WIL Research Laboratories, LLC 1407 George Road Ashland, OH 44805-8946
Sponsor:	American Petroleum Institute 1220 L Street, NW Washington, DC 20005

COMPLIANCE STATEMENT

This study, designated WIL-402010, was conducted in compliance with the United States EPA GLP Standards (40 CFR Part 792), 18 September 1989; the OECD Principles of GLP [C(97) 186/Final], 26 November 1997; WIL Research's SOPs ; and the protocol as approved by the Sponsor.

[redacted]

8 Dec. 2010
Date

Staff Toxicologist, Developmental and
Reproductive Toxicology
Study Director

[redacted]

10 December 2010
Date

Sponsor Representative

Applicant/Submitter

Date

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1. SUMMARY

1.1. OBJECTIVE

The study was designed to determine the dosage levels of the test substance to be evaluated in a potential combined repeated dose toxicity study with reproduction/developmental toxicity screening test (OECD 422) in rats.

1.2. STUDY DESIGN

The test substance, naphthenic acid, in the vehicle, corn oil, was administered orally by gavage once daily to 4 groups of Crl:CD(SD) rats, each group consisting of 5 males and 5 bred females. Dosage levels were 30, 100, 300, and 1000 mg/kg/day administered at a dosage volume of 10 mL/kg. A concurrent control group of 5 rats/sex/group received the vehicle (corn oil) on a comparable regimen. Males and females were approximately 9 and 13 weeks of age, respectively, at the beginning of test substance administration. Males were dosed daily for 14 consecutive days (study days 0-13). Following mating with untreated resident males, females were dosed during gestation days 1-20. All animals were observed twice daily for mortality and moribundity. Clinical observations, body weights, and food consumption were recorded at appropriate intervals. Gross necropsies were conducted on all males on study day 14. On gestation day 20, a laparohysterectomy was performed on each female. The uteri, placentae, and ovaries were examined, and the numbers of fetuses, early and late resorptions, total implantations, and corpora lutea were recorded. Gravid uterine weights were recorded, and net body weights and net body weight changes were calculated. The fetuses were weighed, sexed, and examined for external malformations and developmental variations. Selected organs from all animals at the scheduled necropsies were weighed.

1.3. RESULTS

All males and females survived to the scheduled necropsies. At approximately 1 hour following dose administration, clinical findings noted in the 1000 mg/kg/day group males and females included salivation and clear and/or red material around the nose and mouth and on the forelimbs and/or neck. Clear material around the nose and mouth were also

observed in the 100 and 300 mg/kg/day group females approximately 1 hour following dose administration. These findings generally did not persist to the daily examinations. In addition, behavior-related clinical findings consisting of hunched posture, rocking, lurching, or swaying while ambulating, and prostration were noted in 2 females in the 1000 mg/kg/day group at the daily examinations and/or approximately 1 hour following dose administration. At the daily examinations, an increase in the incidence of yellow material on the urogenital area was noted in the 1000 mg/kg/day group males and females.

Lower mean body weight gains and corresponding reduced food consumption were noted in the 1000 mg/kg/day group males throughout the treatment period (study days 0-14). As a result, mean body weight in this group was 9.1 % lower than the control group on study day 14. Mean body weights, body weight gains, and food consumption in the 30, 100, and 300 mg/kg/day male groups were unaffected by test substance administration.

A mean body weight loss during gestation days 0-6 with corresponding reduced food consumption was noted in the 1000 mg/kg/day group females when compared to the control group. This loss was primarily due to 2 females that lost 20 g to 27 g of body weight and were noted with behavioral-related clinical findings at the daily examinations and/or approximately 1 hour following dose administration during this period. Mean body weight gain in this group was similar to the control group during gestation days 6-14, and mean food consumption was similar to the control group throughout the remainder of the gestation period. However, lower mean body weight gains were noted in the 1000 mg/kg/day group during the last week of treatment (gestation days 14-20) and was attributed to the 3 females in this group; 2 females with completely resorbed litters and 1 female with a litter composed of 2 dead fetuses and 1 early resorption. Consequently, mean maternal body weight in the 1000 mg/kg/day group on gestation day 20 was 15.6% lower than the control group and mean terminal body weight, gravid uterine weight, and net body weight gain in this group were lower than the control group. Mean body weights, body weight gains, food consumption, gravid uterine weights, net

body weights, and net body weight changes in the 30, 100, and 300 mg/kg/day female groups were unaffected by test substance administration.

At the scheduled necropsies, no remarkable macroscopic findings were noted in the males and females at any dosage level. Increased mean absolute and relative (to final body weight) kidney and liver weights and decreased mean absolute and/or relative (to final body weight) thymus weights were noted in the 1000 mg/kg/day group males and females. Lower mean absolute ovarian weights were also noted in the 1000 mg/kg/day group females. In addition, lower mean final body weights were noted in the males and females in this group compared to the control group. In the 300 mg/kg/day group males, increased mean absolute and relative (to final body weight) liver weights were noted compared to the control group. No other effects on organ weights were noted when the test substance-treated groups were compared to the control group.

An increase in the mean litter proportion of pre-implantation loss and a corresponding lower mean number of implantation sites were noted in the 1000 mg/kg/day group compared with the control group. In addition, an increase in the mean litter proportion of postimplantation loss (primarily early resorptions) with a corresponding decrease in the number and proportion of viable fetuses and an increase in the mean litter proportion of dead fetuses were noted in the 1000 mg/kg/day group compared to the concurrent control group. There were no effects on mean fetal body weight or fetal sex ratio noted in the 1000 mg/kg/day group. Intrauterine growth and survival in the 30, 100, and 300 mg/kg/day groups were unaffected by test substance administration.

1.4. CONCLUSION

Clinical signs were noted in the 1000 mg/kg/day group females and consisted of hunched posture, rocking, lurching, or swaying while ambulating and prostration. Test substance-related lower mean body weight and reduced food consumption were noted in the 1000 mg/kg/day group males and females. Increased absolute and relative (to final body weight) kidney and liver weights and decreased mean absolute and/or relative (to final body weight) thymus weights were noted in the 1000 mg/kg/day group males and

females. In addition, lower mean absolute ovarian weights were noted in the 1000 mg/kg/day group females. In the 300 mg/kg/day group males, a higher mean absolute and relative (to final body weight) liver weight was also observed. Two females in the 1000 mg/kg/day group had completely resorbed litters and 1 female had a litter composed of 2 dead fetuses and 1 early resorption. An increase in the mean litter proportion of pre-implantation and postimplantation loss were noted in the 1000 mg/kg/day group which corresponded to a decrease in the mean number and litter proportion of viable fetuses. No treatment-related effects on external fetal malformations and no developmental variations were noted in this study at any dosage level evaluated. Based on these results, dosage levels of 100, 300, and 900 mg/kg/day were selected for a combined repeated dose toxicity study with reproduction/developmental toxicity screening test (OECD 422) in Crl:CD(SD) rats administered naphthenic acid orally by gavage.

2. INTRODUCTION

2.1. GENERAL STUDY INFORMATION

This report presents the data from "An Oral (Gavage) 14-Day and Pilot Prenatal Developmental Toxicity Study of Naphthenic Acid in Rats." Due to software spacing constraints, the study title is presented as "Oral 14-Day/Pilot Dev Tox Study of Naphthenic Acid in Rats" on the report tables.

The study protocol is presented in Appendix A. A list of abbreviations potentially used in this report is presented in Section 12. (Abbreviations).

For the data collection process, each phase of the study was separated into what were termed WIL Research computer protocols. The computer protocol reference numbers and types of data collected were identified as follows:

Computer Protocol	Type of Data Collected
WIL-402010M	Male study data
WIL-402010F	Female study data

2.2. KEY STUDY DATES[1]

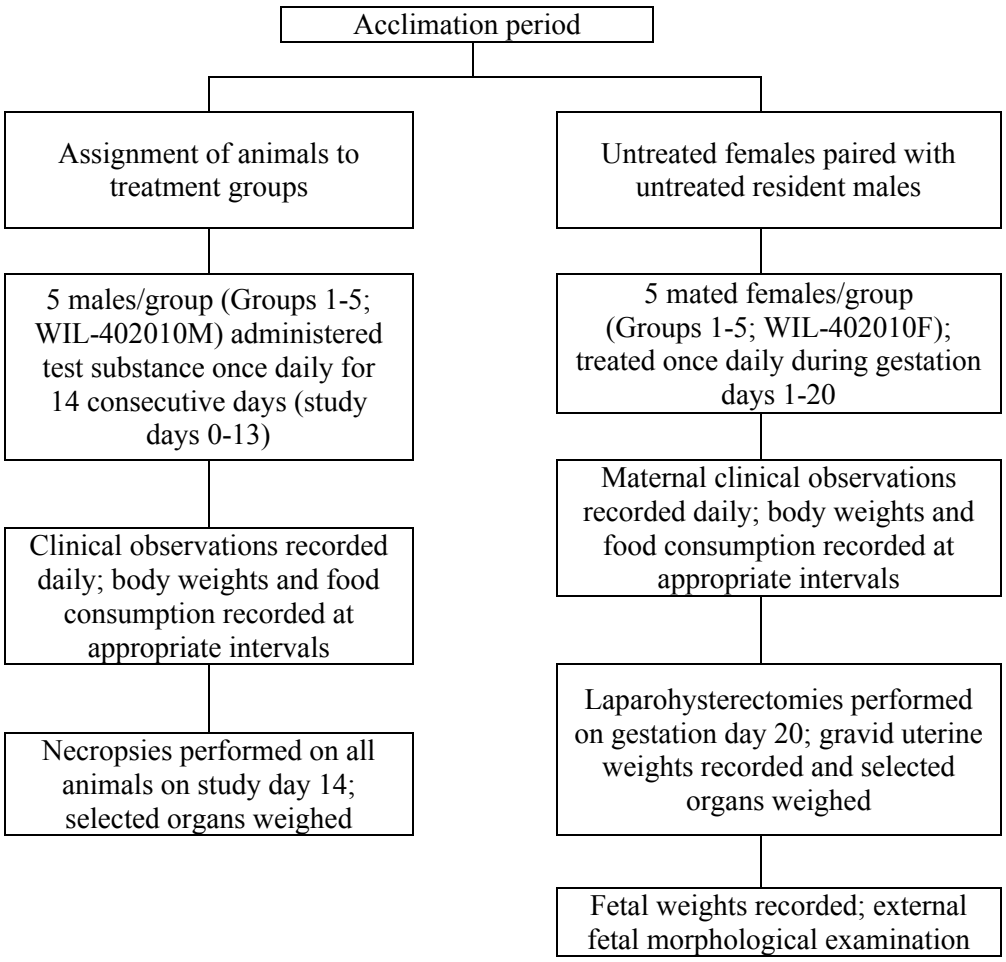
Date(s)	Event(s)
17 May 2010	Experimental starting date (initial characterization of the test substance)
2 June 2010	Experimental start date (first test substance administration)
2-15 June 2010	Test substance administration period (males)
2-24 June 2010	Test substance administration period (females)
16 June 2010	Male necropsy
24 June 2010	Last female laparohysterectomy
6 August 2010	Experimental termination/completion date (last characterization analysis)

[1] Date ranges represent the first and last dates of evaluation.

2.3. WIL RESEARCH KEY STUDY PERSONNEL

[redacted]	Assistant Director, Analytical Chemistry
[redacted]	Senior Operations Manager, Vivarium
[redacted]	Manager, Gross Pathology and Developmental Toxicology Laboratory
[redacted]	Group Manager, Formulations Laboratory
[redacted]	Director, Operations
[redacted]	Operations Manager, Reporting and Regulatory Technical Services

3. STUDY DESIGN



4. EXPERIMENTAL PROCEDURES - MATERIALS AND METHODS

4.1. TEST SUBSTANCE AND VEHICLE

4.1.1. TEST SUBSTANCE

The test substance, naphthenic acid, was received from EPL Archives, Inc., Sterling, VA, on behalf of the Sponsor, on 1 April 2010, as follows:

Identification	Physical Description
Naphthenic Acid Lot no. CP006002 CAS no.: 1338-24-5 [WIL log no. 10006B]	Clear, dark yellow liquid

Characterization of the test substance was performed at WIL Research; details about the methodology and results of these analyses are presented in Appendix B. The purity of the test substance was 100%. The test substance was stored at room temperature, and according to the Material Safety Data Sheet was considered stable under this condition (see Appendix C). A reserve sample of the test substance was collected and stored in the Archives at WIL Research.

4.1.2. VEHICLE

The vehicle used in preparation of the test substance formulations and for administration to the control group was corn oil (lot no. YF0793, exp. date: 22 May 2011, received from Spectrum Chemical Manufacturing Corporation, New Brunswick, NJ).

4.1.3. PREPARATION

For the control group (Group 1), a sufficient amount of vehicle was transferred into a glass container. The vehicle was divided into aliquots for daily dispensation and stored at room temperature. The vehicle was mixed throughout preparation, sampling, and dose administration procedures.

Dosing formulations were prepared at the test substance concentrations indicated in the following table:

Group Number	Treatment	Dosage Level (mg/kg/day)	Test substance Concentration[a] (mg/mL)
1	Vehicle Control	0	0
2	Naphthenic Acid	30	3
3	Naphthenic Acid	100	10
4	Naphthenic Acid	300	30
5	Naphthenic Acid	1000	100

[a] = The dosing formulations were not adjusted for purity.

The test substance formulations were prepared approximately weekly as single formulations for each dosage level, divided into aliquots for daily dispensation, and stored at room temperature. The test substance formulations were stirred continuously throughout the preparation, sampling, and dose administration procedures.

The first dosing formulations were visually inspected by the Study Director and were found to be visibly homogeneous and acceptable for administration.

4.1.4. SAMPLING AND ANALYSES

Prior to the initiation of dose administration, samples for homogeneity determination were collected from the top, middle, and bottom strata of the 3 and 100 mg/mL dosing formulations. Samples for resuspension homogeneity were collected from the top and bottom strata of aliquots (similar in size needed for 1 day of dose administration) prepared from the same dosing formulations following 11-days of room temperature storage; aliquots were mixed for at least 30 minutes prior to sampling. Samples for concentration analysis were collected from the middle stratum of the dosing formulations (including the control group) prepared for the first and last weeks of dose administration. One set of samples from each collection was subjected to the appropriate analyses. The remaining set of samples was stored frozen (approximately -20°C) as back-up. All analyses were conducted by the Analytical Chemistry Department at WIL Research using

a validated gas chromatography method using mass spectrometric detection. Details about the methodology and results of these analyses are presented in Appendix D, and the results are summarized in Section 6.1.

4.2. TEST SYSTEM, ANIMAL RECEIPT, AND ACCLIMATION

Sexually mature male and virgin female Sprague Dawley [Crl:CD(SD)] rats were used as the test system on this study. The animal model, the Crl:CD(SD) rat, is recognized as appropriate for reproduction studies and has been proven to be susceptible to the effects of reproductive toxicants. In addition, WIL Research has reproductive historical control data in the Crl:CD(SD) rat. The number of animals selected for this study (see Section 4.7.) was the minimum number of animals to allow for meaningful extrapolation to the definitive toxicity study.

Crl:CD(SD) rats (30 males and 32 females) were received in good health from Charles River Laboratories, Inc., Raleigh, NC on 18 May 2010. The males and females were approximately 46 and 79 days old, respectively, upon receipt. Each animal was examined by a qualified biologist on the day of receipt. The day following receipt, all animals were weighed and clinical observations were recorded. Each rat was uniquely identified by a Monel® metal ear tag displaying the animal number. The males were housed for an acclimation period of 15 days prior to the first day of treatment. The females were housed for an acclimation period of 14 days prior to breeding. During the acclimation period, the animals were observed twice daily for mortality and general changes in appearance and behavior. Female body weights were recorded prior to the initiation of breeding.

4.3. ANIMAL HOUSING

Upon arrival (males and females) and until cohabitation (females), all rats were individually housed in clean, stainless steel, wire-mesh cages suspended above cage-board. The cage-board was changed at least 3 times per week. A separate group of untreated resident males were used for mating with the test substance-treated females. The female rats were paired for mating in the home cage of the untreated resident male.

Following positive evidence of mating, the females were returned to individual cages. Nesting material was not required, as euthanasia was scheduled prior to the date of expected parturition. Animals were maintained in accordance with the *Guide for the Care and Use of Laboratory Animals* (National Research Council, 1996). The animal facilities at WIL Research are fully accredited by AAALAC International.

4.4. DIET, DRINKING WATER, AND MAINTENANCE

The basal diet used in this study, PMI Nutrition International, LLC Certified Rodent LabDiet® 5002, was a certified feed with appropriate analyses performed by the manufacturer and provided to WIL Research. Feed lots used during the study were documented in the study records. Feeders were changed and sanitized once per week. Municipal water supplying the facility was sampled for contaminants according to WIL Research's SOPs. The results of the diet and water analyses are maintained at WIL Research. No contaminants were present in animal feed or water at concentrations sufficient to interfere with the objectives of this study. Reverse osmosis-purified (on-site) drinking water, delivered by an automatic watering system, and the basal diet were provided *ad libitum* throughout the acclimation period and during the study.

4.5. ENVIRONMENTAL CONDITIONS

All rats were housed throughout the acclimation period and during the study in an environmentally controlled room. The room temperature and humidity controls were set to maintain environmental conditions of 71°F ± 5°F (22°C ± 3°C) and 50% ± 20% relative humidity. Room temperature and relative humidity data were recorded approximately hourly and are summarized in Appendix E. Actual mean daily temperature ranged from 70.6°F to 73.6°F (21.4°C to 23.1°C) and mean daily relative humidity ranged from 42.3% to 57.7% during the study. Fluorescent lighting provided illumination for a 12-hour light (0600 hours to 1800 hours)/12-hour dark photoperiod. Air handling units were set to provide a minimum of 10 fresh air changes per hour.

4.6. ASSIGNMENT OF ANIMALS TO TREATMENT GROUPS AND BREEDING PROCEDURES

At the conclusion of the male acclimation period, all available males were weighed and examined in detail for physical abnormalities. At the discretion of the Study Director, each animal judged to be in good health and meeting acceptable body weight requirements was selected for use in the computerized randomization procedure. At that time, the individual body weights and corresponding animal identification numbers were entered into WTDMS™. A printout containing the animal numbers, corresponding body weights, and individual group assignments was generated based on body weight stratification randomized in a block design. The animals then were arranged into groups according to the printout. These males were not used for mating.

At the conclusion of the female acclimation period, all available females were weighed and examined in detail for physical abnormalities. At the discretion of the Study Director, each animal judged to be in good health and meeting acceptable body weight requirements was placed in a suspended wire-mesh cage with a resident male from the same strain and source for breeding. Resident males were untreated, sexually mature rats utilized exclusively for breeding. These rats were maintained under similar laboratory conditions as the females. A breeding record containing the male and female identification numbers and the dates of cohabitation was maintained. Positive evidence of mating was confirmed by the presence of a vaginal copulatory plug or the presence of sperm in a vaginal lavage and verified by a second biologist. Each mating pair was examined daily. The day on which evidence of mating was identified was termed gestation day 0 and the animals were separated. The selected females were approximately 13 weeks old when paired for breeding.

The experimental design, consisted of 4 test substance-treated groups and 1 control group composed of 5 rats/sex/group. At the initiation of dose administration (study day 0), the males were approximately 9 weeks old; body weights ranged from 281 g to 352 g. The bred females were assigned to groups using a WTDMS™ computer program which

randomized the animals based on stratification of the gestation day 0 body weights in a block design. Body weight values of the selected females ranged from 225 g to 290 g on gestation day 0 (the day prior to the first day of dose administration). Animals not assigned to study were transferred to the WIL Research stock colony.

4.7. ORGANIZATION OF TEST GROUPS, DOSAGE LEVELS, AND TREATMENT REGIMEN

The vehicle and test substance formulations were administered orally by gavage, via an appropriately sized flexible, Teflon®-shafted, stainless steel ball-tipped dosing cannula (Natume, Japan) once daily. The males were dosed once daily for 14 consecutive days (study days 0-13). The females were dosed once daily during gestation days 1-20. The dosage volume for all groups was 10 mL/kg. Individual dosages were based on the most recently recorded body weights to provide the correct mg/kg/day dose. All animals were dosed at approximately the same time each day.

The following table presents the study group assignment:

Group Number	Treatment	Dosage Level (mg/kg/day)	Dosage Volume (mL/kg)	Number of Males	Number of Females
1	Vehicle	0	10	5	5
2	Naphthenic Acid	30	10	5	5
3	Naphthenic Acid	100	10	5	5
4	Naphthenic Acid	300	10	5	5
5	Naphthenic Acid	1000	10	5	5

Dosage levels were selected based on results of previous studies and were provided by the Sponsor after consultation with the Study Director.

The selected route of administration for this study was oral (gavage) because this is a potential route of exposure for humans and historically this route has been used extensively for studies of this nature.

5. PARAMETERS EVALUATED

5.1. CLINICAL OBSERVATIONS AND SURVIVAL

All rats were observed twice daily, once in the morning and once in the afternoon, for moribundity and mortality. Individual clinical observations were recorded daily, including the day of necropsy (prior to test substance administration during the treatment period). Each male and female was also observed for signs of toxicity approximately 1 hour following dose administration. The absence or presence of findings was recorded for individual animals. In addition, the presence of findings at the time of dose administration was recorded for individual animals.

5.2. BODY WEIGHTS

Individual male body weights were recorded weekly throughout the study and prior to the scheduled euthanasia. Mean weekly body weights and body weight changes are presented for each interval. In addition, cumulative mean body weight changes are presented for the entire treatment period (study days 0-14). Female body weights were recorded on gestation days 0, 6, 7, 10, 14, 17, and 20. Mean gestation body weights and corresponding mean body weight changes are presented for these intervals and for the overall gestation interval (days 0-20).

Gravid uterine weight was collected and net body weight (the gestation day 20 body weight exclusive of the weight of the uterus and contents) and net body weight change (the gestation day 0-20 body weight change exclusive of the weight of the uterus and contents) were calculated and presented for each gravid female at the scheduled laparohysterectomy.

5.3. FOOD CONSUMPTION

Individual male food consumption was recorded weekly throughout the study. Individual female food consumption was recorded on gestation days 0, 6, 7, 10, 14, 17, and 20. Food consumption was reported as g/animal/day and g/kg/day for the corresponding body weight change intervals. Calculation of the comprehensive intervals excludes all erroneous values such as total food spillage.

When food consumption could not be determined for an animal during a given interval (due to a weighing error, food spillage, obvious erroneous value, *etc*.), group mean values were calculated for that interval using the available data. The time periods when food consumption values were unavailable for a given animal were designated as "NA" on the individual report tables.

5.4. MACROSCOPIC EXAMINATIONS (MALES)

All males were euthanized by carbon dioxide inhalation on study day 14. A gross necropsy was performed on all animals and included examination of the external surfaces, all orifices, the cranial cavity, the external surfaces of the brain and the thoracic, abdominal, and pelvic cavities including viscera. Tissues were preserved in 10% neutral-buffered formalin for possible future histopathologic examination only as indicated by the gross findings. The carcasses were then discarded.

5.5. GESTATION DAY 20 LAPAROHYSTERECTOMY

The laparohysterectomies and macroscopic examinations were performed blind to treatment group. All females were euthanized on gestation day 20 by carbon dioxide inhalation. The thoracic, abdominal, and pelvic cavities were opened by a ventral mid-line incision, and the contents were examined. In all instances, the *postmortem* findings were correlated with the *antemortem* comments, and any abnormalities were recorded. The uterus and ovaries were then exposed and excised. The number of corpora lutea on each ovary was recorded. The trimmed uterus was weighed and opened, and the number and location of all fetuses, early and late resorptions and the total number of implantation sites were recorded. The placentae were also examined. The individual uterine distribution of implantation sites was documented using the following procedure. All implantation sites, including resorptions, were numbered in consecutive order beginning with the left distal to the left proximal uterine horn, noting the position of the cervix, and continuing from the right proximal to the right distal uterine horn. The carcass of each female was then discarded.

Uteri with no macroscopic evidence of implantation were opened and subsequently placed in 10% ammonium sulfide solution for detection of early implantation loss (Salewski, 1964).

Intrauterine data were summarized using 2 methods of calculation. An example of each method of calculation follows:

1. Group Mean Litter Basis:

$$\text{Postimplantation Loss/Litter} = \frac{\text{No. Dead Embryos, Resorptions (Early/Late)/Group}}{\text{No. Gravid Females/Group}}$$

2. Proportional Litter Basis:

$$\text{Summation Per Group (\%)} = \frac{\text{Sum of Postimplantation Loss/Litter (\%)}}{\text{No. Litters/Group}}$$

Where:

$$\text{Postimplantation Loss/Litter (\%)} = \frac{\text{No. Dead Embryos, Resorptions (Early/Late)/Litter}}{\text{No. Implantation Sites/Litter}} \times 100$$

5.6. ORGAN WEIGHTS

The following organs were weighed from all animals at the scheduled necropsy.

Kidneys	Liver
Testes[a]	Ovaries (with oviducts)[a]
Thymus	

[a] = These paired organs were weighed separately.

Except as noted, paired organs were weighed together. Organ-to-final body weight ratios were calculated.

5.7. EXTERNAL FETAL MORPHOLOGICAL EXAMINATION

Fetal examinations were performed blind to treatment group. A detailed external examination of each fetus was conducted to include, but was not limited to, an

examination of the eyes, palate and external orifices. Findings were recorded as either developmental variations (alterations in anatomic structure that are considered to have no significant biological effect on animal health or body conformity and/or occur at high incidence, representing slight deviations from normal) or malformations (those structural anomalies that alter general body conformity, disrupt or interfere with normal body function, or may be incompatible with life). Each fetus was weighed, sexed, euthanized by a subcutaneous injection of sodium pentobarbital in the scapular region, and discarded.

5.8. DATA ACQUISITION AND ANALYSIS

5.8.1. ACQUISITION AND REPORTING

Program/System	Description
Archive Management System (AMS)	In-house developed application for storage, maintenance, and retrieval information for archived materials (*e.g.*, lab books, study data, wet tissues, slides, *etc*.)
Formulations Dose Dispensing Management System (FDDMS)	In-house developed system used to assign unique barcodes to formulation containers and individual containers used for dispensing dosing formulations.
InSight® Publisher	Electronic publishing system (output is Adobe Acrobat, PDF)
Master Schedule	Maintains the master schedule for the company.
Metasys DDC Electronic Environmental Control System	Controls and monitors animal room environmental conditions.
Microsoft® Office 2002 and 2007	Used in conjunction with the publishing software to generate study reports.
Provantis Dispense™	Comprehensive system (Instem LSS Limited) to manage test materials, including receipt, formulation instructions, and accountability.
WIL Formulations Dispense System (WFDS)	In-house developed system for use in conjunction with Provantis Dispense™ to ensure proper storage and use of formulations.
WIL Metasys	In-house developed system used to record and report animal room environmental conditions.

Program/System	Description
WIL Toxicology Data Management System™ (WTDMS™)	In-house developed system used for collection and reporting of in-life and *postmortem* data.

Note: Version numbers of WTDMS™ programs used for the study are presented on the report data tables (reporting programs); version numbers and release dates are otherwise maintained in the study records and/or facility records.

5.8.2. STATISTICAL ANALYSES

All statistical tests were performed using WTMDS™ unless otherwise noted. Analyses were conducted using two-tailed tests (except as noted otherwise) for minimum significance levels of 1% and 5%, comparing each test substance-treated group to the control group by sex. Each mean was presented with the standard deviation (S.D.), standard error (S.E.), and the number of animals (N) used to calculate the mean. Due to the different rounding conventions inherent in the types of software used, the means, standard deviations, and standard errors on the summary and individual tables may differ by ±1 in the last significant figure. Where applicable, the litter was used as the experimental unit.

Mean male and female body weights, body weight changes, food consumption, and absolute and relative organ weights; female net body weight, net body weight changes, and gravid uterine weights, numbers of corpora lutea, implantation sites, and viable fetuses, fetal body weights (separately by sex and combined), were subjected to a parametric one-way ANOVA (Snedecor and Cochran, 1980) to determine intergroup differences between the control and test substance-treated groups. If the ANOVA revealed significant ($p<0.05$) intergroup variance, Dunnett's test (Dunnett, 1964) was used to compare the test substance-treated groups to the control group. Mean litter proportions (percent per litter) of prenatal data (viable and nonviable fetuses, early and late resorptions, total resorptions, pre- and postimplantation loss, and fetal sex distribution) were subjected to the Kruskal-Wallis nonparametric ANOVA test (Kruskal and Wallis, 1952) to determine intergroup differences between the control and test substance-treated groups. If the ANOVA revealed significant ($p<0.05$) intergroup variance, Dunn's test (Dunn, 1964) was used to compare the test substance-treated groups to the control group.

6. RESULTS AND DISCUSSION

6.1. ANALYTICAL CHEMISTRY

Analytical Chemistry Report: Appendix D

The analyzed dosing formulations were within WIL Research's SOP range for suspensions (85% to 115%), were homogeneous, and were stable at room temperature for 11 days. Based on these results, the protocol-specified dosages of test substance were administered to the animals. No quantifiable amount of test substance was detected in the vehicle formulation that was administered to the control group (Group 1).

Results of the analyses of dosing formulations are summarized below.

Text Table 1. Results of Homogeneity Analyses

	Group 2 (3 mg/mL)	Group 5 (100 mg/mL)
Homogeneity Assessment of the 27 May 2010 Formulations		
Mean Concentration (mg/mL)	3.04	101
RSD (%)	2.0	5.0
Mean % of Target	101	101
11-Day Room Temperature Resuspension Homogeneity Assessment of the 27 May 2010 Formulations		
Mean Concentration (mg/mL)	2.94	101
RSD (%)	4.7	6.0
Mean % of Target	97.9	101

Text Table 2. Results of Stability Analyses

	Mean Concentration, mg/mL (% of Time Zero)	
	Group 2 (3 mg/mL)	Group 5 (100 mg/mL)
11-Day Room Temperature Storage	2.94 (96.6)	101 (100)

Text Table 3. Results of Concentration Analyses

Date of Preparation	Mean Concentration, mg/mL (% of Target) Group 1 (0 mg/mL)	Group 2 (3 mg/mL)	Group 3 (10 mg/mL)	Group 4 (30 mg/mL)	Group 5 (100 mg/mL)
1 June 2010	NQ	3.34 (111)	9.22 (92.2)	28.7 (95.8)	97.4 (97.4)
16 June 2010	NQ	3.04 (101)	9.87 (98.7)	27.9 (92.9)	89.7 (89.7)

NQ = Not quantifiable

6.2. MALES

6.2.1. CLINICAL OBSERVATIONS AND SURVIVAL

Summary Data: Table S1, Table S2

Individual Data: Table I1, Table I2, Table I3

All males in the control, 30, 100, 300, and 1000 mg/kg/day groups survived to the scheduled necropsy on study day 14. Clinical findings noted in the 1000 mg/kg/day group at approximately 1 hour following dose administration included clear material on the neck and forelimbs and around the nose and mouth beginning as early as study day 2 and generally continuing through study day 14. In addition, salivation prior to dosing was noted in all males in the 1000 mg/kg/day group on 1-6 occassions each during study days 7-14. At the daily examinations, an increased incidence of yellow material on the urogenital area was observed in 3 males in the 1000 mg/kg/day group during study days 3-14. All of the above-mentioned clinical findings were considered to be test substance-related. All other clinical findings noted in the test substance-treated groups occurred in frequently and/or in a manner that was not dose-related.

6.2.2. BODY WEIGHTS

Summary Data: Table S3, Table S4

Individual Data: Table I4, Table I5

A significantly ($p<0.01$) lower mean body weight gain was noted in the 1000 mg/kg/day group when compared to the control group during the first week of treatment (study days 0-7) followed by a lower (not statistically significant) mean body weight gain during

study days 7-14. As a result, a significantly ($p<0.01$) lower mean body weight gain was noted in this group compared to the control group when the overall treatment period (study days 0-14) was evaluated. Consequently, mean body weight in the 1000 mg/kg/day group was 9.1% lower than the control group on study day 14; the difference was not statistically significant.

Mean body weights and body weight gains in the 30, 100, and 300 mg/kg/day groups were unaffected by test substance administration. Differences from the control group were slight and not statistically significant.

6.2.3. FOOD CONSUMPTION

Summary Data: Table S5, Table S6

Individual Data: Table I6, Table I7

Lower mean food consumption, evaluated as g/animal/day and g/kg/day, was noted in the 1000 mg/kg/day group during study days 0-7, 7-14, and when the overall treatment period (study days 0-14) was evaluated; the difference from the control group was significant ($p<0.05$) during study days 0-7. These reductions in food consumption corresponded to the lower mean body weight gains observed in this group during the treatment period.

Mean food consumption in the 30, 100, and 300 mg/kg/day groups was unaffected by test substance administration. Differences from the control group were slight and not statistically significant.

6.2.4. MACROSCOPIC EXAMINATIONS

Summary Data: Table S7

Individual Data: Table I8

All males survived to the scheduled necropsy on study day 14. Macroscopic findings observed in the test substance-treated groups occurred infrequently and in a manner that was not dose-related.

6.2.4.1. ORGAN WEIGHTS

Summary Data: Table S8

Individual Data: Table I9, Table I10

Increased mean absolute and relative (to final body weight) kidney and liver weights were noted in the 1000 mg/kg/day group; differences were generally significant ($p<0.01$) when compared to the control group. A decrease in the mean absolute and relative (to final body weight) thymus weight was noted in the 1000 mg/kg/day group when compared with the control group; the difference was not statistically significant. In addition, a lower (not statistically significant) mean final body weight was noted in the 1000 mg/kg/day group compared to the control group. An increase in the mean absolute and relative (to final body weight) liver weight was noted in the 300 mg/kg/day group males when compared to the control group; only the difference in the relative to final body weight value was significant ($p<0.01$). No other effects on organ weight data were noted when the test substance-treated groups were compared to the control group.

6.3. FEMALES

6.3.1. CLINICAL OBSERVATIONS AND SURVIVAL

Summary Data: Table S9, Table S10, Table S11

Individual Data: Table I11, Table I12, Table I13

All females in the control, 30, 100, 300, and 1000 mg/kg/day groups survived to the scheduled necropsy. In the 1000 mg/kg/day group, behavioral clinical findings consisting of hunched posture, rocking, lurching, or swaying while ambulating, and/or prostration were noted for 2 females at approximately 1 hour following dose administration during gestation days 2-4. Hunched posture was also noted for 1 of these females at the daily examinations on gestation days 3 and 4. Clear material on the forelimbs and around the nose was noted in the 1000 mg/kg/day group at approximately 1 hour following dose administration beginning on gestation days 10 and 11, respectively, and generally continuing through gestation day 20. Additionally, clear or red material around the mouth was noted in this group at approximately 1 hour following

dose administration beginning as early as gestation day 2 and generally continuing through gestation day 20. Salivation prior to dosing was also noted for 2 females in this group during gestation days 10-18. At the daily examinations, an increase in the incidence of yellow material on the urogenital area was observed in the 1000 mg/kg/day group during gestation days 3-12. Clear material around the mouth and nose was also observed in the 100 and 300 mg/kg/day groups at approximately 1 hour following dose administration beginning as early as gestation day 4 and 7, respectively, and these observations continued sporadically until gestation day 20. In the 30 and 100 mg/kg/day groups, an increase in the incidences of hair loss on the forelimbs was observed at the daily examinations. In the absence of a dose-response, the hair loss noted in the 30 and 100 mg/kg/day groups was not attributed to test substance administration. There were no remarkable clinical findings noted in the 30 mg/kg/day group at the daily examinations or approximately 1 hour following dose administration.

6.3.2. BODY WEIGHTS

Summary Data: Table S12, Table S13, Table S14
Individual Data: Table I14, Table I15, Table I16

A mean body weight loss (2 g) was noted in the 1000 mg/kg/day group during gestation days 0-6 compared to a body weight gain in the control group (18 g); the difference was not statistically significant. This loss was primarily due to 2 females that lost 20 g to 27 g of body weight and were noted with behavioral-related clinical findings at the daily examinations and/or approximately 1 hour following dose administration during this period (see Section 6.3.1.). Mean body weight gains in this group were similar to the control group during gestation days 6-14. Lower mean body weight gains were noted in the 1000 mg/kg/day group during gestation days 14-20; the difference from the control group was significant ($p<0.01$) during gestation days 17-20. When the overall gestation period (gestation days 0-20) was evaluated, a significantly ($p<0.01$) lower mean body weight gain was noted in the 1000 mg/kg/day group compared to the control group. As a result of the lower mean body weight gains, mean body weights in the 1000 mg/kg/day

group were 15.6% lower than the control group on gestation day 20; the difference was significant ($p<0.01$). Mean gravid uterine weight in this group was significantly ($p<0.01$) lower than the control group and was attributed to the 2 females in this group with complete litter resorptions and 1 female with a litter composed of 2 dead fetuses and 1 early resorption (see Section 6.3.6.). Mean net body weight and net body weight gain in this group were slightly lower than the control group; the differences were not statistically significant.

Mean maternal body weights, body weight gains, net body weights, net body weight gains, and gravid uterine weights in the 30, 100, and 300 mg/kg/day groups were unaffected by test substance administration. Differences from the control group were slight and not statistically significant.

6.3.3. FOOD CONSUMPTION

Summary Data: Table S15, Table S16

Individual Data: Table I17, Table I18

Significantly ($p<0.05$) lower mean food consumption, evaluated as g/animal/day and g/kg/day, was noted in the 1000 mg/kg/day group when compared to the control group during gestation days 0-6 and corresponded to a mean body weight loss during this same interval. Mean food consumption in this group was similar to the control group throughout the remainder of the gestation period.

Mean food consumption in the 30, 100, and 300 mg/kg/day groups was unaffected by test substance administration. Differences from the control group were slight and not statistically significant with the exception of significantly ($p<0.05$) higher mean food consumption (g/kg/day value only) in the 30 mg/kg/day group when the overall gestation period (gestation days 0-20) was evaluated.

6.3.4. MACROSCOPIC EXAMINATIONS

Summary Data: Table S17

Individual Data: Table I19

At the scheduled necropsy on gestation day 20, no remarkable internal findings were observed at dosage levels of 30, 100, 300, and 1000 mg/kg/day. All females in the 30, 100, 300, and 1000 mg/kg/day groups were determined to be gravid.

6.3.5. ORGAN WEIGHTS

Summary Data: Table S18

Individual Data: Table I20, Table I21

Increased mean absolute and relative (to final body weight) kidney and liver weights were noted in the 1000 mg/kg/day group; differences were generally significant ($p<0.01$) when compared to the control group. Decreases in mean absolute thymus and ovarian weights were also noted in this group when compared to the control group; the differences were not statistically significant and the relative to final body weight values were similar to the control group. Furthermore, the decrease in ovarian weights corresponded to the increase in the mean litter proportions of pre- and postimplantation loss noted in this group. In addition, a significantly ($p<0.01$) lower mean final body weight was noted in the 1000 mg/kg/day group compared to the control group. No other effects on organ weight data were noted when the test substance-treated groups were compared to the control group.

6.3.6. GESTATION DAY 20 LAPAROHYSTERECTOMY

Summary Data: Table S19, Table S20

Individual Data: Table I22, Table I23, Table I24

Historical Control Data: Appendix F

An increase (not statistically significant) in the mean litter proportion of pre-implantation loss was observed in the 1000 mg/kg/day group when compared to the concurrent control group and the value exceeded the maximum mean value in the WIL historical control

data. Consequently, a significantly ($p<0.05$) lower mean number of implantation sites was noted in the 1000 mg/kg/day group when compared to the control group. This reduction was primarily due to 3 females that had a lower number of implantation sites (3-5 implantation sites). The mean litter proportion of postimplantation loss (primarily early resorptions) in the 1000 mg/kg/day group was higher than the control group. Although the difference was not statistically significant when compared to the concurrent control group, the value exceeded the maximum mean value in the WIL historical control group data for definitive studies. A corresponding lower mean litter proportion and significantly ($p<0.01$) lower mean number of viable fetuses were noted in this group when compared to the concurrent control group and the values were below the minimum mean values in the WIL historical control data. These differences were attributed to 3 females (nos. 73718, 73701, and 73707) in this group; female nos. 73707 and 73718 had completely resorbed litters consisting of early resorptions and female no. 73701 had a litter composed of 2 dead fetuses and 1 early resorption. Additionally, an increase in the mean litter proportion of dead fetuses was observed in the 1000 mg/kg/day group compared to the concurrent control group. Although the difference was not statistically significant compared to the concurrent control group, the value exceeded the maximum mean value in the WIL historical control data. Mean fetal body weight and fetal sex ratio in the 1000 mg/kg/day group were unaffected by maternal test substance administration.

The gestation day 20 laparohysterectomy data are presented in the table below.

Text Table 4. Results of Gestation Day 20 Laparohysterectomy Data

	Dosage Level (mg/kg/day)					WIL HC[a]
Parameter	0	30	100	300	1000	Mean (Range)
Mean no. corpora lutea	16.4	16.4	17.4	15.0	12.0	17.3 (14.5-19.4)
Mean no. implantation sites	14.0	15.2	16.0	14.2	7.8*	15.9 (13.0-17.6)
Mean early resorptions (% per litter)	4.6	3.9	7.0	3.2	46.7	4.7 (1.5-9.9)
Pre-implantation loss (% per litter)	9.6	6.3	8.1	5.3	36.1	7.4 (1.5-15.7)
Postimplantation loss (% per litter)	4.6	3.9	7.0	3.2	60.0	4.8 (2.0-9.9)
Mean no. viable fetuses	13.4	14.6	14.8	13.8	5.2**	15.2 (12.2-17.1)
Viable fetuses (% per litter)	95.4	96.2	93.0	96.8	40.0	95.2 (90.1-98.0)
Dead fetuses (% per litter)	0.0	0.0	0.0	0.0	13.3	0.0 (0.0-0.5)

[a] = WIL historical control data
* = Statistically significant at $p<0.05$ compared to the control group.
** = Statistically significant at $p<0.01$ compared to the control group.

Intrauterine growth and survival were unaffected by maternal test substance administration at dosage levels of 30, 100, and 300 mg/kg/day. Mean numbers of corpora lutea and implantation sites and the mean litter proportions of pre-implantation loss in these groups were similar to the control group. Differences from the control group were slight and not statistically significant.

6.3.7. EXTERNAL FETAL MORPHOLOGICAL DATA

Summary Data: Table S21, Table S22

Individual Data: Table I25

Historical Control Data: Appendix F

The numbers of fetuses (litters) available for morphological evaluation were 67(5), 73(5), 74(5), 69(5), and 26(2) in the control, 30, 100, 300, and 1000 mg/kg/day groups, respectively. External malformations observed in the test substance-treated groups consisted of open eyelids (bilateral) in dead fetuses (fetus nos. 73701-02 and 73701-03) in the 1000 mg/kg/day group and omphalocele (several loops of intestine protruded through an opening in the umbilicus with remnants of a membranous sac) in fetus no. 73697-07 in the 30 mg/kg/day group. Because these findings were noted in single fetuses or litters and/or did not occur in a dose-related manner, they were not considered

to be test substance-related. No other external malformations were noted for fetuses in this study.

No external developmental variations were observed in fetuses in this study.

7. CONCLUSIONS

Clinical signs were noted in the 1000 mg/kg/day group females and consisted of hunched posture, rocking, lurching, or swaying while ambulating and prostration. Test substance-related lower mean body weight and reduced food consumption were noted in the 1000 mg/kg/day group males and females. Increased absolute and relative (to final body weight) kidney and liver weights and decreased mean absolute and/or relative (to final body weight) thymus weights were noted in the 1000 mg/kg/day group males and females. In addition, lower mean absolute ovarian weights were noted in the 1000 mg/kg/day group females. In the 300 mg/kg/day group males, a higher mean absolute and relative (to final body weight) liver weight was also observed. Two females in the 1000 mg/kg/day group had completely resorbed litters and 1 female had a litter composed of 2 dead fetuses and 1 early resorption. An increase in the mean litter proportion of pre-implantation and postimplantation loss were noted in the 1000 mg/kg/day group which corresponded to a decrease in the mean number and litter proportion of viable fetuses. No treatment-related effects on external fetal malformations and no developmental variations were noted in this study at any dosage level evaluated. Based on these results, dosage levels of 100, 300, and 900 mg/kg/day were selected for a combined repeated dose toxicity study with reproduction/developmental toxicity screening test (OECD 422) in Crl:CD(SD) rats administered naphthenic acid orally by gavage.

8. REPORT REVIEW AND APPROVAL

Report Approved By:

[redacted]

Staff Toxicologist, Developmental and
Reproductive Toxicology
Study Director

8 Dec 2010
Date

Report Prepared By:

[redacted]

Study Analyst

8 Dec 2010
Date

Report Reviewed By:

[redacted]

Senior Toxicologist, Developmental and
Reproductive Toxicology

8 Dec 2010.
Date

[redacted]

Senior Director, Developmental and
Reproductive Toxicology

8 Dec 2010
Date

[redacted]

Group Supervisor, Reporting &
Technical Support Services

8 Dec 2010
Date

9. QUALITY ASSURANCE UNIT STATEMENT

9.1. PHASES INSPECTED

Date(s) of Inspection(s)	Phase Inspected	Date(s) Findings Reported to Study Director	Date(s) Findings Reported to Management	Auditor(s)
2-Jun-2010	Test Article Administration	2-Jun-2010	21-Jul-2010	[redacted]
11-Jun-2010	Clinical Observations	11-Jun-2010	21-Jul-2010	[redacted]
22-Jun-2010	Labparohysterectomy and Fetal Examination	22-Jun-2010	21-Jul-2010	[redacted]
13-Jul-2010	Study Records (I-1)	13-Jul-2010	20-Aug-2010	[redacted]
13-Jul-2010	Study Records (N-1, N-2)	13-Jul-2010	20-Aug-2010	[redacted]
14-Jul-2010	Study Records (Rx-1)	14-Jul-2010	20-Aug-2010	[redacted]
24-Jul-2010, 28-Jul-2010	Draft Report (Tables only)	28-Jul-2010	20-Aug-2010	[redacted]
27-Jul-2010, 28-Jul-2010, 29-Jul-2010	Study Records (A-1, A-2, A-3)	29-Jul-2010	20-Aug-2010	[redacted]
10-Aug-2010	Study Records (A-4)	10-Aug-2010	23-Sep-2010	[redacted]
11-Aug-2010	Draft Report (Characterization Analyses)	11-Aug-2010	23-Sep-2010	[redacted]
11-Aug-2010	Draft Report (Analytical Chemistry, Formulation Analysis)	11-Aug-2010	23-Sep-2010	[redacted]
13-Aug-2010	Draft Report (Excluding Tables and Analytical Analysis Appendix)	13-Aug-2010	23-Sep-2010	[redacted]

This study was inspected in accordance with the United States EPA GLP Standards (40 CFR Part 792), the OECD Principles of GLP, WIL Research's SOPs, and the Sponsor's protocol. Quality Assurance findings, derived from the inspections during the conduct of the study and from the inspections of the raw data and draft report, are documented and have been reported to the Study Director. Review of the protocol as

well as a yearly internal facility inspection are conducted by the Quality Assurance Unit at WIL Research. A status report is submitted to management monthly.

This report accurately reflects the data generated during the study. The methods and procedures used in the study were those specified in the protocol and WIL Research's SOPs.

9.2. APPROVAL

This study was inspected according to the criteria discussed in Section 9.1.

Report Audited By:

[redacted]
Group Supervisor, Quality Assurance

8 Dec 2010
Date

[redacted]
Compliance Specialist

8 Dec 2010
Date

Report Released By:

[redacted]
Manager, Quality Assurance

8 Dec 2010
Date

10. REFERENCES

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11. DATA RETENTION

The Sponsor has title to all documentation records, raw data, specimens, or other work product generated during the performance of the study. Any remaining dosing formulation samples will be discarded upon issuance of the final report. All remaining work product generated by WIL Research, including raw paper data, pertinent electronic storage, and specimens, are retained in the Archives at WIL Research as specified in the study protocol.

Reserve samples of the test substance, pertinent electronic storage media, and the original final report are retained in the Archives at WIL Research in compliance with regulatory requirements.

12. ABBREVIATIONS

The following abbreviations may apply to this report:

AAALAC	-	Association for Assessment and Accreditation of Laboratory Animal Care
ANOVA	-	analysis of variance
EPA	-	Environmental Protection Agency
g	-	gram
GLP	-	Good Laboratory Practices
hr	-	hour(s)
kg	-	kilogram
L	-	liter
mg	-	milligram
mL	-	milliliter
NA	-	not applicable
OECD	-	Organisation for Economic Cooperation and Development
SOP	-	standard operating procedure
TSCA	-	Toxic Substance Control Act
WIL Research	-	WIL Research Laboratories, LLC
WTDMS™	-	WIL Toxicology Data Management System
wt.	-	weight
wts.	-	weights

TABLES S1 - S22

TABLE S1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF CLINICAL FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

----- M A L E -----

TABLE RANGE:	06-02-10 TO 06-16-10				
GROUP:	1	2	3	4	5
NORMAL					
-NO SIGNIFICANT CLINICAL OBSERVATIONS	74/ 5	74/ 5	74/ 5	75/ 5	47/ 5
DISPOSITION					
-SCHEDULED EUTHANASIA	5/ 5	5/ 5	5/ 5	5/ 5	5/ 5
BODY/INTEGUMENT					
-WET YELLOW MATERIAL RIGHT INGUINAL AREA	1/ 1	0/ 0	1/ 1	0/ 0	0/ 0
-WET YELLOW MATERIAL LEFT INGUINAL AREA	1/ 1	0/ 0	1/ 1	0/ 0	0/ 0
-WET YELLOW MATERIAL UROGENITAL AREA	1/ 1	0/ 0	0/ 0	0/ 0	15/ 3
-WET YELLOW MATERIAL ANOGENITAL AREA	0/ 0	1/ 1	0/ 0	0/ 0	0/ 0
-HAIR LOSS VENTRAL ABDOMINAL AREA	0/ 0	0/ 0	0/ 0	0/ 0	13/ 1
-HAIR LOSS RIGHT HINDLIMB	0/ 0	0/ 0	0/ 0	0/ 0	11/ 1
-HAIR LOSS LEFT HINDLIMB	0/ 0	0/ 0	0/ 0	0/ 0	11/ 1
-HAIR LOSS LEFT LATERAL ABDOMINAL AREA	0/ 0	0/ 0	0/ 0	0/ 0	1/ 1

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

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07/15/2010

TABLE S2 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF POST-DOSE FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

----- M A L E -----

TABLE RANGE: 06-02-10 TO 06-15-10 GROUP:	1	2	3	4	5
NORMAL					
1 HOUR POST-DOSING					
-NO SIGNIFICANT CLINICAL OBSERVATIONS	70/5	70/5	69/5	55/5	27/5
BODY/INTEGUMENT					
1 HOUR POST-DOSING					
-WET CLEAR MATERIAL VENTRAL NECK	0/0	0/0	0/0	0/0	6/3
-WET CLEAR MATERIAL RIGHT FORELIMB	0/0	0/0	0/0	0/0	8/4
-WET CLEAR MATERIAL LEFT FORELIMB	0/0	0/0	0/0	0/0	9/4
CARDIO-PULMONARY					
TIME OF DOSE					
-GASPING	0/0	0/0	0/0	0/0	1/1
EYES/EARS/NOSE					
1 HOUR POST-DOSING					
-WET CLEAR MATERIAL AROUND NOSE	0/0	0/0	0/0	0/0	11/5
-DRIED RED MATERIAL AROUND NOSE	0/0	0/0	0/0	0/0	1/1
ORAL/DENTAL					
TIME OF DOSE					
-SALIVATION PRIOR TO DOSING	0/0	0/0	2/1	0/0	14/5
1 HOUR POST-DOSING					
-WET CLEAR MATERIAL AROUND MOUTH	0/0	0/0	1/1	11/2	36/5
-DRIED CLEAR MATERIAL AROUND MOUTH	0/0	0/0	0/0	4/1	6/3
-DRIED RED MATERIAL AROUND MOUTH	0/0	0/0	0/0	0/0	1/1
-SALIVATION	0/0	0/0	0/0	0/0	2/2

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE S3 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF BODY WEIGHTS [G]

	MALES				
GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 0					
MEAN	315.	317.	317.	316.	318.
% DIFFERENCE		0.6	0.6	0.3	1.0
S.D.	11.9	11.8	13.9	19.0	26.2
S.E.	5.3	5.3	6.2	8.5	11.7
N	5	5	5	5	5
DAY 7					
MEAN	359.	359.	354.	360.	341.
% DIFFERENCE		0.0	-1.4	0.3	-5.0
S.D.	15.3	14.2	17.6	27.1	23.1
S.E.	6.9	6.3	7.9	12.1	10.3
N	5	5	5	5	5
DAY 14					
MEAN	406.	398.	396.	399.	369.
% DIFFERENCE		-2.0	-2.5	-1.7	-9.1
S.D.	20.6	17.5	22.8	37.3	35.8
S.E.	9.2	7.8	10.2	16.7	16.0
N	5	5	5	5	5

None significantly different from control group

PJTBWSUv5.16
07/15/2010

TABLE S4 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF BODY WEIGHT CHANGES [G]

		MALES				
	GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 0- 7						
	MEAN	43.	41.	37.	43.	24.**
	S.D.	6.5	3.9	5.3	11.6	11.5
	S.E.	2.9	1.7	2.4	5.2	5.1
	N	5	5	5	5	5
DAY 7- 14						
	MEAN	47.	40.	41.	40.	28.
	S.D.	5.6	6.1	6.5	10.6	17.9
	S.E.	2.5	2.7	2.9	4.7	8.0
	N	5	5	5	5	5
DAY 0- 14						
	MEAN	90.	81.	79.	83.	52.**
	S.D.	11.6	8.2	11.1	21.3	20.9
	S.E.	5.2	3.7	4.9	9.5	9.3
	N	5	5	5	5	5

** = Significantly different from the control group at 0.01 using Dunnett's test

MEAN DIFFERENCES CALCULATED FROM INDIVIDUAL DIFFERENCES

PJTBWSUv5.16
07/15/2010

TABLE S5 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FOOD CONSUMPTION [G/ANIMAL/DAY]

		MALES				
	GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 0- 7						
	MEAN	20.	20.	20.	20.	17.*
	S.D.	2.1	1.7	1.4	2.4	2.0
	S.E.	0.9	0.7	0.6	1.1	0.9
	N	5	5	5	5	5
DAY 7- 14						
	MEAN	19.	20.	18.	18.	16.
	S.D.	2.2	1.9	2.0	3.1	2.4
	S.E.	1.0	0.8	0.9	1.4	1.1
	N	5	5	5	5	5
DAY 0- 14						
	MEAN	20.	20.	19.	19.	16.
	S.D.	2.1	1.7	1.7	2.7	2.0
	S.E.	1.0	0.8	0.8	1.2	0.9
	N	5	5	5	5	5

* = Significantly different from the control group at 0.05 using Dunnett's test

PJTFWSUv5.18
07/15/2010

TABLE S6 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FOOD CONSUMPTION [G/KG/DAY]

		MALES				
GROUP:		0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 0- 7						
	MEAN	59.	60.	60.	59.	50.*
	S.D.	4.6	3.0	2.8	4.8	6.8
	S.E.	2.1	1.3	1.3	2.1	3.1
	N	5	5	5	5	5
DAY 7- 14						
	MEAN	50.	52.	49.	48.	46.
	S.D.	3.5	3.7	3.1	5.0	4.4
	S.E.	1.6	1.6	1.4	2.2	2.0
	N	5	5	5	5	5
DAY 0- 14						
	MEAN	55.	56.	54.	53.	48.
	S.D.	4.0	3.1	2.8	4.9	4.9
	S.E.	1.8	1.4	1.3	2.2	2.2
	N	5	5	5	5	5

* = Significantly different from the control group at 0.05 using Dunnett's test

PJTFWSUv5.18
07/15/2010

TABLE S7 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF MACROSCOPIC FINDINGS

SCHEDULED NECROPSY

	M A L E				
GROUP:	1	2	3	4	5
NUMBER OF ANIMALS EXAMINED	5	5	5	5	5
KIDNEYS					
-PALE	0	1	0	1	1
SKIN					
-HAIR LOSS	0	0	0	0	1
NO SIGNIFICANT CHANGES OBSERVED - ALL EXAMINED TISSUES	5	4	5	4	4

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

PGRSI2v4.08
07/16/2010

TABLE S8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF ORGAN WEIGHTS AND ORGAN WTS. RELATIVE TO BODY WTS.

	MALES				
GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
FINAL BODY WT (G)					
MEAN	406.	398.	396.	400.	369.
% DIFFERENCE		-2.0	-2.5	-1.5	-9.1
S.D.	20.7	17.4	22.8	37.1	35.7
S.E.	9.3	7.8	10.2	16.6	16.0
N	5	5	5	5	5
KIDNEYS (G)					
MEAN	3.19	3.25	3.24	3.38	3.68
% DIFFERENCE		1.9	1.6	6.0	15.4
S.D.	0.319	0.266	0.348	0.365	0.485
S.E.	0.142	0.119	0.155	0.163	0.217
N	5	5	5	5	5
KIDNEYS (G/100 G FINAL BODY WEIGHT)					
MEAN	0.786	0.817	0.820	0.845	0.999**
S.D.	0.0499	0.0768	0.0727	0.0227	0.1265
S.E.	0.0223	0.0343	0.0325	0.0101	0.0566
N	5	5	5	5	5
LIVER (G)					
MEAN	18.40	18.10	17.97	20.78	23.87**
% DIFFERENCE		-1.6	-2.3	12.9	29.7
S.D.	2.267	1.170	0.710	2.886	2.575
S.E.	1.014	0.523	0.317	1.291	1.152
N	5	5	5	5	5

** = Significantly different from the control group at 0.01 using Dunnett's test

TABLE S8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF ORGAN WEIGHTS AND ORGAN WTS. RELATIVE TO BODY WTS.

	MALES				
GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
LIVER (G/100 G FINAL BODY WEIGHT)					
MEAN	4.525	4.545	4.548	5.182**	6.465**
S.D.	0.3517	0.2271	0.1694	0.2672	0.3077
S.E.	0.1573	0.1016	0.0757	0.1195	0.1376
N	5	5	5	5	5
TESTIS, LEFT (G)					
MEAN	1.71	1.80	1.75	1.69	1.72
% DIFFERENCE		5.3	2.3	-1.2	0.6
S.D.	0.147	0.136	0.210	0.183	0.222
S.E.	0.066	0.061	0.094	0.082	0.099
N	5	5	5	5	5
TESTIS, LEFT (G/100 G FINAL BODY WEIGHT)					
MEAN	0.422	0.451	0.442	0.423	0.474
S.D.	0.0313	0.0332	0.0431	0.0298	0.0974
S.E.	0.0140	0.0149	0.0193	0.0133	0.0436
N	5	5	5	5	5
TESTIS, RIGHT (G)					
MEAN	1.74	1.83	1.71	1.71	1.75
% DIFFERENCE		5.2	-1.7	-1.7	0.6
S.D.	0.162	0.131	0.217	0.154	0.201
S.E.	0.072	0.058	0.097	0.069	0.090
N	5	5	5	5	5

** = Significantly different from the control group at 0.01 using Dunnett's test

TABLE S8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM SUMMARY OF ORGAN WEIGHTS AND ORGAN WTS. RELATIVE TO BODY WTS.

	MALES				
GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
TESTIS, RIGHT (G/100 G FINAL BODY WEIGHT)					
MEAN	0.429	0.460	0.431	0.429	0.481
S.D.	0.0401	0.0341	0.0456	0.0316	0.0886
S.E.	0.0179	0.0153	0.0204	0.0141	0.0396
N	5	5	5	5	5
THYMUS (G)					
MEAN	0.5351	0.6467	0.6290	0.6622	0.3974
% DIFFERENCE		20.9	17.5	23.8	-25.7
S.D.	0.15073	0.07683	0.13310	0.18433	0.13331
S.E.	0.06741	0.03436	0.05952	0.08244	0.05962
N	5	5	5	5	5
THYMUS (G/100 G FINAL BODY WEIGHT)					
MEAN	0.131	0.163	0.159	0.164	0.108
S.D.	0.0320	0.0267	0.0368	0.0377	0.0386
S.E.	0.0143	0.0119	0.0165	0.0169	0.0173
N	5	5	5	5	5

None significantly different from control group

POFBSTv5.20
07/16/2010

TABLE S9

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF MATERNAL SURVIVAL AND PREGNANCY STATUS

DOSE GROUP :	1		2		3		4		5	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
FEMALES ON STUDY	5		5		5		5		5	
FEMALES THAT ABORTED OR DELIVERED	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FEMALES THAT DIED	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FEMALES THAT ABORTED	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NONGRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
GRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FEMALES THAT WERE EUTHANIZED	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NONGRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
GRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FEMALES EXAMINED AT SCHEDULED NECROPSY	5	100.0	5	100.0	5	100.0	5	100.0	5	100.0
NONGRAVID	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
GRAVID	5	100.0	5	100.0	5	100.0	5	100.0	5	100.0
WITH RESORPTIONS ONLY	0	0.0	0	0.0	0	0.0	0	0.0	3	60.0
WITH VIABLE FETUSES	5	100.0	5	100.0	5	100.0	5	100.0	2	40.0
TOTAL FEMALES GRAVID	5	100.0	5	100.0	5	100.0	5	100.0	5	100.0

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

PSPSv4.01
07/15/2010

TABLE S10 (FEMALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF CLINICAL FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

----- F E M A L E -----

TABLE RANGE:	06-01-10 TO 06-24-10				
GROUP:	1	2	3	4	5
NORMAL					
-NO SIGNIFICANT CLINICAL OBSERVATIONS	99/ 5	57/ 5	53/ 3	80/ 5	35/ 5
DISPOSITION					
-SCHEDULED EUTHANASIA; GESTATION DAY 20	5/ 5	5/ 5	5/ 5	5/ 5	5/ 5
BEHAVIOR/CNS					
-HUNCHED POSTURE	0/ 0	0/ 0	0/ 0	0/ 0	2/ 1
BODY/INTEGUMENT					
-HAIR LOSS RIGHT FORELIMB	6/ 1	35/ 3	47/ 4	5/ 1	0/ 0
-HAIR LOSS LEFT FORELIMB	6/ 1	35/ 3	43/ 4	1/ 1	0/ 0
-HAIR LOSS RIGHT HINDLIMB	0/ 0	1/ 1	8/ 1	15/ 1	30/ 2
-HAIR LOSS VENTRAL ABDOMINAL AREA	0/ 0	1/ 1	19/ 2	6/ 1	32/ 3
-WET YELLOW MATERIAL ANOGENITAL AREA	0/ 0	1/ 1	1/ 1	0/ 0	6/ 2
-HAIR LOSS VENTRAL NECK	0/ 0	0/ 0	0/ 0	3/ 1	1/ 1
-WET YELLOW MATERIAL VENTRAL ABDOMINAL AREA	0/ 0	0/ 0	0/ 0	2/ 1	9/ 2
-WET YELLOW MATERIAL UROGENITAL AREA	0/ 0	1/ 1	1/ 1	3/ 1	13/ 4
-WET YELLOW MATERIAL RIGHT INGUINAL AREA	0/ 0	0/ 0	1/ 1	0/ 0	5/ 1
-WET YELLOW MATERIAL LEFT INGUINAL AREA	0/ 0	0/ 0	1/ 1	0/ 0	5/ 2
-HAIR LOSS LEFT HINDLIMB	0/ 0	6/ 1	17/ 1	3/ 2	22/ 2

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE S10 (FEMALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM SUMMARY OF CLINICAL FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

----- F E M A L E -----

TABLE RANGE:	06-01-10 TO 06-24-10				
GROUP:	1	2	3	4	5
BODY/INTEGUMENT					
-WET YELLOW MATERIAL RIGHT HINDLIMB	0/ 0	0/ 0	0/ 0	0/ 0	5/ 1
-WET YELLOW MATERIAL LEFT HINDLIMB	0/ 0	0/ 0	0/ 0	0/ 0	3/ 1
-HAIR LOSS RUMP	0/ 0	6/ 1	11/ 1	8/ 1	21/ 2
-HAIR LOSS LEFT LATERAL ABDOMINAL AREA	0/ 0	0/ 0	13/ 1	0/ 0	3/ 1
-DRIED RED MATERIAL VENTRAL ABDOMINAL AREA	0/ 0	0/ 0	0/ 0	0/ 0	9/ 1
-DRIED RED MATERIAL UROGENITAL AREA	0/ 0	0/ 0	0/ 0	0/ 0	7/ 2
-DRIED RED MATERIAL RIGHT INGUINAL AREA	0/ 0	0/ 0	0/ 0	0/ 0	1/ 1
-DRIED RED MATERIAL ANOGENITAL AREA	0/ 0	0/ 0	0/ 0	0/ 0	7/ 1
-HAIR LOSS VENTRAL THORACIC AREA	0/ 0	0/ 0	3/ 1	1/ 1	3/ 2
-SCABBING VENTRAL ABDOMINAL AREA	0/ 0	0/ 0	4/ 1	0/ 0	0/ 0
-SCABBING LEFT HINDLIMB	0/ 0	0/ 0	2/ 1	0/ 0	0/ 0
-HAIR LOSS UROGENITAL AREA	0/ 0	0/ 0	5/ 1	0/ 0	5/ 2
-HAIR LOSS BASE OF TAIL	0/ 0	0/ 0	5/ 1	5/ 1	4/ 1
-HAIR LOSS ANOGENITAL AREA	0/ 0	0/ 0	5/ 1	0/ 0	2/ 1
EYES/EARS/NOSE					
-DRIED RED MATERIAL AROUND RIGHT EYE	0/ 0	0/ 0	0/ 0	0/ 0	2/ 1
-DRIED RED MATERIAL AROUND LEFT EYE	0/ 0	0/ 0	0/ 0	0/ 0	3/ 1
-DRIED RED MATERIAL AROUND NOSE	0/ 0	0/ 0	0/ 0	1/ 1	7/ 3
EXCRETA					
-DECREASED DEFECATION	0/ 0	0/ 0	0/ 0	0/ 0	8/ 2

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

----- F E M A L E -----

TABLE RANGE:	06-01-10 TO 06-24-10				
GROUP:	1	2	3	4	5
BODY/INTEG II					
-HAIR LOSS LEFT INGUINAL AREA	0/ 0	0/ 0	7/ 1	0/ 0	3/ 2
-HAIR LOSS RIGHT INGUINAL AREA	0/ 0	0/ 0	3/ 1	5/ 1	3/ 2
ORAL/DENTAL					
-DRIED RED MATERIAL AROUND MOUTH	0/ 0	0/ 0	0/ 0	1/ 1	4/ 2
-SALIVATION	0/ 0	0/ 0	0/ 0	0/ 0	1/ 1

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE S11 (FEMALES)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF POST-DOSE FINDINGS: TOTAL OCCURRENCE/NO. OF ANIMALS

----- F E M A L E -----

TABLE RANGE: 06-02-10 TO 06-24-10 GROUP:	1	2	3	4	5
NORMAL					
1 HOUR POST-DOSING					
-NO SIGNIFICANT CLINICAL OBSERVATIONS	100/5	99/5	88/5	87/5	53/5
BEHAVIOR/CNS					
1 HOUR POST-DOSING					
-HUNCHED POSTURE	0/0	0/0	0/0	0/0	4/2
-ROCKS, LURCHES, OR SWAYS AS IT WALKS	0/0	0/0	0/0	0/0	2/2
-PROSTRATE	0/0	0/0	0/0	0/0	1/1
BODY/INTEGUMENT					
1 HOUR POST-DOSING					
-WET YELLOW MATERIAL ANOGENITAL AREA	0/0	0/0	0/0	1/1	0/0
-WET CLEAR MATERIAL RIGHT FORELIMB	0/0	0/0	1/1	0/0	6/3
-WET CLEAR MATERIAL LEFT FORELIMB	0/0	0/0	1/1	0/0	7/4
EYES/EARS/NOSE					
1 HOUR POST-DOSING					
-LACRIMATION RIGHT EYE	0/0	0/0	0/0	0/0	1/1
-LACRIMATION LEFT EYE	0/0	0/0	0/0	0/0	1/1
-DRIED RED MATERIAL AROUND NOSE	0/0	0/0	0/0	0/0	1/1
-WET CLEAR MATERIAL AROUND NOSE	0/0	0/0	2/2	4/3	4/3
BODY/INTEG II					
1 HOUR POST-DOSING					
-WET CLEAR MATERIAL VENTRAL NECK	0/0	0/0	1/1	2/2	2/1

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

----- F E M A L E -----

TABLE RANGE: 06-02-10 TO 06-24-10 GROUP:	1	2	3	4	5
ORAL/DENTAL					
TIME OF DOSE					
-SALIVATION PRIOR TO DOSING	0/0	0/0	0/0	0/0	6/2
1 HOUR POST-DOSING					
-WET CLEAR MATERIAL AROUND MOUTH	0/0	0/0	12/4	11/3	26/5
-DRIED RED MATERIAL AROUND MOUTH	0/0	1/1	0/0	1/1	9/4
-DRIED CLEAR MATERIAL AROUND MOUTH	0/0	0/0	0/0	1/1	5/3
-WET RED MATERIAL AROUND MOUTH	0/0	0/0	0/0	0/0	2/2
-SALIVATION	0/0	0/0	0/0	0/0	2/1

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE S12

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF BODY WEIGHTS DURING GESTATION [G]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 0					
MEAN	253.	248.	262.	256.	260.
% DIFFERENCE		-2.0	3.6	1.2	2.8
S.D.	9.8	13.4	19.0	21.1	15.5
S.E.	4.4	6.0	8.5	9.4	6.9
N	5	5	5	5	5
DAY 6					
MEAN	272.	267.	281.	268.	257.
% DIFFERENCE		-1.8	3.3	-1.5	-5.5
S.D.	13.2	14.6	22.4	23.4	23.5
S.E.	5.9	6.5	10.0	10.5	10.5
N	5	5	5	5	5
DAY 7					
MEAN	275.	269.	284.	272.	264.
% DIFFERENCE		-2.2	3.3	-1.1	-4.0
S.D.	10.8	13.6	15.8	19.6	23.0
S.E.	4.8	6.1	7.0	8.8	10.3
N	5	5	5	5	5
DAY 10					
MEAN	287.	285.	298.	290.	278.
% DIFFERENCE		-0.7	3.8	1.0	-3.1
S.D.	9.6	15.7	18.2	16.7	18.3
S.E.	4.3	7.0	8.1	7.5	8.2
N	5	5	5	5	5
DAY 14					
MEAN	303.	303.	314.	304.	290.
% DIFFERENCE		0.0	3.6	0.3	-4.3
S.D.	13.3	15.6	17.2	21.0	29.1
S.E.	5.9	7.0	7.7	9.4	13.0
N	5	5	5	5	5

None significantly different from control group

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE S12

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF BODY WEIGHTS DURING GESTATION [G]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 17					
MEAN	338.	339.	347.	335.	304.
% DIFFERENCE		0.3	2.7	-0.9	-10.1
S.D.	16.9	21.5	24.9	23.9	19.4
S.E.	7.6	9.6	11.1	10.7	8.7
N	5	5	5	5	5
DAY 20					
MEAN	379.	385.	392.	373.	320.**
% DIFFERENCE		1.6	3.4	-1.6	-15.6
S.D.	20.6	24.9	29.5	26.3	31.5
S.E.	9.2	11.1	13.2	11.7	14.1
N	5	5	5	5	5

** = Significantly different from the control group at 0.01 using Dunnett's test

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

PGBWSUv5.10
07/15/2010

TABLE S13

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF BODY WEIGHT CHANGES DURING GESTATION [G]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 0- 6					
MEAN	18.	19.	19.	12.	-2.
S.D.	4.7	8.8	17.2	3.0	20.0
S.E.	2.1	4.0	7.7	1.3	8.9
N	5	5	5	5	5
DAY 6- 7					
MEAN	3.	2.	4.	4.	7.
S.D.	4.4	5.6	8.2	7.7	10.1
S.E.	2.0	2.5	3.7	3.4	4.5
N	5	5	5	5	5
DAY 7- 10					
MEAN	12.	17.	13.	18.	14.
S.D.	8.3	5.4	7.1	5.2	7.1
S.E.	3.7	2.4	3.2	2.3	3.2
N	5	5	5	5	5
DAY 10- 14					
MEAN	16.	17.	16.	15.	12.
S.D.	7.5	4.9	5.9	8.4	12.0
S.E.	3.4	2.2	2.7	3.8	5.4
N	5	5	5	5	5
DAY 14- 17					
MEAN	34.	37.	33.	31.	14.
S.D.	6.1	10.5	9.3	12.1	19.4
S.E.	2.7	4.7	4.2	5.4	8.7
N	5	5	5	5	5

None significantly different from control group
MEAN DIFFERENCES CALCULATED FROM INDIVIDUAL DIFFERENCES
NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE S13

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF BODY WEIGHT CHANGES DURING GESTATION [G]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 17- 20					
MEAN	41.	46.	46.	38.	16.**
S.D.	6.0	8.9	9.2	6.8	18.0
S.E.	2.7	4.0	4.1	3.0	8.1
N	5	5	5	5	5
DAY 0- 20					
MEAN	126.	137.	131.	117.	60.**
S.D.	15.2	17.3	23.7	11.4	36.2
S.E.	6.8	7.7	10.6	5.1	16.2
N	5	5	5	5	5

** = Significantly different from the control group at 0.01 using Dunnett's test
MEAN DIFFERENCES CALCULATED FROM INDIVIDUAL DIFFERENCES
NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

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07/15/2010

TABLE S14

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
INITIAL BODY WT.					
MEAN	253.	248.	262.	256.	260.
S.D.	9.8	13.4	19.0	21.1	15.5
S.E.	4.4	6.0	8.5	9.4	6.9
N	5	5	5	5	5
TERMINAL BODY WT.					
MEAN	379.	385.	392.	373.	320.**
S.D.	20.6	24.9	29.5	26.3	31.5
S.E.	9.2	11.1	13.2	11.7	14.1
N	5	5	5	5	5
GRAVID UTERINE WT.					
MEAN	74.7	78.6	82.4	74.7	28.1**
S.D.	7.61	8.55	11.00	9.23	35.71
S.E.	3.40	3.82	4.92	4.13	15.97
N	5	5	5	5	5
NET BODY WT.					
MEAN	304.1	306.6	310.0	298.5	291.5
S.D.	20.15	20.32	18.63	20.48	19.72
S.E.	9.01	9.09	8.33	9.16	8.82
N	5	5	5	5	5
NET BODY WT. CHANGE					
MEAN	50.9	58.2	48.4	42.1	31.9
S.D.	12.89	15.93	16.87	8.61	8.90
S.E.	5.77	7.13	7.54	3.85	3.98
N	5	5	5	5	5

** = Significantly different from the control group at 0.01 using Dunnett's test

PUTSUv5.07
07/15/2010

TABLE S15

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 0- 6					
MEAN	14.	14.	14.	12.	9.*
S.D.	2.1	2.2	2.6	1.9	3.2
S.E.	0.9	1.0	1.2	0.9	1.4
N	5	5	5	5	5
DAY 6- 7					
MEAN	14.	14.	14.	14.	12.
S.D.	1.8	6.2	2.3	2.9	3.9
S.E.	0.8	2.8	1.0	1.3	1.7
N	5	5	5	5	5
DAY 7- 10					
MEAN	13.	16.	15.	15.	15.
S.D.	1.5	1.3	1.9	0.8	2.9
S.E.	0.7	0.6	0.9	0.4	1.3
N	5	5	5	5	5
DAY 10- 14					
MEAN	14.	17.	15.	14.	14.
S.D.	2.9	0.5	1.9	2.3	2.9
S.E.	1.3	0.2	0.8	1.0	1.5
N	5	5	5	5	4
DAY 14- 17					
MEAN	18.	18.	18.	17.	16.
S.D.	2.2	2.5	2.4	3.2	1.5
S.E.	1.0	1.1	1.1	1.4	0.7
N	5	5	5	5	5

* = Significantly different from the control group at 0.05 using Dunnett's test

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE S15

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 17- 20					
MEAN	18.	20.	18.	15.	16.
S.D.	2.9	1.5	2.6	1.8	2.6
S.E.	1.3	0.7	1.2	0.8	1.3
N	5	5	5	5	4
DAY 0- 20					
MEAN	15.	17.	16.	14.	14.
S.D.	1.5	1.1	1.8	1.3	1.0
S.E.	0.7	0.5	0.8	0.6	0.5
N	5	5	5	5	4

None significantly different from control group
NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE S16

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 0- 6					
MEAN	51.	54.	53.	45.	35.*
S.D.	6.3	7.3	7.3	4.2	11.0
S.E.	2.8	3.3	3.3	1.9	4.9
N	5	5	5	5	5
DAY 6- 7					
MEAN	50.	53.	51.	54.	45.
S.D.	7.7	22.3	9.8	12.1	11.6
S.E.	3.4	10.0	4.4	5.4	5.2
N	5	5	5	5	5
DAY 7- 10					
MEAN	46.	56.	51.	53.	57.
S.D.	5.4	2.9	6.5	5.3	12.3
S.E.	2.4	1.3	2.9	2.4	5.5
N	5	5	5	5	5
DAY 10- 14					
MEAN	49.	57.	49.	48.	50.
S.D.	8.9	3.9	4.4	6.7	6.0
S.E.	4.0	1.7	2.0	3.0	3.0
N	5	5	5	5	4
DAY 14- 17					
MEAN	55.	57.	54.	53.	54.
S.D.	4.8	6.8	4.3	9.3	9.4
S.E.	2.1	3.0	1.9	4.2	4.2
N	5	5	5	5	5

* = Significantly different from the control group at 0.05 using Dunnett's test

NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
DAY 17- 20					
MEAN	49.	56.	47.	43.	50.
S.D.	6.2	3.3	5.0	4.2	5.9
S.E.	2.8	1.5	2.2	1.9	2.9
N	5	5	5	5	4
DAY 0- 20					
MEAN	49.	55.*	50.	47.	48.
S.D.	3.6	3.2	3.1	3.5	2.5
S.E.	1.6	1.4	1.4	1.6	1.3
N	5	5	5	5	4

* = Significantly different from the control group at 0.05 using Dunnett's test
NONGRAVID WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE S17

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF MATERNAL MACROSCOPIC FINDINGS

GROUP :	1	2	3	4	5
NUMBER EXAMINED	5	5	5	5	5
NO SIGNIFICANT CHANGES OBSERVED	5	5	5	5	3
GRAVID -- AMMONIUM SULFIDE POSITIVE	0	0	0	0	2

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

PMGSIv4.04
07/15/2010

TABLE S18

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF ORGAN WEIGHTS AND ORGAN WTS. RELATIVE TO BODY WTS.

FEMALES

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
FINAL BODY WT (G)					
MEAN	379.	385.	392.	373.	320.**
% DIFFERENCE		1.6	3.4	-1.6	-15.6
S.D.	20.6	24.9	29.5	26.3	31.5
S.E.	9.2	11.1	13.2	11.7	14.1
N	5	5	5	5	5
KIDNEYS (G)					
MEAN	1.84	1.97	1.87	1.96	2.09
% DIFFERENCE		7.1	1.6	6.5	13.6
S.D.	0.200	0.189	0.194	0.168	0.214
S.E.	0.090	0.085	0.087	0.075	0.096
N	5	5	5	5	5
KIDNEYS (G/100 G FINAL BODY WEIGHT)					
MEAN	0.484	0.511	0.475	0.525	0.661**
S.D.	0.0287	0.0319	0.0262	0.0216	0.1082
S.E.	0.0128	0.0143	0.0117	0.0097	0.0484
N	5	5	5	5	5
LIVER (G)					
MEAN	14.82	15.49	16.18	16.01	20.11**
% DIFFERENCE		4.5	9.2	8.0	35.7
S.D.	1.446	1.206	1.266	1.111	1.039
S.E.	0.646	0.539	0.566	0.497	0.465
N	5	5	5	5	5

** = Significantly different from the control group at 0.01 using Dunnett's test

NONGRAVID WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE S18

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM SUMMARY OF ORGAN WEIGHTS AND ORGAN WTS. RELATIVE TO BODY WTS.

	FEMALES				
GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
LIVER (G/100 G FINAL BODY WEIGHT)					
MEAN	3.906	4.020	4.123	4.290	6.328**
S.D.	0.2509	0.1504	0.0887	0.1202	0.5218
S.E.	0.1122	0.0673	0.0397	0.0537	0.2334
N	5	5	5	5	5
OVARY/OD, LEFT (G)					
MEAN	0.0688	0.0727	0.0745	0.0840	0.0625
% DIFFERENCE		5.7	8.3	22.1	-9.2
S.D.	0.01146	0.01345	0.00733	0.01814	0.01102
S.E.	0.00512	0.00601	0.00328	0.00811	0.00493
N	5	5	5	5	5
OVARY/OD, LEFT (G/100 G FINAL BODY WEIGHT)					
MEAN	0.018	0.019	0.019	0.022	0.020
S.D.	0.0022	0.0030	0.0008	0.0037	0.0041
S.E.	0.0010	0.0014	0.0004	0.0016	0.0018
N	5	5	5	5	5
OVARY/OD, RIGHT (G)					
MEAN	0.0839	0.0802	0.0891	0.0753	0.0619
% DIFFERENCE		-4.4	6.2	-10.3	-26.2
S.D.	0.01361	0.00701	0.01790	0.01514	0.01197
S.E.	0.00609	0.00313	0.00800	0.00677	0.00535
N	5	5	5	5	5

** = Significantly different from the control group at 0.01 using Dunnett's test

NONGRAVID WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE S18

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM SUMMARY OF ORGAN WEIGHTS AND ORGAN WTS. RELATIVE TO BODY WTS.

	FEMALES				
GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
OVARY/OD, RIGHT (G/100 G FINAL BODY WEIGHT)					
MEAN	0.022	0.021	0.023	0.020	0.019
S.D.	0.0031	0.0022	0.0034	0.0033	0.0029
S.E.	0.0014	0.0010	0.0015	0.0015	0.0013
N	5	5	5	5	5
THYMUS (G)					
MEAN	0.2481	0.2646	0.2890	0.2550	0.1944
% DIFFERENCE		6.7	16.5	2.8	-21.6
S.D.	0.04853	0.04155	0.06621	0.05381	0.08086
S.E.	0.02170	0.01858	0.02961	0.02407	0.03616
N	5	5	5	5	5
THYMUS (G/100 G FINAL BODY WEIGHT)					
MEAN	0.066	0.068	0.074	0.068	0.063
S.D.	0.0140	0.0077	0.0171	0.0108	0.0286
S.E.	0.0062	0.0034	0.0076	0.0048	0.0128
N	5	5	5	5	5

None significantly different from control group

NONGRAVID WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

POFBSTv5.20
07/16/2010

TABLE S19

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FETAL DATA AT SCHEDULED NECROPSY

GROUP	SEX M	SEX F	VIABLE FETUSES	DEAD FETUSES	RESORPTIONS EARLY	RESORPTIONS LATE	POST IMPLANTATION LOSS	IMPLANTATION SITES	CORPORA LUTEA	PRE IMPLANTATION LOSS	FETAL WEIGHTS IN GRAMS	NO. OF GRAVID FEMALES
1 TOTAL	39	28	67	0	3	0	3	70	82	12	NA	5
MEAN	7.8	5.6	13.4	0.0	0.6	0.0	0.6	14.0	16.4	2.4	3.8	
S.D.	1.64	1.67	2.07	0.00	0.89	0.00	0.89	1.41	5.98	4.83	0.18	
S.E.	0.73	0.75	0.93	0.00	0.40	0.00	0.40	0.63	2.68	2.16	0.08	
2 TOTAL	30	43	73	0	3	0	3	76	82	6	NA	5
MEAN	6.0	8.6	14.6	0.0	0.6	0.0	0.6	15.2	16.4	1.2	3.6	
S.D.	2.24	2.30	2.19	0.00	0.55	0.00	0.55	2.39	3.65	1.30	0.27	
S.E.	1.00	1.03	0.98	0.00	0.24	0.00	0.24	1.07	1.63	0.58	0.12	
3 TOTAL	37	37	74	0	6	0	6	80	87	7	NA	5
MEAN	7.4	7.4	14.8	0.0	1.2	0.0	1.2	16.0	17.4	1.4	3.7	
S.D.	2.51	3.13	1.92	0.00	0.84	0.00	0.84	2.55	2.30	1.34	0.27	
S.E.	1.12	1.40	0.86	0.00	0.37	0.00	0.37	1.14	1.03	0.60	0.12	
4 TOTAL	40	29	69	0	2	0	2	71	75	4	NA	5
MEAN	8.0	5.8	13.8	0.0	0.4	0.0	0.4	14.2	15.0	0.8	3.8	
S.D.	2.35	1.48	2.39	0.00	0.55	0.00	0.55	1.92	1.87	0.84	0.31	
S.E.	1.05	0.66	1.07	0.00	0.24	0.00	0.24	0.86	0.84	0.37	0.14	
5 TOTAL	13	13	26	2	11	0	13	39	60	21	NA	5
MEAN	2.6	2.6	5.2**	0.4	2.2	0.0	2.6	7.8*	12.0	4.2	3.5	
S.D.	3.58	3.71	7.16	0.89	2.59	0.00	2.51	4.87	3.39	4.44	0.21	
S.E.	1.60	1.66	3.20	0.40	1.16	0.00	1.12	2.18	1.52	1.98	0.15	

* = Significantly different from the control group at 0.05

** = Significantly different from the control group at 0.01

NA = NOT APPLICABLE

MEAN NUMBER OF VIABLE FETUSES, MEAN NUMBER OF IMPLANTATION SITES, MEAN NUMBER OF CORPORA LUTEA, FETAL WEIGHTS COMPARED USING DUNNETT'S TEST

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

PLSUv5.12
07/15/2010

TABLE S20

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
CORPORA LUTEA					
MEAN	16.4	16.4	17.4	15.0	12.0
S.D.	5.98	3.65	2.30	1.87	3.39
S.E.	2.68	1.63	1.03	0.84	1.52
N	5	5	5	5	5
IMPLANTATION SITES					
MEAN	14.0	15.2	16.0	14.2	7.8*
S.D.	1.41	2.39	2.55	1.92	4.87
S.E.	0.63	1.07	1.14	0.86	2.18
N	5	5	5	5	5
VIABLE FETUSES (%)					
MEAN	95.4	96.2	93.0	96.8	40.0
S.D.	6.89	3.61	4.83	4.49	54.77
S.E.	3.08	1.61	2.16	2.01	24.49
N	5	5	5	5	5
DEAD FETUSES (%)					
MEAN	0.0	0.0	0.0	0.0	13.3
S.D.	0.00	0.00	0.00	0.00	29.83
S.E.	0.00	0.00	0.00	0.00	13.34
N	5	5	5	5	5
EARLY RESORPTIONS (%)					
MEAN	4.6	3.9	7.0	3.2	46.7
S.D.	6.89	3.63	4.83	4.49	50.55
S.E.	3.08	1.62	2.16	2.01	22.61
N	5	5	5	5	5

PROPORTIONAL (%) DATA COMPARED USING DUNN'S TEST
CORPORA LUTEA AND IMPLANTATION SITES COMPARED USING DUNNETT'S TEST
MODIFIED STATISTICS USED. * INDICATES PARAMETRIC ANALYSIS AND + INDICATES NON-PARAMETRIC ANALYSIS.
* = Significantly different from the control group at 0.05

TABLE S20

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
LATE RESORPTIONS (%)					
MEAN	0.0	0.0	0.0	0.0	0.0
S.D.	0.00	0.00	0.00	0.00	0.00
S.E.	0.00	0.00	0.00	0.00	0.00
N	5	5	5	5	5
TOTAL RESORPTIONS (%)					
MEAN	4.6	3.9	7.0	3.2	46.7
S.D.	6.89	3.63	4.83	4.49	50.55
S.E.	3.08	1.62	2.16	2.01	22.61
N	5	5	5	5	5
PRE-IMPLANTATION LOSS (%)					
MEAN	9.6	6.3	8.1	5.3	36.1
S.D.	17.68	6.24	8.42	5.42	32.08
S.E.	7.91	2.79	3.77	2.42	14.35
N	5	5	5	5	5
POST-IMPLANTATION LOSS (%)					
MEAN	4.6	3.9	7.0	3.2	60.0
S.D.	6.89	3.63	4.83	4.49	54.77
S.E.	3.08	1.62	2.16	2.01	24.49
N	5	5	5	5	5
MALES (%)					
MEAN	58.3	41.1	50.8	57.5	50.6
S.D.	10.32	13.34	18.62	11.00	10.94
S.E.	4.62	5.97	8.33	4.92	7.74
N	5	5	5	5	2

PROPORTIONAL (%) DATA COMPARED USING DUNN'S TEST
MODIFIED STATISTICS USED. * INDICATES PARAMETRIC ANALYSIS AND + INDICATES NON-PARAMETRIC ANALYSIS.
None significantly different from control group

TABLE S20

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

GROUP:	0 MG/KG/DAY	30 MG/KG/DAY	100 MG/KG/DAY	300 MG/KG/DAY	1000 MG/KG/DAY
FEMALES (%)					
MEAN	41.7	58.9	49.2	42.5	49.4
S.D.	10.32	13.34	18.62	11.00	10.94
S.E.	4.62	5.97	8.33	4.92	7.74
N	5	5	5	5	2
MALE FETAL WEIGHTS (g)					
MEAN	3.9	3.7	3.8	3.9	3.6
% DIFFERENCE		-5.1	-2.6	0.0	-7.7
S.D.	0.24	0.27	0.26	0.33	0.14
S.E.	0.11	0.12	0.12	0.15	0.10
N	5	5	5	5	2
FEMALE FETAL WEIGHTS (g)					
MEAN	3.6	3.6	3.6	3.6	3.3
% DIFFERENCE		0.0	0.0	0.0	-8.3
S.D.	0.15	0.29	0.33	0.28	0.14
S.E.	0.07	0.13	0.15	0.12	0.10
N	5	5	5	5	2
COMBINED FETAL WEIGHTS (g)					
MEAN	3.8	3.6	3.7	3.8	3.5
% DIFFERENCE		-5.3	-2.6	0.0	-7.9
S.D.	0.18	0.27	0.27	0.31	0.21
S.E.	0.08	0.12	0.12	0.14	0.15
N	5	5	5	5	2

PROPORTIONAL (%) DATA COMPARED USING DUNN'S TEST
FETAL WEIGHTS COMPARED USING DUNNETT'S TEST
MODIFIED STATISTICS USED. * INDICATES PARAMETRIC ANALYSIS AND + INDICATES NON-PARAMETRIC ANALYSIS.
None significantly different from control group

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TABLE S21

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FETUSES AND LITTERS WITH MALFORMATIONS [ABSOLUTE NO.]

DAY 20

	FETUSES					LITTERS				
DOSE GROUP:	1	2	3	4	5	1	2	3	4	5
NUMBER EXAMINED EXTERNALLY	67	73	74	69	26	5	5	5	5	2
OMPHALOCELE	0	1	0	0	0	0	1	0	0	0
TOTAL NUMBER WITH MALFORMATIONS										
EXTERNAL :	0	1	0	0	0	0	1	0	0	0

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

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07/15/2010

TABLE S22

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM SUMMARY OF FETUSES AND LITTERS WITH VARIATIONS [ABSOLUTE NO.]

DAY 20

	FETUSES					LITTERS				
DOSE GROUP:	1	2	3	4	5	1	2	3	4	5
NUMBER EXAMINED EXTERNALLY	67	73	74	69	26	5	5	5	5	2
NUMBER WITH FINDINGS	0	0	0	0	0	0	0	0	0	0

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

PMALv5.08
07/15/2010

APPENDIX A

Study Protocol

PROTOCOL

AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Submitted To:

American Petroleum Institute
1220 L Street, NW
Washington, DC 20005

WIL Research Laboratories, LLC
1407 George Road
Ashland, OH 44805-8946

1 OBJECTIVE:

To determine dose levels of the test substance to be evaluated in a potential combined repeated dose toxicity study with the reproduction/developmental toxicity screening test (OECD 422) in rats.

This study will be conducted in compliance with the EPA/TSCA (40 CFR 792) and OECD [C(97) 186/Final] Principles of Good Laboratory Practice.

2 PERSONNEL INVOLVED IN THE STUDY:

2.1 Sponsor Representative:

[redacted]
American Petroleum Institute
1220 L Street, NW
Washington, DC 20005
Tel: (202) 682-8333
Email: [redacted]

2.2 WIL Study Director:

[redacted]
Staff Toxicologist, Developmental and
Reproductive Toxicology
Tel: (419) 289-8700
Fax: (419) 289-3650
Email: [redacted]

2.3 WIL Departmental Responsibilities:

[redacted]
Director, Developmental and
Reproductive Toxicology
Emergency Contact
Tel: (419) 289-8700
Fax: (419) 289-3650
Email: [redacted]

[redacted]
President and Chief Operating Officer

[redacted]
Assistant Director, Developmental and
Reproductive Toxicology

[redacted]
Director, Pathology

[redacted]
Assistant Director, Neurosciences

[redacted]
Director, Metabolism and Analytical Chemistry

[redacted]
Clinical Veterinarian,
Head of Surgery and Experimental Medicine

[redacted]
Director, Informational Systems

[redacted]
Manager, Gross Pathology and
Developmental Toxicology Laboratory

[redacted]
Manager, Quality Assurance

[redacted]
Operations Manager, Developmental and
Reproductive Toxicology and the Formulations Laboratory

[redacted]
Manager, Reporting and Regulatory
Technical Services

3 STUDY SCHEDULE:

Proposed Experimental Starting (Animal Receipt) Date:	May 18, 2010
Proposed Experimental Start (First Day of Dosing) Date:	June 2, 2010
Proposed Last Day of Dosing (Males)	June 15, 2010
Proposed Last Day of Dosing (Females)	June 25, 2010
Proposed Experimental Completion/Termination Date:	June 25, 2010
Proposed Audited Report Date:	August 20, 2010

4 TEST SUBSTANCE DATA:

4.1 Test Substance Shipment:

Test substance and applicable documentation, including a Certificate of Analysis, will be shipped under Sponsor's responsibility to:

Formulations Laboratory (WIL-402010, [redacted])
Attn: [redacted]
WIL Research Laboratories, LLC
1407 George Road
Ashland, Ohio 44805-8946

4.2 Identification:

Naphthenic Acid.

4.3 Lot Number:

CP006002

4.4 Expiration/Retest Date:

Test substance will be characterized prior to and following use for dose administration.

4.5 Purity:

100%

4.6 Storage Conditions:

Room temperature.

4.7 Stability:

The test substance is considered to be stable under the storage conditions provided by the Sponsor.

4.8 Physical Description:

To be documented by WIL Research Laboratories, LLC.

4.9 Reserve Samples:

Reserve samples of the test substance will be taken in accordance with WIL Standard Operating Procedures and stored in the Archives at WIL Research Laboratories, LLC indefinitely, unless otherwise specified.

4.10 Personnel Safety Data:

Included in the study records. It is the responsibility of the Sponsor to notify the testing facility of any special handling requirements for the test substance. A Material Safety Data Sheet (MSDS) should accompany the test substance upon arrival at the laboratory.

4.11 Test Substance Disposition:

With the exception of the reserve sample for each batch of test substance, all neat test substance remaining at study completion will be returned to the Sponsor. Alternatively, the test substance can be retained for subsequent studies.

5 TEST SYSTEM:

5.1 Species:

Rat

5.2 Breed/Strain:

Sprague-Dawley Crl:CD(SD)

5.3 Source:

Charles River Laboratories, Inc.
(Facility to be included in study records)

5.4 Number of Animals:

25 Males and 25 Females (maximum of 30 Males and 32 Females purchased). Non-litter mates will be purchased. Animals not assigned to study will be transferred to the stock animal colony or will be euthanized by carbon dioxide inhalation and the carcasses discarded.

This is the minimum number of animals to allow for meaningful extrapolation to the definitive toxicity study.

5.5 Body Weight Range:

Males: 250-375 g at randomization.
Females: minimum of 220g at initiation of breeding

5.6 Approximate Age:

Males: 57-65 days at randomization
Females: 80 to 120 days at the initiation of breeding

5.7 Identification System:

The animals will be uniquely identified by a Monel® metal ear tag displaying the animal number. Individual cage cards will be affixed to each cage and will display the animal number, group number, study number, dosage level and sex of the animal.

5.8 Justification for Selection:

This species and strain of animal is recognized as appropriate for reproduction studies. WIL Research Laboratories, LLC has reproductive historical control data in the Crl:CD(SD) rat. This animal model has been proven to be susceptible to the effects of reproductive toxicants.

6 SPECIFIC MAINTENANCE SCHEDULE:

6.1 Animal Housing:

The animals will be individually housed (except during mating) in clean suspended wire-mesh cages in an environmentally controlled room during the

study. The cages will be elevated above cage-board or other suitable material, which will be changed at least three times each week. The cages will be subjected to routine cleaning at a frequency consistent with maintaining good animal health and WIL Standard Operating Procedures. The facilities at WIL Research Laboratories, LLC are accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International).

6.2 Environmental Conditions:

Controls will be set to maintain temperature at 71 ± 5°F (22 ± 3°C) and relative humidity at 50 ± 20%. Temperature and relative humidity will be monitored continuously. Data for these two parameters will be scheduled for automatic collection on an hourly basis. Fluorescent lighting controlled by light timers will provide illumination for a 12-hour light/dark photoperiod. The ventilation rate will be set at a minimum of 10 room air changes per hour, 100% fresh air.

6.3 Drinking Water:

Reverse osmosis-purified water will be available *ad libitum*. Filters servicing the automatic watering system are changed regularly according to WIL Standard Operating Procedures. The municipal water supplying the laboratory is analyzed on a routine basis according to WIL Standard Operating Procedures to ensure that contaminants are not present in concentrations that would be expected to affect the outcome of the study.

6.4 Basal Diet:

PMI Nutrition International, LLC Certified Rodent LabDiet® 5002 will be offered *ad libitum* during the study. Periodic analyses of the certified feed are performed by the manufacturer to ensure that heavy metals and pesticides are not present at concentrations that would be expected to affect the outcome of the study. Results of the analyses are provided to WIL Research Laboratories, LLC by the manufacturer. Feeders will be changed and sanitized once per week.

7 EXPERIMENTAL DESIGN:

7.1 Animal Receipt and Quarantine:

Each animal will be inspected by a qualified technician upon receipt. Rats judged to be in good health and suitable as test animals will be immediately placed in quarantine for a minimum of 10 days. All rats will be initially weighed, permanently identified with a metal ear tag and receive a clinical observation. During the quarantine period, each rat will be observed twice daily

for changes in general appearance and behavior. Prior to the start of the in-life phase, those animals judged to be suitable test subjects will be identified.

7.2 Breeding Procedure:

At the conclusion of the quarantine period, female rats judged to be suitable test subjects and meeting acceptable body weight requirements will be cohabitated with untreated resident male rats (1:1) of the same strain and source in a suspended wire-mesh cage for mating. Detection of mating will be confirmed by evidence of a vaginal copulatory plug in the vagina or by a vaginal lavage for sperm. After confirmation of mating, the female will be returned to an individual suspended wire-mesh cage (assigned to a group), and the day will be designated as day 0 of gestation. Main study males will not be mated.

7.3 Randomization:

The mated females will be assigned to groups using a WIL Toxicology Data Management System (WTDMS™) computer program which assigns animals based on stratification of the gestation day 0 body weights into a block design to one control group and four test substance groups of five rats each.

At the conclusion of the male quarantine period, males judged to be suitable test subjects and meeting acceptable body weight requirements will be assigned to the study at random using a computer program. At that time, the animal numbers and corresponding body weights will be entered into the WIL Toxicology Data Management System (WTDMS™). A printout containing the animal numbers and individual group assignments will be generated based on body weight stratification into a block design. The animals will then be arranged into the groups according to the printout. The control group and four test substance groups will consist of 5 males each.

Any animal assigned to the study that is found dead, euthanized *in extremis* or exhibits abnormal clinical signs, reduced food consumption or body weight losses prior to the start of dosing may be replaced by an animal of appropriate age, when possible. Replacement animals will be arbitrarily assigned (not computer randomized) to the study based on comparable body weights (if possible) with respect to the animal that was replaced.

7.4 Route and Rationale of Test Substance Administration:

The route of administration will be oral (gavage) since this is a potential route of exposure for humans. Historically, this route has been used extensively for studies of this nature. Appropriately sized flexible, Teflon®-shafted, stainless steel ball-tipped dosing cannulae will be used for the oral administration by gavage.

7.5 Organization of Test Groups, Dosage Levels and Treatment Regimen:

7.5.1 Organization of Test Groups:

The dosage levels will be determined from results of previous studies and will be provided by the Sponsor Representative after consultation with the WIL Study Director.

The following table presents the study group arrangement.

Group Number	Test Substance	Dosage Level (mg/kg/day)	Dosage Concentration (mg/mL)	Dosage Volume (mL/kg)	Number of Animals	
					Male	Female
1	Vehicle Control	0	0	10	5	5
2	Naphthenic Acid	30	3	10	5	5
3	Naphthenic Acid	100	10	10	5	5
4	Naphthenic Acid	300	30	10	5	5
5	Naphthenic Acid	1000	100	10	5	5

7.5.2 Vehicle Control Substance:

Corn oil.

7.5.3 Treatment Regimen:

All rats will be dosed at approximately the same time each day.

7.5.3.1 Males:

The test and control substances will be administered as a single daily dose from study day 0 until study day 13, inclusively.

7.5.3.2 Females:

The test and control substances will be administered as a single daily dose from gestation day 1 through 20, inclusively.

7.5.4 Adjustment of Doses:

Individual dosages will be calculated based on the most recent body weight to provide the proper mg/kg/day dosage.

7.6 Test Substance Characterization:

A sample of the test substance will be collected prior to and following use for test substance administration and characterized by the WIL Research Analytical Chemistry department according the method provided by the sponsor.

7.7 Preparation and Analysis of Test Substance Formulations:

7.7.1 Method and Frequency of Preparation:

Based on the physical characteristics of the test substance, appropriate methods will be used to ensure the best possible formulations of the test substance in the vehicle. Dosing formulations will be stored at room temperature for a period not to exceed established stability. The Study Director or designee will visually inspect the formulations prior to initiation of dosing. This visual inspection will be performed to ensure that the formulations are visibly homogeneous and acceptable for dosing. Any special procedures required for formulation will be documented according to Good Laboratory Practices and presented in the final report of this study. Test substance formulations will normally be prepared approximately weekly and divided into aliquots for daily dispensation. The test substance and vehicle formulations will be stirred continuously during dosing. Frequency of formulation may be adjusted based on stability results.

7.7.2 Homogeneity and Stability of Test Substance Formulations:

Analyses to demonstrate the stability of the test substance formulations and, for suspensions, the homogeneity of the test substance formulations will be conducted before the initiation of dosing, if possible, at concentrations spanning the range of concentrations to be used on the study.

For stability assessments, test substance formulations will be prepared, stored at room temperature and sampled over a minimum of 10 days. The samples will be analyzed to evaluate stability. Additional aspects of stability (e.g., stability of frozen samples) may also be investigated.

For homogeneity assessments, test substance formulations of sufficient volume for dosing a group of animals for up to one week (length dependent on stability results) will be prepared. Samples will be collected from the top, middle and bottom of the formulations and the samples analyzed to assess the homogeneity of the test substance in the mixtures. If aliquots of the test substance formulations will be stored prior to use, a volume of formulation similar in size to the amount

needed for one day will be stored under suitable conditions for the maximum length of time acceptable. After remixing for a minimum of 30 minutes using a magnetic stirrer, samples will be collected from the top and bottom of the formulations and analyzed to assess the homogeneity after storage and resuspension. Homogeneity assessments will not be performed for test substance formulations that are solutions provided that the Sponsor provides pertinent solubility data. Any back-up samples kept at WIL Research Laboratories, LLC will be discarded after the study director's approval of the analytical results.

7.7.3 Concentration Analysis:

Samples will be taken from the middle of the first and last dosing formulation prepared during the in-life phase of the study. These samples will be analyzed to verify the concentration of the test substance in the dosing formulations. Any back-up samples kept at WIL Research Laboratories, LLC will be discarded after the study director's approval of the analytical results.

7.8 General Observations During the Experimental Period:

7.8.1 Appearance and Behavior:

Each animal will be observed twice daily for moribundity and mortality, once in the morning and once in the afternoon, for the duration of the study. Clinical observations will be recorded daily. Mortality and all signs of overt toxicity will be recorded on the day observed. The observations shall include, but are not limited to, evaluation for changes in appearance of skin and fur, eyes, mucous membranes, respiratory and circulatory systems, autonomic and central nervous systems, somatomotor activity and behavior. All animals will also be observed on the day of necropsy and any findings will be recorded.

During the treatment period, each animal will be observed at approximately one hour following each dose administration for findings that are potentially related to treatment or that might change before the next scheduled observation. Additional post-dosing observation periods may be necessary and will be documented in the study records.

7.8.2 Body Weights and Food Consumption:

7.8.2.1 Males:

Individual body weights and food consumption will be recorded weekly.

7.8.2.2 Females:

Individual body weights and food consumption will be recorded on gestation days 0, 6, 7, 10, 14, 17, and 20.

7.8.3 Deaths and Animals Euthanized *in Extremis*:

Males not surviving until the scheduled euthanasia will be necropsied, and the cause of death will be recorded, if possible. Animals not expected to survive to the next observation period (moribund) will be euthanized by carbon dioxide inhalation. The cranial, thoracic, abdominal and pelvic cavities will be opened and the contents examined. Tissues will be preserved in 10% neutral-buffered formalin only as deemed necessary by the gross findings. Organ weights will not be obtained. All carcasses will be discarded.

Females not surviving until the scheduled euthanasia will be necropsied and the cause of death recorded, if possible. Rats not expected to survive to the next observation period (moribund) will be euthanized by carbon dioxide inhalation. The cranial, thoracic, abdominal and pelvic cavities will be opened and the contents examined. The number and location of implantation sites and corpora lutea will be recorded. Uteri which appear nongravid by macroscopic examination will be opened and placed in a 10% ammonium sulfide solution (Salewski, 1964) for detection of early implantation loss. Tissue with gross lesions will be preserved in 10% neutral-buffered formalin for possible future histopathologic examination. Carcasses from adult animals will be discarded. Viable fetuses will be euthanized by a subcutaneous injection of sodium pentobarbital in the scapular region. Recognizable fetuses will be examined externally and discarded.

7.8.4 Premature Deliveries:

Females that deliver prematurely will be euthanized by carbon dioxide inhalation that day. The thoracic, abdominal and pelvic cavities will be opened and the organs examined. The number and location of former implantation sites and viable fetuses will be recorded. Corpora lutea will also be counted and recorded. Gross lesions will be preserved in 10% neutral-buffered formalin for possible future histopathologic examinations. Carcasses from adult animals will be discarded. Viable fetuses or pups will be euthanized by a subcutaneous (scapular region) or intraperitoneal injection of sodium pentobarbital (as appropriate). Recognizable fetuses or pups will be examined externally and discarded.

7.9 Macroscopic Examination:

7.9.1 Female Scheduled Necropsy – Gestation Day 20:

7.9.1.1 Laparohysterectomy and Macroscopic Examination:

Laparohysterectomies and macroscopic examinations will be performed blind to treatment group. All surviving rats will be euthanized by carbon dioxide inhalation on gestation day 20. The thoracic, abdominal, and pelvic cavities will be opened and the organs examined. The uterus of each dam will be excised and its adnexa trimmed. The number of corpora lutea will be counted and recorded. Gravid uterine weights will be obtained and recorded. The uterus of each dam will be opened and the number of viable and nonviable fetuses, early and late resorptions and the total number of implantation sites will be recorded, and the placentae will be examined. The individual uterine distribution will be documented using the following procedure: all implantation sites, including early and late resorptions, will be numbered in consecutive fashion beginning with the left distal uterine horn, noting the position of the cervix and continuing from the proximal to the distal right uterine horn. Uteri which appear nongravid by macroscopic examination will be opened and placed in a 10% ammonium sulfide solution (Salewski, 1964) for detection of early implantation loss. Maternal tissues will be preserved in 10% neutral-buffered formalin only as deemed necessary by the gross findings. Representative sections of corresponding organs from a sufficient number of controls will be retained for comparison, if possible. The carcasses will be discarded.

7.9.1.2 Fetal Examination:

Each viable fetus will be examined externally, sexed, weighed, euthanized by a subcutaneous injection of sodium pentobarbital in the scapular region and discarded. If autolysis is either absent or minimal, non-viable fetuses will be examined, crown rump by length measured, weighed and individually sexed. The crown-rump length of late resorptions (advanced degree of autolysis) will be measured, the degree of autolysis recorded, a gross external examination performed (if possible) and the tissue will be discarded. The findings will be recorded as either developmental variations or malformations. Representative photographs of all malformations, as

appropriate, will be included in the study records. Corresponding low magnification photographs, depicting both the malformed fetus and a comparison control fetus, or normal littermate, will also be included in the study records as needed and as appropriate for comparison, when possible. Selected specimens may be preserved at the discretion of the Study Director.

7.9.2 Male Scheduled Necropsy:

A gross necropsy will be conducted on surviving males on study day 14 following euthanasia by carbon dioxide inhalation. This will include examination of the external surface, all orifices, the cranial cavity, the external surface of the brain and the thoracic, abdominal and pelvic cavities including viscera. Tissues will be preserved in 10% neutral-buffered formalin only as deemed necessary by the gross findings. All carcasses will be discarded.

7.9.3 Organ Weights:

The following organs will be weighed from all animals at the scheduled necropsy. Organ-to-final-body-weight ratios will be calculated.

Kidneys	Liver
Testes*	Ovaries (with oviducts)*
Thymus	

* - These paired organs will be weighed separately.

8 DURATION OF STUDY:

The acclimation and in-life phases of this study will require approximately 2 months.

9 STATISTICAL METHODS:

All analyses will be two-tailed for minimum significance levels of 5% and 1%. All means will be presented with standard deviations. All statistical tests will be performed using a computer with appropriate programming as referenced below.

9.1 <u>In-Life Data:</u>

Continuous data variables, [mean maternal body weights (absolute and net for females), body weight gains (absolute and net for females) and food consumption of each interval] will be subjected to a parametric one-way

analysis of variance (ANOVA) (Snedecor, 1980) to determine intergroup difference. If the results of the ANOVA are significant ($p<0.05$), Dunnett's test (Dunnett, 1964) will be applied to the data to compare the treated groups to the control group.

9.2 Laparohysterectomy Data:

The group mean numbers of viable fetuses, corpora lutea, implantation sites, maternal gravid uterine weights and mean fetal weight (separately by sex, and combined) will be subjected to a parametric one-way analysis of variance (ANOVA) (Snedecor, 1980) and Dunnett's test (Dunnett, 1964) as described above. The mean litter proportions of prenatal data (% per litter of viable and nonviable fetuses, early and late resorptions, total resorptions, pre- and post-implantation loss and the fetal sex distribution) will be subjected to the Kruskal-Wallis nonparametric ANOVA test (Kruskal, 1952) to determine intergroup difference. If the results of the ANOVA are significant ($p<0.05$), the Dunn's Test (Dunn, 1964) will be applied to the data to compare the treated groups to the control group.

9.3 Organ Weight Data:

Organ weights (absolute and relative to body weights) will be subjected to a parametric ANOVA test (Snedecor, 1980) and Dunnett's test (Dunnett, 1964) as described above.

10 QUALITY ASSURANCE:

The study will be audited by the WIL Quality Assurance Unit while in progress to assure compliance with Good Laboratory Practice Regulations, adherence to the protocol and to WIL Standard Operating Procedures. The raw data and draft report will be audited by the WIL Quality Assurance Unit prior to submission to the Sponsor to assure that the final report accurately describes the conduct and the findings of the study. This study will be conducted in compliance with the EPA/TSCA (40 CFR 792) and OECD [C(97) 186/Final] Principles of Good Laboratory Practice.

This study will be included on the WIL regulated master schedule.

11 RECORDS TO BE MAINTAINED:

All original raw data records, as defined by WIL SOPs and the applicable GLPs, will be stored as described in Section 12 in the Archives at WIL Research Laboratories, LLC.

12 WORK PRODUCT:

The Sponsor will have title to all documentation records, raw data, specimens and other work product generated during the performance of the study. Any remaining formulation samples will be discarded after issuance of the Final Report. All work product, including raw paper data, pertinent electronic storage media and specimens, will be retained at no charge for six months following issuance of the final report in the Archives at WIL Research Laboratories, LLC. Thereafter, WIL Research Laboratories, LLC will charge a monthly archiving fee for retention of all work product. All work product will be stored in compliance with regulatory requirements.

Any work product, including documents, specimens, and samples, that are required by this protocol, its amendments, or other written instructions of the Sponsor, to be shipped by WIL Research Laboratories, LLC to another location will be appropriately packaged and labeled as defined by WIL's SOPs and delivered to a common carrier for shipment. WIL Research Laboratories, LLC will not be responsible for shipment following delivery to the common carrier.

13 REPORTS:

The final report will contain a summary, test substance data, methods and procedures, maternal and fetal data, WIL Historical Control Data, the analytical chemistry report and an interpretation and discussion of the study results. The final report will be comprehensive and shall define level(s) inducing toxic effects under the condition of this investigation.

WIL Research Laboratories, LLC will submit one copy of an audited draft report in a timely manner upon completion of data collection prior to issuance of the final report. One revision will be permitted as part of the cost of the study, from which the Sponsor's reasonable revisions and suggestions will be incorporated into the final report, as appropriate. Additional changes or revisions may be made, at extra cost. It is expected that the Sponsor will review the draft report and provide comments to WIL Research Laboratories, LLC within a two-month time frame following submission. WIL Research Laboratories, LLC will submit the final report within one month following receipt of comments. If the Sponsor's comments and/or authorization to finalize the report have not been received at WIL Research Laboratories, LLC within one year following submission of the draft report, WIL Research Laboratories, LLC may elect to finalize the report following appropriate written notification to the Sponsor. Two electronic copies (PDF) of the final report on CD-R will be provided. Requests for paper copies of the final report may result in additional charges.

14 ANIMAL WELFARE ACT COMPLIANCE:

This study will comply with all applicable sections of the Final Rules of the Animal Welfare Act (AWA) regulations (9 CFR Parts 1, 2 and 3). The Sponsor should make particular note of the following:

- The Sponsor Representative's signature on this protocol documents for the Study Director the Sponsor's assurance that the study described in this protocol does not unnecessarily duplicate previous experiments.

- Whenever possible, procedures used in this study have been designed to avoid or minimize discomfort, distress or pain to animals. All methods are described in this study protocol or in written laboratory Standard Operating Procedures.

- Animals that experience severe or chronic pain or distress that cannot be relieved will be painlessly euthanized as deemed appropriate by the veterinary staff and Study Director. The Sponsor will be advised by the Study Director of all circumstances which could lead to this action in as timely a manner as possible.

- Methods of euthanasia used during this study are in conformance with the above-referenced regulation.

- The Sponsor/Study Director has considered alternatives to procedures that may cause more than momentary or slight pain or distress to the animals and has provided a written narrative description (AWA covered species only) of the methods and sources used to determine that alternatives are not available.

15 PROTOCOL MODIFICATION:

Modification of the protocol may be accomplished during the course of this investigation. However, no changes will be made in the study design without the verbal or written permission of the Sponsor. In the event that the Sponsor verbally requests or approves a change in the protocol, such changes will be made by appropriate documentation in the form of a protocol amendment. All alterations of the protocol and reasons for the modification(s) will be signed by the Study Director and the Sponsor Representative.

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17 PROTOCOL APPROVAL:

Sponsor approval received via E Mail on 5 MAY 2010.
Date

American Petroleum Institute

[redacted]
Sponsor Representative

12 May 2010
Date

WIL Research Laboratories, LLC

[redacted]
Study Director

11 May 2010
Date

[redacted]
Director, Developmental and
Reproductive Toxicology

11 May 2010
Date

APPENDIX B

Test Substance Characterization (WIL Research Laboratories, LLC)

An Oral (Gavage) 14-Day and Pilot Prenatal Developmental Toxicity Study of Naphthenic Acid in Rats

Test Substance Characterization

Analytical Chemistry Department

WIL Research Laboratories, LLC

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1. INTRODUCTION

This report provides a detailed description of a method using gas chromatography (GC) with mass spectrometric (MS) detection for naphthenic acid characterization. Test substance samples were collected and analyzed prior to use for dose administration and after completion of dose administration 12 weeks later.

A list of abbreviations that may have been used in this report is located in Section 7. (Abbreviations).

2. KEY STUDY PERSONNEL

[redacted]

Assistant Director, Analytical Chemistry
Data Coordinator, Reporting & Technical Support Services
Group Manager, Reporting & Technical Support Services

3. EXPERIMENTAL

3.1. GAS CHROMATOGRAPHY

Instrument:	Agilent 6890 gas chromatograph (GC) equipped with an Agilent 5975 mass spectrometer (MS), an autosampler, and MSD Security ChemStation data system, or equivalent
Column:	Zebron ZB-5 column, 30 m × 0.32 mm ID, 0.25-µm film-thickness.
Temperature Program:	Initial temperature 100°C, hold for 3 minutes. Ramp at 8°C/min to 300°C
Carrier Gas:	Helium
Carrier Gas Pressure:	10.0 psi
Injector Temperature:	300°C
Injection Volume:	2.0 µL split
Split Ratio:	10:1
Run Time:	28 minutes

3.2. MASS SPECTROMETRY

Acquisition Parameters

Solvent Delay:	5.0 minutes
Ion Source:	Electron Impact
Scan Range:	55-550 m/z
Transfer Line Temperature:	290°C
Quadrupole Temperature:	150°C
Source Temperature:	230°C

3.3. SAMPLE PROCESSING

Triplicate aliquots of the test substance (50.0 µL each, WIL ID no 10006B) were added to glass autosampler vials, and 450 µL of methylene chloride was added to each vial. The samples were mixed with vortex action. An aliquot (10.0 µL) of each diluted sample was removed and placed in another autosampler vial along with 100 µL of the derivatizing agent, N-methyl-N-(*tert*-butyldimethylsilyl) trifluoroacetamine (MTBSTFA) containing 1% *tert*-butyldimethylsilylchloride. The vials were capped and mixed with vortex action for approximately 20 minutes at approximately 60°C. The caps were removed and the solvent was evaporated under a stream of nitrogen until dry. The contents were reconstituted in 0.500 mL of methylene chloride.

3.4. CHARACTERIZATION

Single injections were made of each sample. The average ion intensity from approximately 10 minutes to 28 minutes was used to calculate the normalized response for carbon numbers (n) 5 through 33 and Z numbers -2 though -12 using the following equation:

$$C_nH_{2n} + {}_ZO_2$$

In total, there were 156 ions monitored for naphthenic acids. The following chart lists the ions monitored.

n\z	0	-2	-4	-6	-8	-10	-12
5	102						
6	116						
7	130	128					
8	144	142					
9	158	156					
10	172	170	168				
11	186	184	182				
12	200	198	196	194			
13	214	212	210	208			
14	228	226	224	222	220		
15	242	240	238	236	234		
16	256	254	252	250	248	246	
17	270	268	266	264	262	260	
18	284	282	280	278	276	274	272
19	298	296	294	292	290	288	286
20	312	310	308	306	304	302	300
21	326	324	322	320	318	316	314
22	340	338	336	334	332	330	328
23	354	352	350	348	346	344	342
24	368	366	364	362	360	358	356
25	382	380	378	376	374	372	370
26	396	394	392	390	388	386	384
27	410	408	406	404	402	400	398
28	424	422	420	418	416	414	412
29	438	436	434	432	430	428	426
30	452	450	448	446	444	442	440
31	466	464	462	460	458	456	454
32	480	478	476	474	472	470	468
33	494	492	490	488	486	484	482

4. RESULTS AND DISCUSSION

Figure 1 and Figure 2 are graphs displaying the representative distribution of carbon numbers and Z families for the test substance before use and after completion of dose administration. The sum of all the normalized intensities equals 100%.

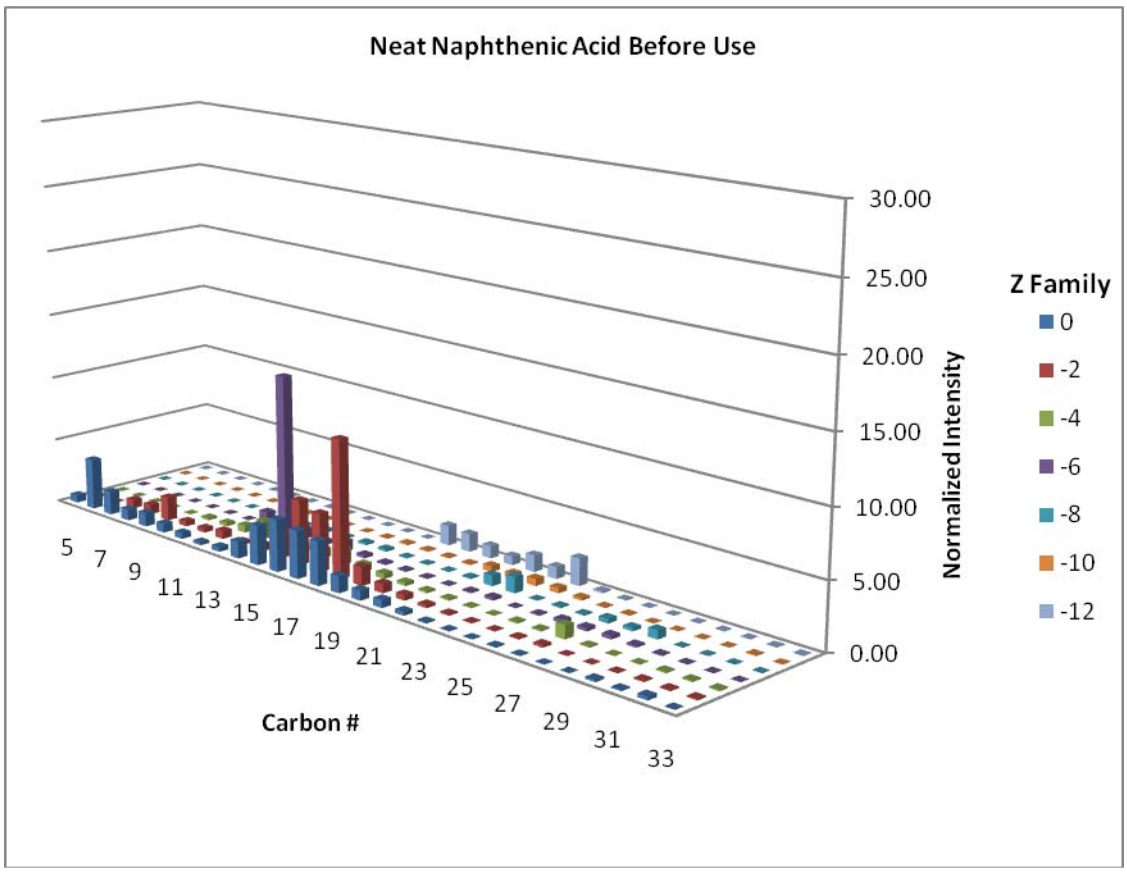

Figure 1: Representative Distribution of Carbon Numbers and Z Families of Neat Naphthenic Acid Before Use for Dose Administration

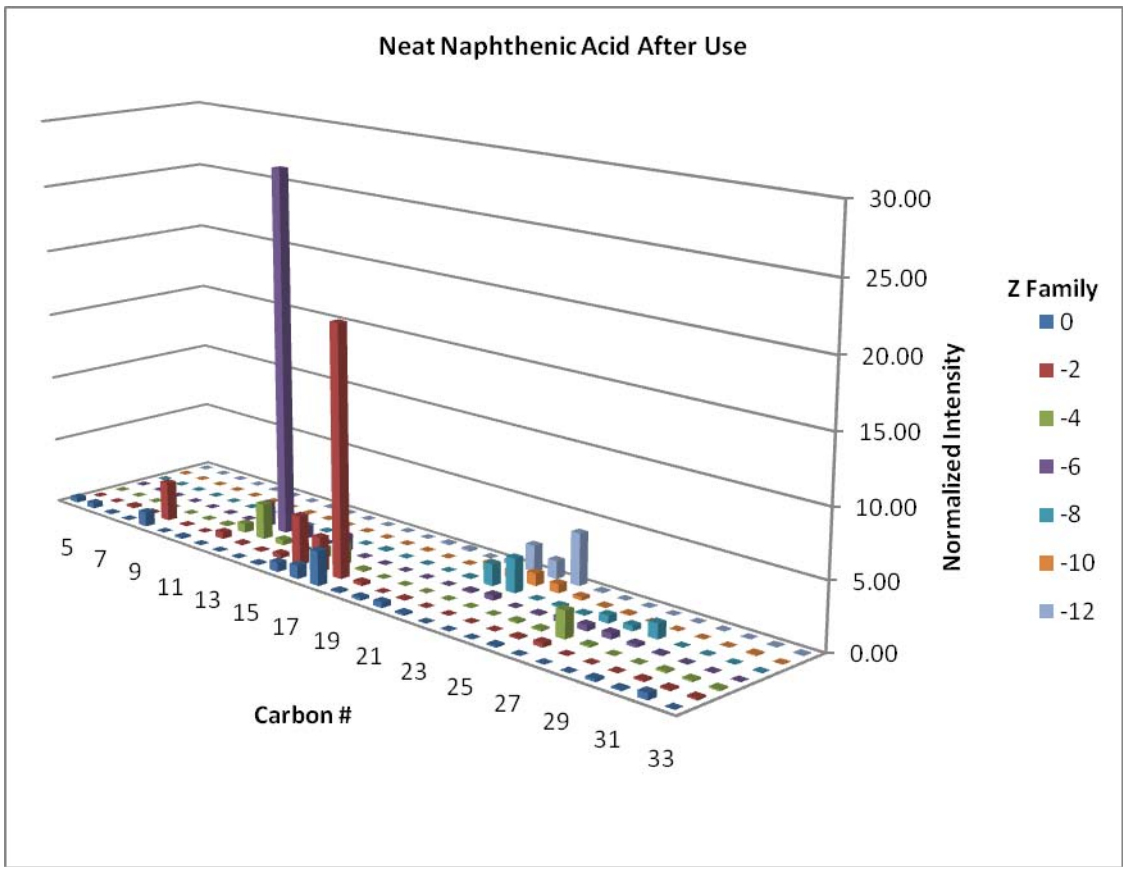

Figure 2: Representative Distribution of Carbon Numbers and Z Families of Neat Naphthenic Acid After Completion of Dose Administration

4.1. TEST ARTICLE CHARACTERIZATION AND STABILITY

The characterization of the test substance prior to use for dose administration is summarized in Table 1. Following 12 weeks of room temperature storage, the characterization assessment was repeated and is summarized in Table 2.

5. CONCLUSION

A GC/MS method was used to characterize neat naphthenic acid. Test substance samples were collected and analyzed prior to use for dose administration and after completion of dose administration 12 weeks later.

6. REPORT REVIEW AND APPROVAL

Report Approved by:

[redacted]

8 Dec 2010
Date

Staff Toxicologist, Developmental
and Reproductive Toxicology
Study Director

Report Prepared by:

[redacted]

8 Dec 2010
Date

Assistant Director, Analytical Chemistry

7. ABBREVIATIONS

The following abbreviations may apply to this report:

µ	-	micro
µL	-	microliter
ACN	-	acetonitrile
amu	-	atomic mass unit
AUC	-	area under the curve
cm	-	centimeter
conc.	-	concentration
DI	-	deionized
DMSO	-	dimethylsulfoxide
EPA	-	Environmental Protection Agency
ESI+	-	positive electrospray ionization
FA	-	formic acid
FDA	-	Food and Drug Administration
FIFRA	-	Federal Insecticide, Fungicide and Rodenticide Act
g	-	gram
GLP	-	Good Laboratory Practices
GMP	-	Good Manufacturing Practices
HPLC	-	high performance liquid chromatography
hr	-	hour(s)
IS	-	internal standard
kg	-	kilogram
L	-	liter
LLOQ	-	lower limit of quantitation
M	-	molar
MC	-	methylcellulose
MeOH	-	methanol
mg	-	milligram
mL	-	milliliter
mm	-	millimeter
msec	-	milliseconds
MS	-	mass spectrometry
mM	-	millimolar
NA	-	not applicable
ND	-	not detected
ng	-	nanogram
nm	-	nanometer
ppm	-	parts per million
QC	-	quality control

%RE	-	percent relative error
RSD	-	relative standard deviation
SD	-	standard deviation
SOP	-	standard operating procedure
SPE	-	solid phase extraction
UV	-	ultraviolet
v	-	volume
w	-	weight
WIL	-	WIL Research Laboratories, LLC
WTDMS™	-	WIL Toxicology Data Management System

TABLES 1 - 2

AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL
DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Table 1: Before Use Characterization of Neat Test Substance

(Analyzed 17 May 2010)

Carbon #	Percent of Total Ion Intenstity (WIL ID no. 10006B)			Mean % of Total
	Run # 002	Run # 003	Run # 004	
5	0.609	0.585	0.586	0.593
6	3.98	3.81	3.91	3.90
7	2.62	2.41	2.45	2.50
8	1.61	1.57	1.60	1.59
9	2.81	2.89	2.85	2.85
10	1.33	1.22	1.25	1.27
11	1.10	1.02	1.03	1.05
12	2.53	2.53	2.50	2.52
13	13.7	14.4	14.1	14.1
14	3.14	3.09	3.09	3.11
15	5.58	5.46	5.63	5.55
16	10.6	10.3	10.5	10.5
17	9.62	9.58	9.68	9.63
18	15.7	16.0	16.0	15.9
19	4.69	4.55	4.65	4.63
20	2.94	2.77	2.84	2.85
21	2.31	2.37	2.39	2.36
22	3.21	3.20	3.16	3.19
23	3.02	3.12	3.10	3.08
24	2.63	2.70	2.60	2.65
25	0.703	0.711	0.662	0.692
26	0.747	0.718	0.692	0.719
27	1.90	1.94	1.89	1.91
28	0.653	0.693	0.618	0.655
29	0.821	0.853	0.808	0.827
30	0.290	0.296	0.270	0.285
31	0.346	0.347	0.323	0.339
32	0.569	0.622	0.563	0.585
33	0.242	0.270	0.231	0.248

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AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL
DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Table 2: After Use Characterization of Neat Test Substance

(Analyzed 6 August 2010)

Carbon #	Percent of Total Ion Intensity (WIL ID no. 10006B)			Mean % of Total
	Run # 010	Run # 011	Run # 012	
5	0.375	0.375	0.388	0.379
6	0.723	0.595	0.408	0.576
7	0.441	0.330	0.234	0.335
8	0.187	0.174	0.146	0.169
9	4.06	4.06	4.04	4.05
10	0.125	0.106	0.0768	0.103
11	0.268	0.250	0.230	0.250
12	2.97	3.00	2.95	2.97
13	28.7	29.3	30.5	29.5
14	1.62	1.53	1.39	1.51
15	1.15	1.02	0.796	0.988
16	6.73	6.61	6.39	6.58
17	5.62	5.39	5.21	5.41
18	20.7	21.0	21.5	21.1
19	0.738	0.618	0.525	0.627
20	0.312	0.273	0.234	0.273
21	1.49	1.50	1.48	1.49
22	4.45	4.49	4.46	4.47
23	5.19	5.19	5.20	5.19
24	4.51	4.54	4.58	4.54
25	0.738	0.720	0.663	0.707
26	1.06	1.15	0.966	1.06
27	3.40	3.45	3.44	3.43
28	1.01	1.01	0.966	0.993
29	1.39	1.37	1.35	1.37
30	0.364	0.360	0.307	0.344
31	0.430	0.421	0.392	0.414
32	0.940	0.917	0.877	0.911
33	0.297	0.292	0.291	0.293

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APPENDIX C

Material Safety Data Sheet (Sponsor-Provided Data)

1 IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY

1.1	Identification of the Product:	**Naphthenic Acids (Carboxylic Acids, Fatty Acids)**	
1.2	Product Code:	NAP ACID	
1.3	Company:		
1.4	Transportation Emergency:	USA	1-800-424-9300 (CHEMTREC)
1.5	Product Information:		
1.6	Intended Use :	For industrial use only. No other use is intended.	

2 HAZARDS IDENTIFICATION

2.1	Classification:	Irritant (Xi). Harmful (Xn).
2.2	Warning Statements:	Causes eye and skin irritation. Harmful if swallowed – may enter lungs if swallowed or vomited. High vapor concentrations may cause drowsiness and irritation of the eyes or respiratory tract.
2.3	Hazard Symbol(s):	
2.4	Risk Phrase(s):	R36/38 (Irritating to eyes and skin). R65 (Harmful: May cause lung damage if swallowed).
2.3	Potential Health Effects:	
	Eye Contact:	Causes eye irritation. Exposure may cause irritation, redness and tearing.
	Skin Contact:	Causes skin irritation. Exposure may cause redness, itching and inflammation.
	Ingestion:	Expected to be a low ingestion hazard. Aspiration hazard. If swallowed, can enter lungs and cause damage.
	Inhalation:	High vapor concentrations may cause drowsiness, respiratory tract irritation, coughing, asthmatic breathing and breathlessness.
	Chronic Effects:	No known deleterious effects.
2.4	Other Hazards:	Target organs: Eyes, skin and central nervous system.

3 COMPOSITION/INFORMATION ON INGREDIENTS

Substance	CAS No.	EC No.	% Present
Naphthenic Acid	1338-24-5	215-662-8	70 - 99
Petroleum Distillates	8008-20-6	232-366-4	1 - 30

4 FIRST-AID MEASURES

In case of contact with eyes:	Promptly flush eyes with running water for 15 minutes, including under eyelids. Seek medical assistance if irritation develops.
In case of contact with skin:	Wash affected area well with soap and water. Seek medical assistance if irritation develops.
In case of ingestion:	Do not induce vomiting. Give 2-3 glasses of milk or water to dilute. Contact physician or poison control center promptly for instructions. If vomiting occurs, keep head lower than hips to help prevent aspiration. Never give anything by mouth to an unconscious person.
In case of inhalation:	Remove to fresh air. Seek medical assistance if irritation develops.

5 FIRE-FIGHTING MEASURES

5.1	Suitable extinguishing media:	Water fog, fire fighting foam, dry chemical or carbon dioxide.
5.2	Unsuitable extinguishing media:	None
5.3	Specific hazards:	Combustion products are Carbon Oxides.
5.4	Personal protective equipment:	Wear Self Contained Breathing Apparatus and protective clothing appropriate for fire-fighting.
5.5	Other precautions:	Non-emergency personnel should be removed from the area immediately. Cool fire-exposed containers with water spray. Prevent water runoff from reaching drains, surface water and ground water.

6 ACCIDENTAL RELEASE MEASURES

6.1	Personal precautions:	Avoid unnecessary exposure by wearing personal protective equipment specified in Section 8. Remove material from eyes, skin and clothing.
6.2	Spill cleanup:	Suction up free liquids using non-sparking equipment. Liquid unable to be suctioned may be absorbed with a non-combustible material (vermiculite, sand, earth, etc.) and transferred to container(s) for later disposal. Remove contaminated sand, earth, etc. and transfer to container(s) for later disposal.
6.3	Environmental precautions:	Keep away from drains, surface water and ground water.

7 HANDLING AND STORAGE

7.1 Handling: Wear appropriate personal protective equipment (see Section 8).

Avoid breathing vapors, mists or spray. Use with adequate ventilation.

Avoid contact with eyes, skin and clothing.

Wash thoroughly after handling.

Do not taste or swallow.

7.2 Storage: Store in a sealed container in a clean, dry, well-ventilated area away from oxidizers, strong bases, heat and flame.

Avoid use of copper and brass alloys in storage and transfer equipment and process equipment.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Engineering controls: Use local exhaust ventilation to control emissions at source.

8.2 Eye/face protection: Wear safety glasses with side shields as minimum protection. Wear goggles or faceshield if a risk of splashing exists.

8.3 Skin protection: Wear chemical resistant gloves. Heavy PVC, butyl rubber or Viton are recommended.

8.4 Respiratory protection: An approved respirator must be worn if engineering controls do not maintain airborne concentrations below established exposure limits or, when limits have not been established, below irritant levels. Respirator selection must be based upon the airborne concentration. Consult a health and safety professional or manufacturer for specific recommendations.

8.5 Thermal hazards: None

8.6 Occupational Exposure Levels

Chemical Name	Source	Type	Exposure Limits	Notes
Cherosene (Non-Aerosol), Come Vapore totale Dell'Idrocarburo	Italy OEL's	TWA	200 mg/m^3	Skin Total Hydrocarbon Vapor
Kerosene	Poland MAC's	TWA	100 mg/m^3	
	Poland MAC's	STEL	300 mg/m^3	
Kerosine	Russian Federation MAC's	Ceiling	300 mg/m^3	As C
	Russian Federation MAC's	TWA	600 mg/m^3	As C
Kerosene (Non-Aerosol), As Total Hydrocarbon Vapor	ACGIH	TWA	200 mg/m^3	Irritation, CNS, Skin
Kerosene	NIOSH	REL	100 mg/m^3	

9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance: Amber color

9.2 Odour: Hydrocarbon

9.3 pH: 5.2 (Saturated Solution)

9.4 Boiling Pt./range: 268°C (515°F)

9.5 Freezing Pt./Range: Not established

9.6 Flash point: >149°C (300°F)

9.7 Flammability: See 9.6

9.8 Autoflammability: See 9.6

9.9 Explosive properties: Not applicable

9.10 Oxidizing properties: Not an oxidizer

9.11 Vapor pressure: 0.005 mm Hg (37.8°C/100°F)

9.12 Relative density (H_2O = 1): 0.960 – 0.982 (15.6°C/60°F)

9.13 Apparent density: Not applicable

9.14 Vapor density (Air = 1): 6.5

9.14 Solubility:
Water - <1% by weight (15.6°C/60°F)
Fat (type) - Not determined
Other solvents - Not determined

9.15 Partition coefficient: Log $P_{o/w}$ (Octanol/water) - Not determined

9.16 Other data: Not Applicable

10 STABILITY AND REACTIVITY

10.1	Reactivity:	Not reactive under specified conditions of storage, shipment and use.
10.2	Stability:	Stable under specified conditions of storage, shipment and use.
10.3	Conditions to avoid:	Heat and ignition sources.
10.4	Incompatible materials:	Strong oxidizers and strong bases.
10.5	Hazardous decomposition products:	Carbon Oxides.

11 TOXICOLOGICAL INFORMATION

11.1 Acute: Eye and skin irritant. Not established as a respiratory tract irritant. May cause lung damage if aspirated.

Specified Substances

Chemical Name	Test Results
Kerosene	Dermal LD_{50} (Rabbit): >2000 mg/kg
	Oral LD_{50} (Rat): >5000 mg/kg
	Inhalation LC_{50}: >5000 mg/m^3, 4 H
	Skin (Rabbit): 500 mg (Severe Irritation)
	Skin (Rabbit): 100%/24 H (Moderate Irritation)
Naphthenic Acid	Oral LD_{50} (Rat): 3000 mg/kg
	Oral LD_{50} (Rat): 5880 mg/kg
	Dermal LD_{50} (Rabbit): >3160 mg/kg
	Eye (Rabbit): Moderate
	Skin Occluded (Rabbit): Moderate to Severe
	Skin (Rabbit): Slight

11.2 Chronic: Neither ingredient is listed by NTP, IARC or OSHA as a carcinogen. Kerosene (Non-Aerosol), as total hydrocarbon vapor, is listed by ACGIH as A3 (Confirmed Animal Carcinogen).

12 ECOLOGICAL INFORMATION

12.1	Ecotoxicity:	No data available.
12.2	Persistence and degradability:	No data available.
12.3	Bioaccumulation potential:	No data available.
12.4	Mobility in soil:	No data available.
12.5	Other adverse effects:	No data available.

13 DISPOSAL CONSIDERATIONS

Generators of waste material are responsible for evaluating materials for compliance with all applicable procedures and regulations. Disposal of unused materials must be in accordance with all local, state and federal regulations. Containers should be cleaned of residual product and rinsed according to all local, state and federal regulations prior to disposal.

14 TRANSPORT INFORMATION

	UN Number	Proper Shipping Name	Hazard Class(es)	Packing Group
ADR/RID:	Not regulated			
IMO/IMDG:	Not regulated	Fatty Acids (Saturated C13+)		
IATA:	Not regulated			
DOT:	NA3082	Other Regulated Substances, Liquid, n.o.s., (Naphthenic Acid)	9	III

Note: Material is regulated by DOT only if shipped in a container containing an amount equal to or greater than the Reportable Quantity (RQ) of 100-pounds.

15 REGULATORY INFORMATION

Warning symbol:

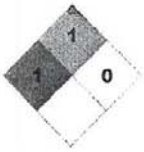
Warning words: Harmful. Irritant.

Risk phrases:
R36/38: Irritating to eyes and skin
R65: May cause lung damage if swallowed

Safety phrases:
S23: Do not breathe vapor
S24/25: Avoid contact with eyes and skin
S62: If swallowed, do not induce vomiting. Seek medical advice immediately and show this container or label

HMIS ratings (estimated):

NFPA ratings (estimated):



SARA :
Section 302: None
Section 311/312: Immediate Health Hazard
Section 313: None

WHMIS: D2B

Inventories:

CAS Number	TSCA	DSL	EINECS
1338-24-5	Yes	Yes	Yes
8008-20-6	Yes	Yes	Yes

16 OTHER INFORMATION

Revision Date: March 28, 2008

Supercedes Revision Date: November, 2004

Revisions: The latest informational changes are indicated by 20% shading.

The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply [illegible] and local). This information is offered in good faith and is believed to be accurate. [illegible], however, makes no guarantee or warranty, expressed or implied, regarding the accuracy of these data or the results to be obtained from the use hereof.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Some may burn but none ignite readily.
- Containers may explode when heated.
- Some may be transported hot.

HEALTH

- Inhalation of material may be harmful.
- Contact may cause burns to skin and eyes.
- Inhalation of Asbestos dust may have a damaging effect on the lungs.
- Fire may produce irritating, corrosive and/or toxic gases.
- Some liquids produce vapors that may cause dizziness or suffocation.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Spill

- See the Table of Initial Isolation and Protective Action Distances for highlighted substances. For non-highlighted substances, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY"

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fires

- Dry chemical, CO_2, water spray or regular foam.

Large Fires

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Do not scatter spilled material with high pressure water streams.
- Dike fire-control water for later disposal.

Fire involving Tanks

- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent dust cloud.
- Avoid inhalation of asbestos dust.

Small Dry Spills

- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Small Spills

- Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

Large Spills

- Dike far ahead of liquid spill for later disposal.
- Cover powder spill with plastic sheet or tarp to minimize spreading.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

APPENDIX D

Analyses of Dosing Formulations (WIL Research Laboratories, LLC)

An Oral (Gavage) 14-Day and Pilot Prenatal Developmental Toxicity Study of Naphthenic Acid in Rats

Analyses of Dosing Formulations

Analytical Chemistry Department

WIL Research Laboratories, LLC

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1. SUMMARY

A gas chromatography method using mass spectrometric detection for the determination of naphthenic acid concentration in corn oil formulations containing test substance ranging in concentration from 2.50 to 125 mg/mL was validated in this study. In addition, test article homogeneity and, following 11 days of room temperature storage, resuspension homogeneity and stability were assessed in formulations prepared at target concentrations of 3 and 100 mg naphthenic acid/mL. Finally, formulations used for dose administration were analyzed to verify test article concentration acceptability.

The naphthenic acid assay procedure was validated in this study with 3 validation sessions. Quantitation was performed using matrix-based calibration samples (*i.e.*, containing corn oil) ranging in test article concentration from 150 to 350 µg/mL. The mean back-calculated calibration sample concentrations had inter-session variability ranging from 2.0% to 6.8% relative standard deviation (RSD) and percent relative error (%RE) ranging from -1.3% to 2.3%, which met the WIL standard operating procedure (SOP) acceptance criteria for calibration samples, *i.e.*, RSD ≤10% and %RE within ± 10% (except at the lowest level where RSD ≤15% and %RE within ± 15% were acceptable). Assay precision and accuracy were verified by the analysis of QC samples prepared at 2.50, 25.0, and 125 mg naphthenic acid/mL. The mean calculated QC concentrations had inter-session variability (precision) ranging from 4.5% to 6.9% RSD and %RE (accuracy) ranging from -6.3% to -3.4%. The results met the WIL SOP acceptance criteria for precision and accuracy, *i.e.*, RSD ≤15% and %RE within ± 15%.

The results of the test article homogeneity assessment in formulations prepared at target concentrations of 3 and 100 mg naphthenic acid/mL met the WIL SOP acceptance criteria, *i.e.*, the RSD for the mean concentration was ≤10% at a concentration within the acceptable limits (85% to 115% of target). Assessment of test article resuspension homogeneity and stability in formulations prepared at target concentrations of 3 and 100 mg naphthenic acid/mL and following 11 days of room temperature storage met the

WIL SOP acceptance criteria for resuspension homogeneity, *i.e.*, the RSD for the mean concentration was 10% or less, and stability, *i.e.*, the post-storage concentration was not <90% of the pre-storage value.

The analyzed formulations used for dose administration met the WIL SOP requirement for concentration acceptability for suspension formulations, *i.e.*, the analyzed concentration was 85% to 115% of the target concentration. No quantifiable amount of test article was detected in the analyzed vehicle administered to the control group.

2. INTRODUCTION

This report provides a detailed description and validation of a gas chromatography (GC) method using mass spectrometric detection for the determination of naphthenic acid concentration in corn oil formulations containing test article ranging in concentration from 2.50 to 125 mg/mL. Assay specificity/selectivity, calibration reproducibility, precision, accuracy, and ruggedness were assessed. In addition, formulations prepared at target concentrations of 3 and 100 mg naphthenic acid/mL were analyzed to assess test article homogeneity and, following 11 days of room temperature storage, resuspension homogeneity and stability. Finally, formulations used for dose administration were analyzed to verify test article concentration acceptability.

A list of abbreviations that may have been used in this report is located in Section 8. (Abbreviations).

3. KEY STUDY PERSONNEL

[redacted]

Assistant Director, Analytical Chemistry
Chemist III, Analytical Chemistry
Chemist II, Analytical Chemistry
Data Coordinator, Reporting & Technical Support Services
Group Manager, Reporting & Technical Support Services

4. EXPERIMENTAL PROCEDURES - MATERIALS AND METHODS

4.1. INTERNAL STANDARD IDENTIFICATION

The internal standard (IS) used for calibration standards, QC samples, and formulation samples was received from Sigma Aldrich, St. Louis, MO, on 15 April 2010 as follows:

Identification	Quantity Received	Physical Description
Fluorine-9-carboxylic acid, 97% (9-FCA) Lot No. 03706KH [WIL log no. ACC 13364]	1 Bottle Net weight: 10 g	Light Yellow Powder

A Certificate of Analysis for the IS was provided by the supplier and is presented in Attachment I. The IS was stored at room temperature.

4.2. GAS CHROMATOGRAPHY

Instrument:	Varian CP-3800 gas chromatograph (GC) equipped with a Varian 4000 ion-trap mass spectrometer (MS), an autosampler, and Varian MS Workstation data system, or equivalent.
Column:	Varian VF-5MS column, 30 m × 0.25 mm ID, 0.25-µm film-thickness.
Temperature Program:	Initial temperature 100˚C, hold for 3.0 minutes. Ramp at 20˚C/min to 300˚C, hold for 2.0 minutes
Carrier Gas:	Helium
Carrier Gas Pressure:	10.0 psi
Injector Temperature	250˚C
Injection Volume:	1.0 µL splitless
Purge Flow:	50 psi at 1.0 min
Retention Time:	Approximately 10.3 minutes for naphthenic acid Approximately 11.9 minutes for 9-FCA (IS)
Run Time:	15 minutes

4.3. MASS SPECTROMETRY

Acquisition Parameters

Solvent Delay:	5.0 minutes
Ion Source:	Electron Impact
Scan Range:	250-350 m/z
Transfer Line Temperature:	280ºC
Trap Temperature:	210ºC
Manifold Temperature:	60ºC

Analyte	Mass (m/z)
Naphthenic Acid	257.3
9-FCA	267.4

4.4. PREPARATION OF INTERNAL STANDARD STOCK SOLUTION

The internal standard stock solution was prepared at a concentration of 0.100 mg 9-fluorenecarboxylic acid (9-FCA)/mL as follows. Approximately 10 mg of 9-FCA (Sigma Aldrich, St Louis, MO) was accurately weighed in a tared glass weigh funnel and transferred to a 100-mL volumetric flask with rinses of methylene chloride. Approximately 75 mL of methylene chloride was added to the flask, and the preparation was mixed and sonicated as needed to achieve complete dissolution of the internal standard. Additional methylene chloride was added to yield the desired concentration and the solution was thoroughly mixed.

4.5. PREPARATION OF DILUENT

The diluent was prepared by thoroughly mixing methylene chloride and corn oil in a 90:10 (v/v) ratio.

4.6. PREPARATION OF CALIBRATION STOCK SOLUTION AND SAMPLES

The calibration stock solution was prepared at a concentration of 1.00 mg naphthenic acid/mL as follows. Approximately 50 mg of naphthenic acid

(WIL ID. 10006B, no correction for purity) was accurately weighed in a tared glass weigh funnel and transferred to a 50-mL volumetric flask with rinses of methylene chloride. Approximately 40 mL of methylene chloride was added to the flask, and the preparation was mixed and sonicated as needed to achieve complete dissolution of the test substance. Additional methylene chloride was added to yield the desired concentration, and the solution was thoroughly mixed.

As detailed in the following table, matrix-based calibration samples were prepared by combining aliquots of the calibration stock solution, corn oil (vehicle), and methylene chloride in polypropylene tubes. The tubes were capped and mixed with vortex action. The samples were further processed as described in Section 4.9. (Sample Processing). Triplicate calibration samples at each concentration were prepared for the validation sessions; at least single calibration samples at each concentration were prepared for routine analyses.

Test Substance Concentration (µg/mL)	Calibration Stock Volume (mL)	Methylene Chloride Volume (mL)	Corn Oil Volume (mL)
150	0.150	0.750	0.100
200	0.200	0.700	0.100
250	0.250	0.650	0.100
300	0.300	0.600	0.100
350	0.350	0.550	0.100

4.7. PREPARATION OF QUALITY CONTROL STOCK SOLUTION AND SAMPLES

The quality control stock solution was prepared at a concentration of 125 mg naphthenic acid/mL as follows. Approximately 0.625 g of naphthenic acid (WIL ID. 10006B, no correction for purity) was accurately weighed in a tared glass weigh funnel and transferred to a 5-mL volumetric flask with rinses of methylene chloride. Approximately 2 mL of methylene chloride was added, and the preparation was

mixed and sonicated as needed to achieve complete dissolution of the test substance. Additional methylene chloride was added to yield the desired concentration and the solution was thoroughly mixed.

As detailed in the following table, QC samples were prepared to simulate the processing of formulations at concentrations of 2.50, 25.0, and 125 mg/mL (nominal QC concentration) by combining aliquots of the QC stock solution, corn oil (vehicle), and methylene chloride in polypropylene tubes. The samples were mixed with vortex action and/or inversion. The samples were further diluted with diluent as necessary. The samples were processed as described in Section 4.9. (Sample Processing). Triplicate QC samples at each concentration were prepared; a single blank sample was prepared.

QC Level	Nominal QC Concentration (mg/mL)	Vehicle Volume (mL)	QC Stock Volume (mL)	Methylene Chloride Volume (mL)	Secondary Dilution	Theoretical Final Concentration (µg/mL)
Blank	0	1.0	0	9.00	NA	0
1	2.50	1.0	0.020	8.98	NA	250
2	25.0	1.0	0.200	8.80	10-fold	250
3	125	1.0	1.00	8.00	50-fold	250

NA = Not applicable

4.8. PROCESSING OF FORMULATION SAMPLES

Quadruplicate formulations samples were collected using a syringe and cannula and placed in polypropylene tubes. Two samples from each quadruplicate set were processed for analysis and the remaining 2 samples (back-up samples) were stored frozen (approximately -20°C) and discarded, if not processed for analysis, after the Study Director's approval of the results. As detailed in the following table, methylene chloride was added to the formulations samples and the samples were mixed with vortex action and/or inversion. The samples were further diluted with diluent as necessary. The samples were further processed as described in Section 4.9. (Sample Processing).

Sample Concentration (mg/mL)	Sample Volume (mL)	Methylene Chloride Volume (mL)	Secondary Dilution	Theoretical Final Concentration (µg/mL)
0	1.00	11.0	NA	0
3	1.00	11.0	NA	250
10	1.00	39.0	NA	250
30	1.00	39.0	3-fold	250
100	1.00	19.0	20-fold	250

NA = Not applicable

4.9. SAMPLE PROCESSING

Calibration, QC, and formulation samples were processed by combining 50.0 µL of each sample, 10.0 µL of the IS stock solution, and 50.0 µL of N-methyl-N-(t-butyldimethylsiyl)trifluoroacetamide (MTBSTFA) containing 1% t-butyldimethylsilylchloride in a glass conical autosampler vial. The samples were capped and mixed with vortex action for approximately 20 minutes at approximately 60°C. The caps were removed and the samples were evaporated to dryness under a stream of nitrogen. The samples were reconstituted with 0.500 mL of methylene chloride and mixed with vortex action.

4.10. CALIBRATION AND QUANTITATION

Single injections were made of each calibration, QC, and formulation sample. A calibration curve was constructed for each set of analyses. The naphthenic acid/IS peak area ratios (y) and the theoretical concentrations (x) of the calibration samples were fit with least-squares regression to the quadratic function:

$$y = ax^2 + bx + c$$

Concentrations were back-calculated from the results of the regression analysis using Microsoft® Excel. The concentration data were transferred to another Excel spreadsheet, where appropriate summary statistics, *i.e.*, mean, standard deviation (SD), relative standard deviation (RSD), percent relative error (%RE), and concentration as a percent of

target, were calculated and presented in tabular form. The concentrations of the formulation and QC samples were calculated by applying any necessary multiplication factors to correct for dilution and/or unit conversions.

5. RESULTS AND DISCUSSION

Under the described chromatographic conditions, the retention time of the test substance and IS were approximately 10.3 and 11.9 minutes, respectively. Figure 1, Figure 2, Figure 3, and Figure 4 are typical chromatograms of a calibration sample, a processed QC sample, a processed formulation sample, and a processed vehicle blank sample, respectively. The total analysis time required for each run was 15 minutes.

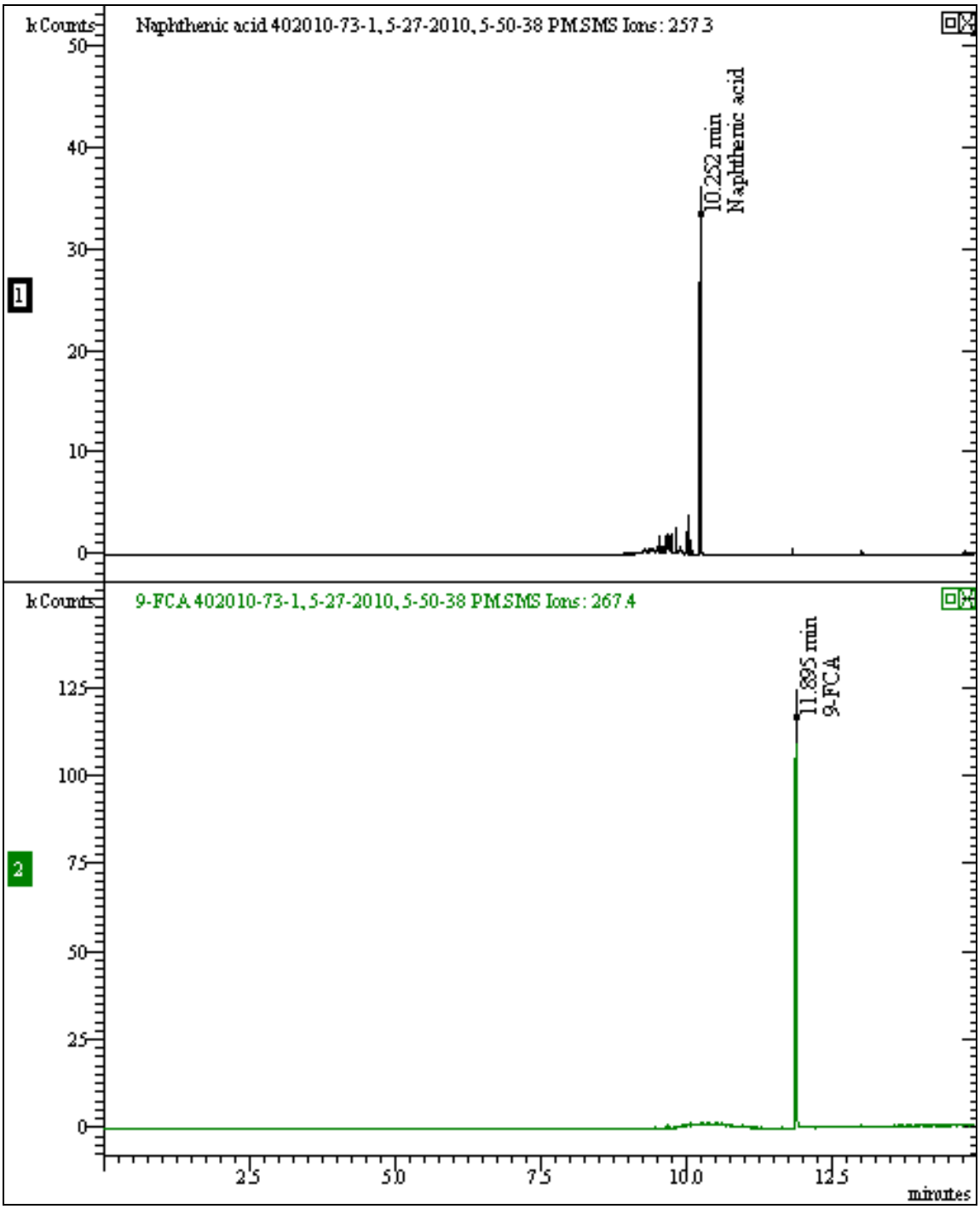

Figure 1: Representative Chromatogram of a 150 µg Naphthenic Acid/mL Calibration Sample

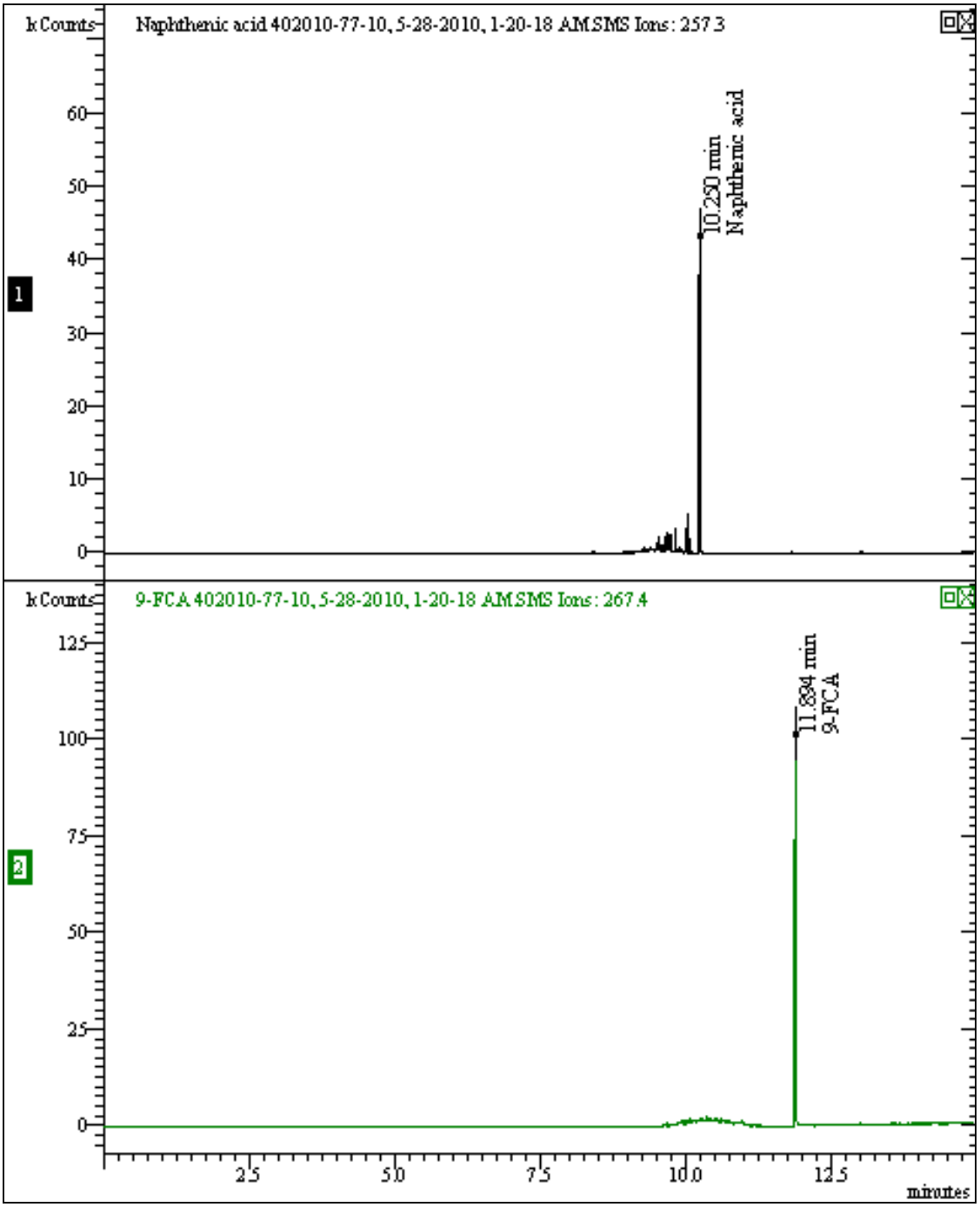

Figure 2: Representative Chromatogram of a Processed 125 mg Naphthenic Acid/mL Quality Control Sample

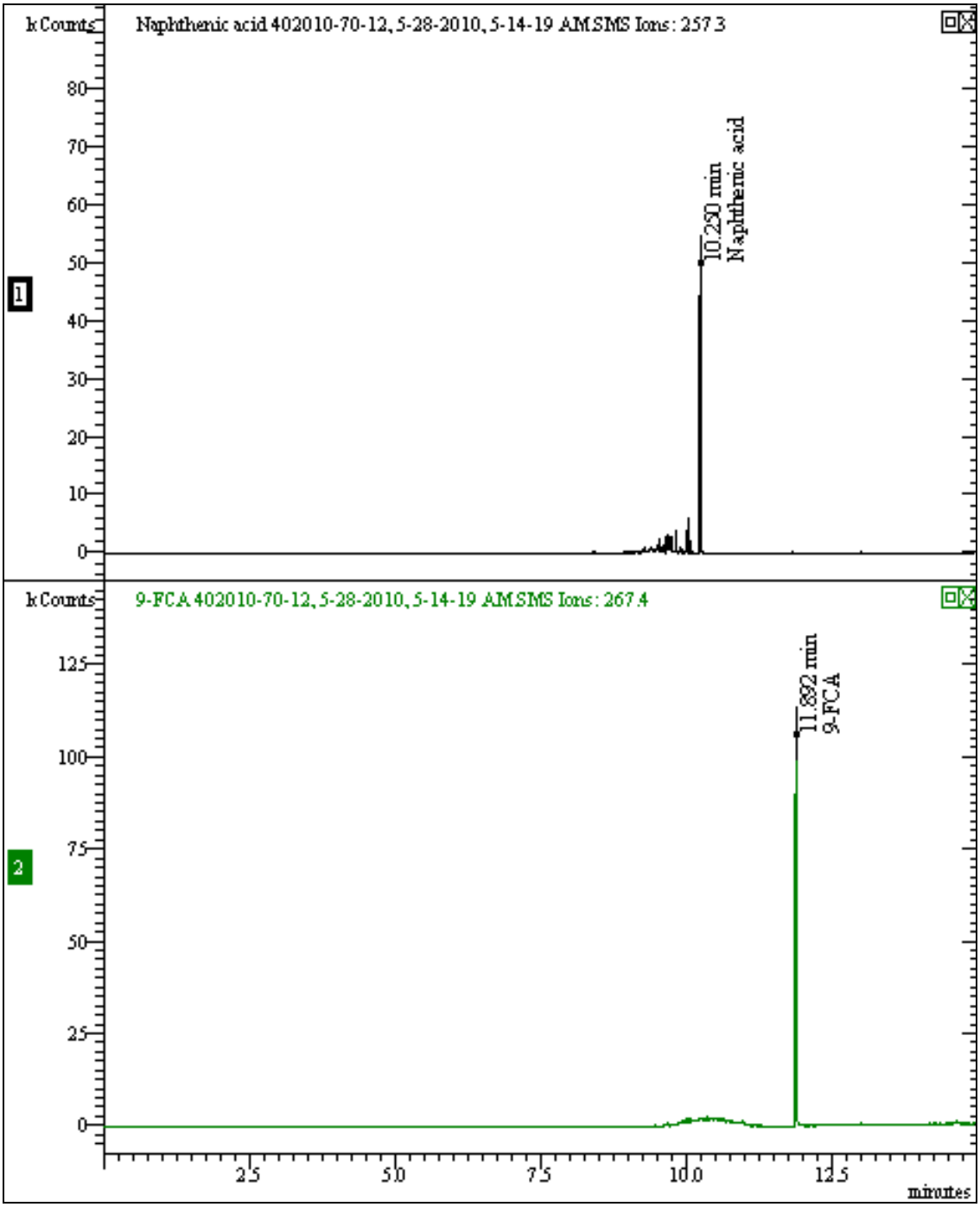

Figure 3: Representative Chromatogram of a Processed 100 mg Naphthenic Acid/mL Formulation Sample

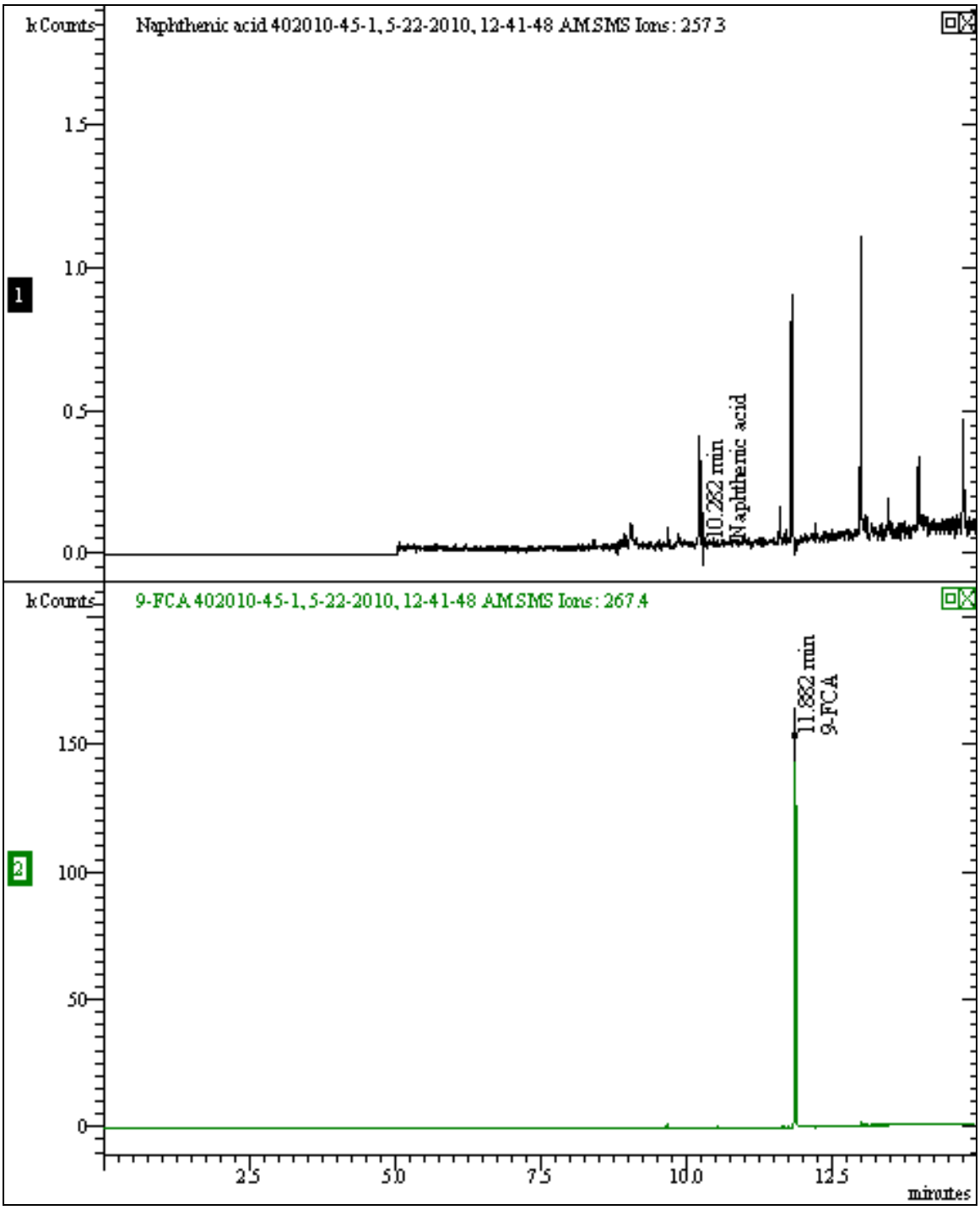

Figure 4: Chromatogram of a Processed Vehicle Blank Sample

5.1. SPECIFICITY/SELECTIVITY

As shown in Figure 4 (and in contrast to the chromatograms shown in Figure 1, Figure 2, and Figure 3), assay specificity/selectivity was confirmed when GC/MS analysis of processed vehicle blank samples revealed that there were no quantifiable peaks at or near the retention time for the test substance and IS (approximately 10.3 and 11.9 minutes, respectively).

5.2. ASSAY VALIDATION: CALIBRATION REPRODUCIBILITY

During each of 3 validation sessions, triplicate matrix-based calibration samples at 5 concentrations were prepared and analyzed as described previously. Single injections were made of each calibration sample. The resulting naphthenic acid/IS peak area ratio versus theoretical naphthenic acid concentration data were fit to the quadratic function using least-squares regression analysis. The results of the regression analyses were used to back-calculate the corresponding concentrations from the peak area ratio data. As per WIL standard operating procedure (SOP), the reproducibility of the calibration curve data was considered valid when 1) the inter-session variability, expressed as RSD, of the back-calculated concentrations at each calibration level was ≤10% RSD, except at the lowest calibration level where ≤15% was acceptable and; 2) the mean back-calculated concentrations at each calibration level were within ± 10% of the theoretical values (%RE within ± 10%), except at the lowest calibration level where %RE within ± 15% was acceptable.

The back-calculated concentrations and the associated intra- and inter-session statistics for the naphthenic acid assay calibration samples are summarized in Table 1. The inter-session variability (RSD) of the back-calculated concentrations ranged from 2.0% to 6.8% RSD. The inter-session mean concentrations had %RE values ranging from -1.3% to 2.3%. Based on the stated criteria, the reproducibility of the calibration data was acceptable.

5.3. ASSAY VALIDATION: PRECISION AND ACCURACY

During each of 3 validation sessions, triplicate QC samples at 3 concentrations were prepared and analyzed as described previously. Single injections were made of each processed QC sample. The results of the regression analyses were used to calculate the corresponding concentrations from the QC peak area ratio data. The variability (RSD) of the calculated QC concentration data was used as a measure of assay precision, and the difference between the theoretical and calculated mean QC concentrations (%RE) was used as a measure of assay accuracy. According to WIL SOP, the precision of the method was considered acceptable when the inter-session RSD of the calculated concentrations at each QC level was ≤15%, and the accuracy of the method was considered acceptable when the inter session calculated mean concentration at each QC level had a %RE value within ± 15%.

The calculated concentrations and the associated intra- and inter-session statistics for the naphthenic acid assay QC samples are summarized in Table 2. The inter-session variability (RSD) of the calculated concentrations of each QC sample (precision) ranged from 4.5% to 6.9% RSD. The inter-session mean concentrations of the QC samples had %RE values (accuracy) ranging from -6.3% to -3.4%. Based on the stated criteria, the precision and accuracy of the naphthenic acid assay were acceptable.

5.4. ASSAY RUGGEDNESS

Assay ruggedness, as required by WIL SOP, was successfully demonstrated for this method because at least 2 of the 3 validation sessions were performed by different analysts.

5.5. ASSAY ACCEPTABILITY

In addition to the experimental samples, each analytical session consisted of (but was not limited to) calibration samples at 5 concentrations and triplicate QC samples prepared at each of 3 concentrations. In this study, the formulations were prepared at target concentrations of 0, 3, 10, 30, and 100 mg naphthenic acid/mL, and the QC samples were

prepared at nominal concentrations of 2.50, 25.0, and 125 mg naphthenic acid/mL. For an analytical session to be considered valid, at least two-thirds of the calculated QC concentrations with at least 1 sample at each concentration had to be 85% to 115% of the nominal QC concentration. All reported results were from analytical sessions that met the acceptance criteria.

5.6. TEST ARTICLE HOMOGENEITY AND RESUSPENSION HOMOGENEITY ASSESSMENT OF FORMULATIONS

Duplicate samples from the top, middle, and bottom strata of the formulations prepared on 27 May 2010 at target test article concentrations of 3 and 100 mg/mL were analyzed to assess test article homogeneity. The formulations that remained after sampling were divided into aliquots as would be used for daily dispensation. Representative aliquots were stored at room temperature for 11 days, at which time the test article was resuspended by stirring. Duplicate samples were collected from the top and bottom strata of the aliquots and analyzed to assess 11-day resuspension homogeneity. The results of the homogeneity and resuspension homogeneity analyses are presented in Table 3 and Table 4, respectively, with the overall statistics summarized as follows:

Homogeneity Assessment of the 27 May 2010 Formulations		
	Group 2 (3 mg/mL)	Group 5 (100mg/mL)
Mean Concentration (mg/mL)	3.04	101
SD	0.060	5.0
RSD (%)	2.0	5.0
Mean Concentration % of Target	101	101

11-Day Room Temperature Resuspension Homogeneity Assessment of the 27 May 2010 Formulations

	Group 2 (3 mg/mL)	Group 5 (100 mg/mL)
Mean Concentration (mg/mL)	2.94	101
SD	0.14	6.1
RSD (%)	4.7	6.0
Mean Concentration % of Target	97.9	101

The homogeneity assessment of the 27 May 2010 formulations met the WIL SOP requirement, *i.e.*, the RSD for the mean concentration was ≤10% at a concentration within the acceptable limits (within 85% to 115% of target concentration). The resuspension homogeneity assessments of the 27 May 2010 formulations met the WIL SOP requirement, *i.e.*, the RSD for the mean concentration was ≤10%.

5.7. TEST ARTICLE STABILITY IN FORMULATIONS

Formulations prepared on 27 May 2010 at target concentrations of 3 and 100 mg naphthenic acid/mL were analyzed on the day of preparation. Aliquots of the formulations were stored at room temperature for 11 days and analyzed to assess test article stability. The 11-day room temperature stability results are presented in Table 4. The mean post-storage concentrations ranged from 96.6% to 100% of the pre-storage values which met the WIL SOP requirement for stability, *i.e.*, the mean post-storage concentration was not <90% of the pre-storage value.

5.8. TEST ARTICLE CONCENTRATION IN FORMULATIONS

Formulations used for dose administration were analyzed to assess test article concentration acceptability. The results of the concentration acceptability assessments are presented in Table 5 and Table 6 with the mean concentration and percent of target values summarized in the following table.

	Mean Concentration, mg/mL (Percent of Target)				
Date of Preparation	Group 1 (0 mg/mL)	Group 2 (3 mg/mL)	Group 3 (10 mg/mL)	Group 4 (30 mg/mL)	Group 5 (100 mg/mL)
1 June 2010	NQ	3.34 (111)	9.22 (92.2)	28.7 (95.8)	97.4 (97.4)
16 June 2010	NQ	3.04 (101)	9.87 (98.7)	27.9 (92.9)	89.7 (89.7)

NQ = Not quantifiable

The analyzed formulations used for dose administration met the WIL SOP requirement for concentration acceptability for suspension formulations, *i.e.*, the analyzed concentration was 85% to 115% of the target concentration. No quantifiable amount of test article was detected in the analyzed vehicle administered to the control group (Group 1).

6. CONCLUSION

A GC/MS method for the determination of naphthenic acid concentration in corn oil formulations containing test article ranging in concentration from 2.50 to 125 mg/mL was validated in this study. Method specificity/selectivity, ruggedness, calibration reproducibility, precision, and accuracy were assessed and validated, satisfying WIL SOP criteria.

Formulations prepared at target test article concentrations of 3 and 100 mg naphthenic acid/mL met the WIL SOP requirement for homogeneity and, after 11 days of room temperature storage, resuspension homogeneity and stability. Analyzed formulations used for dose administration met the applicable WIL SOP acceptance criteria for test article concentration acceptability. No quantifiable amount of test article was detected in the analyzed vehicle administered to the control group.

7. REPORT REVIEW AND APPROVAL

Report Approved by:

[redacted]

8 Dec 2010
Date

Staff Toxicologist, Developmental
and Reproductive Toxicology
Study Director

Report Prepared by:

[redacted]

8 Dec 2010
Date

Assistant Director, Analytical Chemistry

8. ABBREVIATIONS

The following abbreviations may apply to this report:

µ	-	micro
µL	-	microliter
ACN	-	acetonitrile
amu	-	atomic mass unit
btm	-	bottom
cm	-	centimeter
conc.	-	concentration
DI	-	deionized
DMSO	-	dimethylsulfoxide
EPA	-	Environmental Protection Agency
ESI+	-	positive electrospray ionization
FA	-	formic acid
FDA	-	Food and Drug Administration
FIFRA	-	Federal Insecticide, Fungicide and Rodenticide Act
g	-	gram
GLP	-	Good Laboratory Practices
GMP	-	Good Manufacturing Practices
HPLC	-	high performance liquid chromatography
hr	-	hour(s)
IS	-	internal standard
kg	-	kilogram
L	-	liter
LLOQ	-	lower limit of quantitation
M	-	molar
MC	-	methylcellulose
MeOH	-	methanol
mg	-	milligram
mL	-	milliliter
mm	-	millimeter
msec	-	milliseconds
MS	-	mass spectrometry
mM	-	millimolar
NA	-	not applicable
ND	-	not detected
ng	-	nanogram
nm	-	nanometer
ppm	-	parts per million
QC	-	quality control

%RE	-	percent relative error
RSD	-	relative standard deviation
SD	-	standard deviation
SOP	-	standard operating procedure
SPE	-	solid phase extraction
UV	-	ultraviolet
v	-	volume
w	-	weight
WIL	-	WIL Research Laboratories, LLC
WTDMS™	-	WIL Toxicology Data Management System

TABLES 1 - 6

AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL
DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Table 1: Back-Calculated Concentrations of the Validation Calibration Standards

Theoretical Concentration (µg/mL)	**150**	**200**	**250**	**300**	**350**
Session 1	146	206	250	300	365
(21 May 2010)	152	202	237	304	335
Ruggedness	147	208	243	305	349
Mean	148	205	244	303	349
SD	3.5	3.2	6.8	2.5	15
%RSD	2.4	1.6	2.8	0.81	4.3
%RE	-1.1	2.7	-2.6	1.1	-0.14
Session 2	143	206	212	289	350
(25-26 May 2010)	156	199	264	301	355
	144	214	265	302	353
Mean	148	206	247	297	353
SD	7.1	7.8	30	7.5	2.6
%RSD	4.8	3.8	12	2.5	0.73
%RE	-1.5	3.2	-1.1	-0.91	0.77
Session 3	158	200	243	294	335
(27 May 2010)	138	204	258	291	361
	147	202	259	296	360
Mean	148	202	253	294	352
SD	10	2.2	9.2	2.3	14
%RSD	7.0	1.1	3.6	0.79	4.1
%RE	-1.4	1.1	1.4	-2.1	0.63
Inter-Session Statistics					
n	9	9	9	9	9
Mean	148	205	248	298	351
SD	6.5	4.7	17	5.8	11
%RSD	4.4	2.3	6.8	2.0	3.0
%RE	-1.3	2.3	-0.76	-0.63	0.42

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AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL
DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Table 2: Calculated Concentrations of the Validation Quality Control Samples

Theoretical Concentration (mg/mL)	**2.50**	**25.0**	**125**
Session 1	2.49	24.8	119
(21 May 2010)	2.42	23.1	119
Ruggedness	2.42	23.8	116
Mean	2.44	23.9	118
SD	0.037	0.88	1.7
%RSD	1.5	3.7	1.4
%RE	-2.2	-4.4	-5.5
Session 2	2.14	22.6	111
(25-26 May 2010)	2.27	24.1	107
	2.19	24.1	109
Mean	2.20	23.6	109
SD	0.063	0.83	1.8
%RSD	2.8	3.5	1.7
%RE	-12	-5.6	-13
Session 3	2.50	23.4	131
(27 May 2010)	2.56	25.7	*
	2.56	25.7	125
Mean	2.54	24.9	128
SD	0.035	1.3	4.0
%RSD	1.4	5.3	3.1
%RE	1.7	-0.33	2.3
Inter-Session Statistics			
n	9	9	8
Mean	2.40	24.1	117
SD	0.16	1.1	8.1
%RSD	6.6	4.5	6.9
%RE	-4.1	-3.4	-6.3

* Sample not included in summary statistics, suspected sample preparation error

402010 results.xls II
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AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL
DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Table 3: Homogeneity Assessment of the 27 May 2010 Formulations
(Analyzed 27 May 2010)

Group/ Strata	Dose Conc. (mg/mL)	Ref # (402010 -)	Line # (402010E)	Analyzed Conc. (mg/mL)	Percent of Target (%)	Mean Conc. (mg/mL)	SD	RSD (%)	Mean Conc % of Target (%)
2/Top	3	70 - 1	61	3.01	100	3.04	0.060	2.0	101
		70 - 2	62	2.96	98.7				
2/Mid		70 - 3	63	3.04	101				
		70 - 4	64	3.02	101				
2/Btm		70 - 5	65	3.05	102				
		70 - 6	66	3.14	105				
5/Top	100	70 - 7	67	93.4	93.4	101	5.0	5.0	101
		70 - 8	68	104	104				
5/Mid		70 - 9	69	96.2	96.2				
		70 - 10	70	104	104				
5/Btm		70 - 11	71	105	105				
		70 - 12	72	105	105				

402010 results.xls 1H
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AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL
DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Table 4: 11-Day Room Temperature Resuspension and Stability Analysis of the 27 May 2010 Formulations
(Analyzed 7 June 2010)

Group/ Strata	Dose Conc. (mg/mL)	Ref # (402010 -)	Line # (402010G -)	Analyzed Conc. (mg/mL)	Percent of Target (%)	Mean Conc. (mg/mL)	SD	RSD (%)	Mean Conc % of Target (%)	Mean Conc % of Time Zero
2 Top	3	119 - 1	33	2.78	92.6	2.94	0.14	4.7	97.9	96.6
		119 - 2	34	2.97	99.2					
2 Btm		119 - 3	35	2.89	96.4					
		119 - 4	36	3.10	103					
5 Top	100	119 - 5	37	92.1	92.1	101	6.1	6.0	101	100
		119 - 6	38	106	106					
5 Btm		119 - 7	39	103	103					
		119 - 8	40	104	104					

Time Zero Concentrations	
Group	Conc. (mg/mL)
2	3.04
5	101

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AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL
DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Table 5: Concentration Assessment of the 1 June 2010 Formulations

(Analyzed 1 June 2010)

Group/ Strata	Dose Conc. (mg/mL)	Ref # (402010 -)	Line # (402010F)	Analyzed Conc. (mg/mL)	Percent of Target (%)	Mean Conc. (mg/mL)	SD	RSD (%)	Mean Conc % of Target (%)
1/Mid	0	90 - 1	34			<---Not Quantifiable--->			
		90 - 2	35			<---Not Quantifiable--->			
2/Mid	3	90 - 3	36	3.33	111	3.34	0.013	0.38	111
		90 - 4	37	3.35	112				
3/Mid	10	90 - 5	38	8.65	86.5	9.22	0.80	8.7	92.2
		90 - 6	39	9.79	97.9				
4/Mid	30	90 - 7	40	29.2	97.5	28.7	0.70	2.5	95.8
		90 - 8	41	28.2	94.1				
5/Mid	100	90 - 9	42	101	101	97.4	5.6	5.7	97.4
		90 - 10	43	93.5	93.5				

402010 results.xls 1C
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AN ORAL (GAVAGE) 14-DAY AND PILOT PRENATAL
DEVELOPMENTAL TOXICITY STUDY OF NAPHTHENIC ACID IN RATS

Table 6: Concentration Assessment of the 16 June 2010 Formulations (Back up Samples)
(Analyzed 18 June 2010)

Group/ Strata	Dose Conc. (mg/mL)	Ref # (402010 -)	Line # (402010H2)	Analyzed Conc. (mg/mL)	Percent of Target (%)	Mean Conc. (mg/mL)	SD	RSD (%)	Mean Conc % of Target (%)
1/Mid	0	151 - 1	35			<---Not Quantifiable--->			
		151 - 2	36			<---Not Quantifiable--->			
2/Mid	3	151 - 3	37	2.91	97.1	3.04	0.18	5.9	101
		151 - 4	38	3.17	106				
3/Mid	10	151 - 5	39	10.1	101	9.87	0.38	3.9	98.7
		151 - 6	40	9.60	96.0				
4/Mid	30	151 - 7	41	27.8	92.7	27.9	0.087	0.31	92.9
		151 - 8	42	27.9	93.1				
5/Mid	100	151 - 9	43	94.9	94.9	89.7	7.3	8.1	89.7
		151 - 10	44	84.6	84.6				

402010 results.xls 3C
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ATTACHMENT I

Certificate of Analysis

Certificate of Analysis

SIGMA-ALDRICH

Product Name	Fluorene-9-carboxylic acid, 97%
Product Number	F1409
Product Brand	ALDRICH
CAS Number	1989-33-9
Molecular Formula	$C_{14}H_{10}O_2$
Molecular Weight	210.23

TEST	SPECIFICATION	LOT 03706KH RESULTS
APPEARANCE	WHITE TO TAN POWDER, CRYSTALS, CRYSTALLINE	LIGHT YELLOW POWDER
INFRARED SPECTRUM		CONFORMS TO STRUCTURE.
TITRATION	96.5%-103.5% (WITH NAOH)	98.7% (WITH NAOH)
HIGH PRESSURE LIQUID CHROMATOGRAPHY	96.5% (MINIMUM)	99.9%
QUALITY CONTROL ACCEPTANCE DATE		AUGUST 2007

Barbara Rajzer, Supervisor
Quality Control
Milwaukee, Wisconsin USA

APPENDIX E

Animal Room Environmental Conditions

ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

PROJECT NO.:WIL- 402010 TEMPERATURE/HUMIDITY - STUDY SUMMARY REPORT

SPONSOR: 402 - AMERICAN PETROLEUM

STUDY SPECIFICATIONS: 402010 DATE IN 05/18/10 TIME IN 11:00
DATE OUT 06/24/10 TIME OUT 08:00

ROOM SPECIFICATIONS: B ROOM 61 LOW TEMPERATURE °F: 66.0 HIGH TEMPERATURE °F: 76.0 LOW HUMIDITY %RH: 30.0

TEST SYSTEM: Rat LOW TEMPERATURE °C: 18.9 HIGH TEMPERATURE °C: 24.4 HIGH HUMIDITY %RH: 70.0

	PRIMARY TEMP		SECONDARY TEMP		PRIMARY HUM	SECONDARY HUM
DATE	MEAN (°F)	MEAN (°C)	MEAN (°F)	MEAN (°C)	MEAN (%RH)	MEAN (%RH)
05/18/10	70.9	21.6	70.8	21.6	46.3	46.3
05/19/10	70.8	21.6	70.5	21.4	46.2	46.4
05/20/10	72.0	22.2	71.1	21.7	44.2	44.6
05/21/10	70.8	21.6	70.4	21.3	46.2	46.5
05/22/10	71.1	21.7	70.6	21.4	46.5	47.0
05/23/10	72.1	22.3	71.1	21.7	45.1	45.8
05/24/10	72.1	22.3	71.1	21.7	45.8	46.6
05/25/10	72.4	22.4	71.2	21.8	46.2	47.1
05/26/10	72.7	22.6	72.1	22.3	45.8	46.9
05/27/10	71.8	22.1	72.6	22.6	42.4	43.3
05/28/10	72.5	22.5	73.1	22.8	42.3	43.2
05/29/10	72.4	22.4	73.0	22.8	42.4	43.3
05/30/10	72.6	22.6	73.5	23.1	44.2	45.1
05/31/10	71.8	22.1	73.8	23.2	45.4	46.2
06/01/10	71.0	21.7	73.2	22.9	43.7	44.5
06/02/10	71.4	21.9	73.6	23.1	44.8	45.4
06/03/10	71.5	21.9	73.4	23.0	45.4	44.8
06/04/10	71.1	21.7	73.4	23.0	47.7	44.0
06/05/10	71.4	21.9	73.6	23.1	51.3	44.8

	PRIMARY TEMP		SECONDARY TEMP		PRIMARY HUM	SECONDARY HUM
DATE	MEAN (°F)	MEAN (°C)	MEAN (°F)	MEAN (°C)	MEAN (%RH)	MEAN (%RH)
06/06/10	70.6	21.4	73.0	22.8	47.4	44.3
06/07/10	70.8	21.6	73.3	22.9	43.4	43.4
06/08/10	71.0	21.7	73.6	23.1	43.0	42.7
06/09/10	70.9	21.6	73.6	23.1	46.4	42.9
06/10/10	72.2	22.3	73.9	23.3	44.3	42.6
06/11/10	70.9	21.6	73.2	22.9	48.4	42.5
06/12/10	72.5	22.5	73.9	23.3	53.0	44.7
06/13/10	71.7	22.1	73.5	23.1	52.8	43.3
06/14/10	71.6	22.0	73.5	23.1	52.3	43.2
06/15/10	71.1	21.7	73.3	22.9	57.7	44.3
06/16/10	71.5	21.9	73.1	22.8	47.1	42.0
06/17/10	71.1	21.7	73.2	22.9	42.9	39.3
06/18/10	71.9	22.2	73.6	23.1	44.0	40.2
06/19/10	72.0	22.2	73.4	23.0	45.6	40.6
06/20/10	71.7	22.1	73.3	22.9	43.8	38.7
06/21/10	71.9	22.2	73.5	23.1	47.4	40.4
06/22/10	73.5	23.1	74.6	23.7	51.6	43.8
06/23/10	73.6	23.1	74.7	23.7	57.2	43.0
06/24/10	72.3	22.4	74.3	23.5	55.1	45.9

	PRIMARY TEMP		SECONDARY TEMP		PRIMARY HUM	SECONDARY HUM
DATE	MEAN (°F)	MEAN (°C)	MEAN (°F)	MEAN (°C)	MEAN (%RH)	MEAN (%RH)

SUMMARY OF DAILY MEANS	MEAN	MIN	MAX
PRIMARY TEMP °F:	71.7	70.6	73.6
PRIMARY TEMP °C:	22.1	21.4	23.1
SECONDARY TEMP °F:	72.9	70.4	74.7
SECONDARY TEMP °C:	22.7	21.3	23.7
PRIMARY HUM %RH:	46.8	42.3	57.7
SECONDARY HUM %RH:	43.9	38.7	47.1
N DAYS	38		

B ROOM 61 SUMMARY OF HOURLY VALUES

	PRIMARY TEMP		SECONDARY TEMP		PRIMARY HUM	SECONDARY HUM
MEAN	71.7 °F	22.1 °C	72.9 °F	22.7 °C	46.8 %RH	43.9 %RH
MIN	68.8 °F	20.4 °C	69.1 °F	20.6 °C	37.8 %RH	33.1 %RH
MAX	82.2 °F	27.9 °C	79.9 °F	26.6 °C	70.3 %RH	64.5 %RH
SD	1.79	0.99	1.54	0.86	5.15	3.70
SE	0.06	0.03	0.05	0.03	0.17	0.12
N SAMPLES	883		883		883	883
FIRST DAY	05/18/10					
LAST DAY	06/24/10					
N DAYS	38					

STUDY 402010 SUMMARY OF HOURLY VALUES

	PRIMARY TEMP		SECONDARY TEMP		PRIMARY HUM	SECONDARY HUM
MEAN	71.7 °F	22.1 °C	72.9 °F	22.7 °C	46.8 %RH	43.9 %RH
MIN	68.8 °F	20.4 °C	69.1 °F	20.6 °C	37.8 %RH	33.1 %RH
MAX	82.2 °F	27.9 °C	79.9 °F	26.6 °C	70.3 %RH	64.5 %RH
SD	1.79	0.99	1.54	0.86	5.15	3.70
SE	0.06	0.03	0.05	0.03	0.17	0.12
N SAMPLES	883		883		883	883
FIRST DAY	05/18/10					
LAST DAY	06/24/10					
N DAYS	38					

APPENDIX F

WIL Developmental Historical Control Data Version 3.9 [Crl:CD(SD) Rats]

Study Date Range: 21 Apr 1998 - 27 Feb 2009 **Mean of Study Means**

Endpoint	Total	Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
NO. OF DATASETS	**152**								
Total No. of Animals in the Control Group	3767								
No. of Animals That Died	6								
No. of Animals That Aborted	0								
No. of Animals That Delivered	0								
Percent Pregnant		96.3	5.16	0.42	98.0	69.2	100.0	95.9	100.0
No. Gravid	3631								
No. With Only Resorptions	5								
No. of Dams With Live Fetuses	3621								
No. Nongravid	136								
No. of Animals Examined at Laparohysterectomy	3761								
Mean Gravid Uterine Weight (g)		85.4	3.70	0.30	85.7	72.2	95.4	82.8	88.1
Mean No. Viable Fetuses/Dam		15.2	0.67	0.05	15.2	12.2	17.1	14.8	15.6
Total No. Viable Fetuses	54997								
Viable Fetuses (%/Litter)		95.2	1.54	0.13	95.5	90.1	98.0	94.1	96.2
Mean No. Postimplantation Loss/Dam		0.7	0.22	0.02	0.7	0.3	1.4	0.6	0.9
Total No. of Postimplantation Losses	2703								
Postimplantation Loss (%/Litter)		4.8	1.54	0.13	4.5	2.0	9.9	3.8	5.9
Early Resorptions (%/Litter)		4.7	1.56	0.13	4.5	1.5	9.9	3.6	5.8
Late Resorptions (%/Litter)		0.1	0.19	0.02	0.0	0.0	0.8	0.0	0.2
Dead Fetuses (%/Litter)		0.0	0.05	0.00	0.0	0.0	0.5	0.0	0.0
Mean No. Implantations/Dam		15.9	0.67	0.05	15.9	13.0	17.6	15.5	16.3
Mean No. Corpora Lutea/Dam		17.3	0.82	0.07	17.3	14.5	19.4	16.7	17.8
Mean No. Preimplantation Loss/Dam		1.4	0.60	0.05	1.3	0.3	3.1	0.9	1.7
Total No. Preimplantation Losses	4967								
Preimplantation Loss (%/Litter)		7.4	3.04	0.25	7.3	1.5	15.7	5.3	9.2
Total No. Male Fetuses	27427								
Total No. Female Fetuses	27570								
% Males/Litter		49.8	2.72	0.22	49.7	43.1	56.7	47.9	51.7
% Females/Litter		50.2	2.72	0.22	50.3	43.3	56.9	48.3	52.1
Mean Fetal Body Weight (g)		3.7	0.11	0.01	3.6	3.4	3.9	3.6	3.7
Mean Male Body Weight (g)		3.7	0.12	0.01	3.7	3.5	4.0	3.7	3.8
Mean Female Body Weight (g)		3.6	0.11	0.01	3.5	3.4	3.8	3.5	3.6

Mean of Study Means

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

MALFORMATIONS (% Per Litter)	**Mean**	**S.D.**	**SEM**	**Median**	**Min**	**Max**	**25th Quartile**	**75th Quartile**
TOTAL EXTERNAL MALFORMATIONS	0.1	0.21	0.02	0.0	0.0	1.3	0.0	0.2
TOTAL VISCERAL MALFORMATIONS	0.1	0.17	0.01	0.0	0.0	0.9	0.0	0.0
TOTAL SKELETAL MALFORMATIONS	0.1	0.24	0.02	0.0	0.0	1.1	0.0	0.2
TOTAL MALFORMATIONS	0.3	0.38	0.04	0.0	0.0	1.6	0.0	0.3
EXTERNAL								
Aglossia	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Anal Atresia	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Apodia	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Astomia	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Carpal and/or Tarsal Flexure	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Cleft Face	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Cleft Lip	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Cleft Palate	0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Craniorachischisis	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Cyclopia	0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Ectromelia	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Exencephaly with or without Open Eyelid(s)	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Fetal Anasarca	0.0	0.12	0.01	0.0	0.0	1.3	0.0	0.0
Filamentous Tail	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Gastroschisis	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Hydrocephaly with or without Dome Head	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Mandibular Agnathia	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Mandibular Micrognathia	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Maxillary Agnathia	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Meningoencephalocele	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0

Mean of Study Means

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

MALFORMATIONS (% Per Litter)	**Mean**	**S.D.**	**SEM**	**Median**	**Min**	**Max**	**25th Quartile**	**75th Quartile**
EXTERNAL								
Micromelia	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Microphthalmia and/or Anophthalmia	0.0	0.09	0.01	0.0	0.0	0.5	0.0	0.0
Omphalocele	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Open Eyelid(s)	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Proboscis-Like Nose	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Tail- Short	0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Umbilical Herniation of the Intestine	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
VISCERAL								
Aorta- Narrowed	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Epididymis- Absent	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Heart and/or Great Vessel Anomaly	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Hydrocephaly	0.0	0.08	0.01	0.0	0.0	0.8	0.0	0.0
Interrupted Aortic Arch	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Kidney(s)- Absent	0.0	0.03	0.00	0.0	0.0	0.4	0.0	0.0
Kidney(s) and/or Ureter(s) Absent	0.0	0.04	0.00	0.0	0.0	0.3	0.0	0.0
Lung(s)- Lobular Agenesis	0.0	0.05	0.00	0.0	0.0	0.6	0.0	0.0
Lung(s)- Lobular Dysgenesis	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Retroesophageal Aortic Arch	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Situs Inversus	0.0	0.09	0.01	0.0	0.0	0.4	0.0	0.0
Testis- Absent	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Thyroid Gland(s)- Absent	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Transposition of the Great Vessels	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Vessel(s)- Malpositioned	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0

Mean of Study Means

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

MALFORMATIONS (% Per Litter)	**Mean**	**S.D.**	**SEM**	**Median**	**Min**	**Max**	**25th Quartile**	**75th Quartile**
SKELETAL								
Bent Limb Bone(s)	0.0	0.09	0.01	0.0	0.0	1.0	0.0	0.0
Costal Cartilage Anomaly	0.0	0.05	0.00	0.0	0.0	0.3	0.0	0.0
Rib Anomaly	0.0	0.08	0.01	0.0	0.0	0.4	0.0	0.0
Rib(s)- Only 11 Pairs Present	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Rib(s)- Only 12 Pairs Present	0.0	0.06	0.01	0.0	0.0	0.5	0.0	0.0
Skull Anomaly	0.0	0.04	0.00	0.0	0.0	0.4	0.0	0.0
Sternebra(e)- Fused	0.0	0.08	0.01	0.0	0.0	1.0	0.0	0.0
Sternebra(e)- Malaligned (Severe)	0.0	0.06	0.00	0.0	0.0	0.4	0.0	0.0
Sternoschisis	0.0	0.07	0.01	0.0	0.0	0.6	0.0	0.0
Vertebral Agenesis	0.0	0.07	0.01	0.0	0.0	0.3	0.0	0.0
Vertebral Anomaly with or without Associated Rib Anomaly	0.0	0.11	0.01	0.0	0.0	0.7	0.0	0.0
Vertebral Centra Anomaly	0.0	0.06	0.00	0.0	0.0	0.5	0.0	0.0

Mean of Study Means

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

VARIATIONS (% Per Litter)	Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
TOTAL EXTERNAL VARIATIONS	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
TOTAL VISCERAL VARIATIONS	0.4	0.70	0.06	0.2	0.0	4.0	0.0	0.6
TOTAL SKELETAL VARIATIONS	33.6	6.79	0.56	33.4	18.0	50.4	29.6	37.2
TOTAL VARIATIONS	33.4	6.91	0.71	31.6	18.0	51.1	19.7	36.2
EXTERNAL								
Twinning	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
VISCERAL								
Adrenal Gland(s)- Enlarged	0.0	0.12	0.01	0.0	0.0	1.4	0.0	0.0
Adrenal Gland(s)- Pale	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Diaphragm- Thin	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Hemorrhagic Iris	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Hemorrhagic Ring Around the Iris	0.0	0.07	0.01	0.0	0.0	0.3	0.0	0.0
Kidney(s)- Small	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Liver- Accessory Lobule(s)	0.0	0.09	0.01	0.0	0.0	0.8	0.0	0.0
Liver- Pale	0.0	0.03	0.00	0.0	0.0	0.3	0.0	0.0
Liver- Swollen	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Major Blood Vessel Variation	0.1	0.15	0.01	0.0	0.0	0.8	0.0	0.0
Renal Papilla(e) not Developed and/or Distended Ureter(s)	0.2	0.62	0.05	0.0	0.0	4.0	0.0	0.3
Spleen- Accessory	0.0	0.09	0.01	0.0	0.0	1.0	0.0	0.0
Spleen- Pale	0.0	0.07	0.01	0.0	0.0	0.3	0.0	0.0
Spleen- Small	0.0	0.13	0.01	0.0	0.0	1.4	0.0	0.0
Testis- Small	0.0	0.03	0.00	0.0	0.0	0.2	0.0	0.0
SKELETAL								
14th Full Rib(s)	0.1	0.17	0.01	0.0	0.0	0.9	0.0	0.0

Mean of Study Means

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

VARIATIONS (% Per Litter)	Mean	S.D.	SEM	Median	Min	Max	25th Quartile	75th Quartile
SKELETAL								
14th Rudimentary Rib(s)	6.8	2.84	0.23	6.5	0.0	15.1	4.8	8.6
25 Presacral Vertebrae	0.1	0.31	0.03	0.0	0.0	2.0	0.0	0.0
27 Presacral Vertebrae	0.2	0.28	0.02	0.0	0.0	1.8	0.0	0.3
7th Cervical Rib(s)	0.8	0.78	0.06	0.7	0.0	3.5	0.3	1.1
7th Sternebra	0.0	0.25	0.02	0.0	0.0	2.5	0.0	0.0
Bent Rib(s)	0.2	0.48	0.04	0.0	0.0	4.0	0.0	0.3
Cervical Centrum #1 Ossified	20.2	5.87	0.48	19.7	6.6	35.8	16.3	24.2
Entire Sternum Unossified	0.0	0.06	0.01	0.0	0.0	0.4	0.0	0.0
Extra Site of Ossification Anterior to Cervical Centrum #2	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Extra Site of Ossification Anterior to Rib #5	0.0	0.02	0.00	0.0	0.0	0.2	0.0	0.0
Extra Site of Ossification Anterior to Sternebra #1	0.0	0.04	0.00	0.0	0.0	0.4	0.0	0.0
Extra Site of Ossification Ventral to Cervical Centrum #2	0.0	0.02	0.00	0.0	0.0	0.3	0.0	0.0
Hyoid Unossified	1.3	0.98	0.08	1.2	0.0	4.4	0.5	2.0
Ischium Unossified	0.0	0.06	0.01	0.0	0.0	0.6	0.0	0.0
Pubis Unossified	0.1	0.22	0.02	0.0	0.0	2.3	0.0	0.0
Reduced Ossification of the 13th Rib(s)	0.6	0.69	0.06	0.5	0.0	3.6	0.2	0.8
Reduced Ossification of the Limb Bone(s)	0.0	0.03	0.00	0.0	0.0	0.2	0.0	0.0
Reduced Ossification of the Rib(s)	0.0	0.13	0.01	0.0	0.0	1.2	0.0	0.0
Reduced Ossification of the Skull	0.1	0.20	0.02	0.0	0.0	1.0	0.0	0.0
Reduced Ossification of the Vertebral Arches	0.1	0.20	0.02	0.0	0.0	1.1	0.0	0.2
Skull Bone(s)- Accessory	0.0	0.08	0.01	0.0	0.0	0.7	0.0	0.0
Sternebra(e) #1, #2, #3 and/or #4 Unossified	0.2	0.27	0.02	0.0	0.0	1.3	0.0	0.3
Sternebra(e) #5 and/or #6 Unossified	6.6	6.03	0.49	4.0	0.0	26.1	2.5	9.3
Sternebra(e)- Malaligned (Slight or Moderate)	0.4	0.49	0.04	0.3	0.0	3.0	0.0	0.6
Sternebrae with Thread-Like Attachment	0.0	0.05	0.00	0.0	0.0	0.6	0.0	0.0

Mean of Study Means

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

VARIATIONS (% Per Litter)	**Mean**	**S.D.**	**SEM**	**Median**	**Min**	**Max**	**25th Quartile**	**75th Quartile**
SKELETAL								
Unco-Ossified Vertebral Centra	0.0	0.06	0.00	0.0	0.0	0.5	0.0	0.0
Vertebral Centra Unossified	0.0	0.05	0.00	0.0	0.0	0.4	0.0	0.0

Modal Distribution of Fetal Body Weights

No. of Datasets in Historical Control	**152**
Range of Study Dates	4/21/1998 - 2/27/2009
No. of Dams in Historical Control	3767
No. of Dams with Live Fetuses	3621
Mean Fetal Body Weight Range (g)	3.4 - 3.9

Mean Fetal Body Weight (g)	**3.4**	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**
Total No. Datasets	2	27	52	43	20	8
Mean Litter Size	15.1	15.4	15.2	15.2	14.7	14.6
Litter Size Range	15.0 - 15.1	14.4 - 17.1	13.7 - 16.7	13.7 - 16.6	12.2 - 15.8	13.8 - 15.3

Summary Incidence Malformations and Variations
(Total Number Fetuses/Litters Affected)
Ranked Uppermost to Nethermost

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

MALFORMATIONS	**Number Fetuses**	**Litters**
EXTERNAL		
Microphthalmia and/or Anophthalmia	18	18
Fetal Anasarca	7	5
Mandibular Micrognathia	6	6
Omphalocele	6	6
Anal Atresia	5	5
Filamentous Tail	5	5
Cleft Palate	4	4
Umbilical Herniation of the Intestine	4	4
Tail- Short	3	3
Aglossia	2	2
Carpal and/or Tarsal Flexure	2	2
Cyclopia	2	2
Exencephaly with or without Open Eyelid(s)	2	2
Mandibular Agnathia	2	2
Apodia	1	1
Astomia	1	1
Cleft Face	1	1
Cleft Lip	1	1
Craniorachischisis	1	1
Ectromelia	1	1
Gastroschisis	1	1
Hydrocephaly with or without Dome Head	1	1
Maxillary Agnathia	1	1

Summary Incidence Malformations and Variations
(Total Number Fetuses/Litters Affected)
Ranked Uppermost to Nethermost

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

MALFORMATIONS	**Number Fetuses**	**Litters**
EXTERNAL		
Meningoencephalocele	1	1
Micromelia	1	1
Open Eyelid(s)	1	1
Proboscis-Like Nose	1	1
VISCERAL		
Situs Inversus	13	13
Hydrocephaly	8	8
Lung(s)- Lobular Dysgenesis	5	5
Retroesophageal Aortic Arch	5	5
Kidney(s) and/or Ureter(s) Absent	4	4
Interrupted Aortic Arch	2	2
Thyroid Gland(s)- Absent	2	2
Transposition of the Great Vessels	2	2
Aorta- Narrowed	1	1
Epididymis- Absent	1	1
Heart and/or Great Vessel Anomaly	1	1
Kidney(s)- Absent	1	1
Lung(s)- Lobular Agenesis	1	1
Testis- Absent	1	1
Vessel(s)- Malpositioned	1	1
SKELETAL		
Vertebral Anomaly with or without Associated Rib Anomaly	20	17
Rib Anomaly	11	11

Summary Incidence Malformations and Variations

(Total Number Fetuses/Litters Affected)

Ranked Uppermost to Nethermost

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

MALFORMATIONS	**Number Fetuses**	**Litters**
SKELETAL		
Vertebral Agenesis	10	10
Sternoschisis	10	9
Vertebral Centra Anomaly	6	6
Bent Limb Bone(s)	6	4
Costal Cartilage Anomaly	5	5
Rib(s)- Only 12 Pairs Present	5	5
Sternebra(e)- Malaligned (Severe)	5	5
Sternebra(e)- Fused	2	2
Rib(s)- Only 11 Pairs Present	1	1
Skull Anomaly	1	1

Summary Incidence Malformations and Variations
(Total Number Fetuses/Litters Affected)
Ranked Uppermost to Nethermost

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

VARIATIONS	**Number Fetuses**	**Litters**
EXTERNAL		
Twinning	1	1
VISCERAL		
Renal Papilla(e) not Developed and/or Distended Ureter(s)	121	75
Major Blood Vessel Variation	42	41
Hemorrhagic Ring Around the Iris	11	11
Spleen- Pale	8	8
Spleen- Accessory	8	5
Liver- Accessory Lobule(s)	7	5
Spleen- Small	6	6
Adrenal Gland(s)- Enlarged	5	1
Hemorrhagic Iris	2	2
Kidney(s)- Small	2	2
Liver- Pale	2	2
Testis- Small	2	2
Adrenal Gland(s)- Pale	1	1
Diaphragm- Thin	1	1
Liver- Swollen	1	1
SKELETAL		
Cervical Centrum #1 Ossified	10707	2698
14th Rudimentary Rib(s)	3655	1519
Sternebra(e) #5 and/or #6 Unossified	3593	1287
Hyoid Unossified	705	448
7th Cervical Rib(s)	433	335

Summary Incidence Malformations and Variations
(Total Number Fetuses/Litters Affected)
Ranked Uppermost to Nethermost

NO. OF DATASETS	**149**	
Total No. of Fetuses/Litters Examined Externally	53902	3548
Total No. of Fetuses/Litters Examined Viscerally	53708	3548
Total No. of Fetuses/Litters Examined Skeletally	53695	3547

VARIATIONS	**Number Fetuses**	**Litters**
SKELETAL		
Reduced Ossification of the 13th Rib(s)	328	220
Sternebra(e)- Malaligned (Slight or Moderate)	201	180
Sternebra(e) #1, #2, #3 and/or #4 Unossified	103	95
Bent Rib(s)	88	67
27 Presacral Vertebrae	82	64
Reduced Ossification of the Vertebral Arches	59	54
25 Presacral Vertebrae	57	34
Reduced Ossification of the Skull	47	40
14th Full Rib(s)	40	34
Pubis Unossified	37	31
7th Sternebra	24	10
Reduced Ossification of the Rib(s)	19	16
Entire Sternum Unossified	8	8
Skull Bone(s)- Accessory	8	8
Vertebral Centra Unossified	5	5
Unco-Ossified Vertebral Centra	4	4
Ischium Unossified	4	3
Extra Site of Ossification Anterior to Sternebra #1	3	3
Reduced Ossification of the Limb Bone(s)	2	2
Sternebrae with Thread-Like Attachment	2	1
Extra Site of Ossification Anterior to Cervical Centrum #2	1	1
Extra Site of Ossification Anterior to Rib #5	1	1
Extra Site of Ossification Ventral to Cervical Centrum #2	1	1

FINAL REPORT

Contents:	Volume 2 of 2 Appendix G
Study Title:	An Oral (Gavage) 14-Day and Pilot Prenatal Developmental Toxicity Study of Naphthenic Acid in Rats
Study Number:	WIL-402010
Study Director:	[redacted]
Data Requirements:	Not Applicable
Study Initiation Date:	11 May 2010
Study Completion Date:	8 December 2010
Performing Laboratory:	WIL Research Laboratories, LLC 1407 George Road Ashland, OH 44805-8946
Sponsor:	American Petroleum Institute 1220 L Street, NW Washington, DC 20005

APPENDIX G

Individual Animal Data

TABLE I1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73665	M	0 MG/KG/DAY	NORMAL	06-02-10	8:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:07	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:12	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73665	M	0 MG/KG/DAY	DISPOSITION	06-16-10	8:44	P	SCHEDULED EUTHANASIA
73666	M	0 MG/KG/DAY	NORMAL	06-02-10	8:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:08	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:13	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73666	M	0 MG/KG/DAY	NORMAL	06-16-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73666	M	0 MG/KG/DAY	DISPOSITION	06-16-10	8:44	P	SCHEDULED EUTHANASIA
73666	M	0 MG/KG/DAY	BODY/INTEGUMENT	06-03-10	8:21	1	WET YELLOW MATERIAL RIGHT INGUINAL AREA
				06-03-10	8:21	1	WET YELLOW MATERIAL LEFT INGUINAL AREA
				06-03-10	8:21	1	WET YELLOW MATERIAL UROGENITAL AREA
73676	M	0 MG/KG/DAY	NORMAL	06-02-10	8:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:08	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:13	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73676	M	0 MG/KG/DAY	DISPOSITION	06-16-10	8:44	P	SCHEDULED EUTHANASIA
73691	M	0 MG/KG/DAY	NORMAL	06-02-10	8:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:08	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73691	M	0 MG/KG/DAY	NORMAL	06-10-10	8:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:13	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73691	M	0 MG/KG/DAY	DISPOSITION	06-16-10	8:44	P	SCHEDULED EUTHANASIA
73692	M	0 MG/KG/DAY	NORMAL	06-02-10	8:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:08	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:13	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73692	M	0 MG/KG/DAY	DISPOSITION	06-16-10	8:44	P	SCHEDULED EUTHANASIA
73668	M	30 MG/KG/DAY	NORMAL	06-02-10	8:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:09	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 4

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73668	M	30 MG/KG/DAY	NORMAL	06-08-10	7:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:14	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73668	M	30 MG/KG/DAY	DISPOSITION	06-16-10	8:44	P	SCHEDULED EUTHANASIA
73668	M	30 MG/KG/DAY	BODY/INTEGUMENT	06-03-10	8:22	1	WET YELLOW MATERIAL ANOGENITAL AREA
73669	M	30 MG/KG/DAY	NORMAL	06-02-10	8:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:09	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:14	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73669	M	30 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73682	M	30 MG/KG/DAY	NORMAL	06-02-10	8:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 5

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73682	M	30 MG/KG/DAY	NORMAL	06-04-10	8:09	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:14	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73682	M	30 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73687	M	30 MG/KG/DAY	NORMAL	06-02-10	8:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:09	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:15	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73687	M	30 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73688	M	30 MG/KG/DAY	NORMAL	06-02-10	8:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:10	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:15	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73688	M	30 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73663	M	100 MG/KG/DAY	NORMAL	06-02-10	8:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:10	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:15	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 7

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73663	M	100 MG/KG/DAY	NORMAL	06-14-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73663	M	100 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73670	M	100 MG/KG/DAY	NORMAL	06-02-10	8:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:10	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:15	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73670	M	100 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73670	M	100 MG/KG/DAY	BODY/INTEGUMENT	06-03-10	8:24	1	WET YELLOW MATERIAL RIGHT INGUINAL AREA
				06-03-10	8:24	1	WET YELLOW MATERIAL LEFT INGUINAL AREA
73680	M	100 MG/KG/DAY	NORMAL	06-02-10	8:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:24	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:10	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73680	M	100 MG/KG/DAY	NORMAL	06-10-10	8:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:16	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73680	M	100 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73683	M	100 MG/KG/DAY	NORMAL	06-02-10	8:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:24	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:11	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:16	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73683	M	100 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73684	M	100 MG/KG/DAY	NORMAL	06-02-10	8:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:11	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73684	M	100 MG/KG/DAY	NORMAL	06-07-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:16	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73684	M	100 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73667	M	300 MG/KG/DAY	NORMAL	06-02-10	9:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:11	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:17	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73667	M	300 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73674	M	300 MG/KG/DAY	NORMAL	06-02-10	9:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73674	M	300 MG/KG/DAY	NORMAL	06-04-10	8:11	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:17	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73674	M	300 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73675	M	300 MG/KG/DAY	NORMAL	06-02-10	9:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:12	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:17	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73675	M	300 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73681	M	300 MG/KG/DAY	NORMAL	06-02-10	9:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:12	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:17	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73681	M	300 MG/KG/DAY	DISPOSITION	06-16-10	8:45	P	SCHEDULED EUTHANASIA
73685	M	300 MG/KG/DAY	NORMAL	06-02-10	9:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:12	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	8:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:18	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I1 (MALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73685	M	300 MG/KG/DAY	NORMAL	06-14-10	7:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73685	M	300 MG/KG/DAY	DISPOSITION	06-16-10	8:46	P	SCHEDULED EUTHANASIA
73671	M	1000 MG/KG/DAY	NORMAL	06-02-10	9:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73671	M	1000 MG/KG/DAY	DISPOSITION	06-16-10	8:46	P	SCHEDULED EUTHANASIA
73671	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-04-10	8:13	1	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-05-10	8:37	1	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-06-10	8:59	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-06-10	8:59	1	HAIR LOSS RIGHT HINDLIMB
				06-06-10	8:59	1	HAIR LOSS LEFT HINDLIMB
				06-07-10	7:48	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-07-10	7:49	1	HAIR LOSS RIGHT HINDLIMB
				06-07-10	7:49	1	HAIR LOSS LEFT HINDLIMB
				06-08-10	7:43	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-08-10	7:43	1	HAIR LOSS RIGHT HINDLIMB
				06-08-10	7:43	1	HAIR LOSS LEFT HINDLIMB
				06-09-10	7:57	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-09-10	7:58	1	HAIR LOSS RIGHT HINDLIMB
				06-09-10	7:58	1	HAIR LOSS LEFT HINDLIMB
				06-10-10	8:35	1	HAIR LOSS RIGHT HINDLIMB
				06-10-10	8:35	1	HAIR LOSS LEFT HINDLIMB
				06-10-10	8:35	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-11-10	7:47	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-11-10	7:48	1	HAIR LOSS RIGHT HINDLIMB
				06-11-10	7:48	1	HAIR LOSS LEFT HINDLIMB
				06-12-10	8:18	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-12-10	8:18	1	HAIR LOSS RIGHT HINDLIMB

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73671	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-12-10	8:18	1	HAIR LOSS LEFT HINDLIMB
				06-13-10	7:55	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-13-10	7:55	1	HAIR LOSS RIGHT HINDLIMB
				06-13-10	7:55	1	HAIR LOSS LEFT HINDLIMB
				06-14-10	7:52	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-14-10	7:52	1	HAIR LOSS RIGHT HINDLIMB
				06-14-10	7:52	1	HAIR LOSS LEFT HINDLIMB
				06-15-10	7:48	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-15-10	7:48	1	HAIR LOSS RIGHT HINDLIMB
				06-15-10	7:48	1	HAIR LOSS LEFT HINDLIMB
				06-15-10	7:48	1	HAIR LOSS LEFT LATERAL ABDOMINAL AREA
				06-16-10	7:54	2	HAIR LOSS VENTRAL ABDOMINAL AREA
				06-16-10	7:54	1	HAIR LOSS RIGHT HINDLIMB
				06-16-10	7:55	1	HAIR LOSS LEFT HINDLIMB
73677	M	1000 MG/KG/DAY	NORMAL	06-02-10	9:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:13	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	9:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	7:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73677	M	1000 MG/KG/DAY	DISPOSITION	06-16-10	8:46	P	SCHEDULED EUTHANASIA
73678	M	1000 MG/KG/DAY	NORMAL	06-02-10	9:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	7:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73678	M	1000 MG/KG/DAY	DISPOSITION	06-16-10	8:46	P	SCHEDULED EUTHANASIA
73678	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-04-10	8:14	2	WET YELLOW MATERIAL UROGENITAL AREA
				06-05-10	8:38	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-06-10	9:00	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-16-10	7:56	1	WET YELLOW MATERIAL UROGENITAL AREA
73686	M	1000 MG/KG/DAY	NORMAL	06-02-10	9:06	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:14	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	7:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	7:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	7:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73686	M	1000 MG/KG/DAY	DISPOSITION	06-16-10	8:46	P	SCHEDULED EUTHANASIA
73686	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-05-10	8:39	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-06-10	9:01	1	WET YELLOW MATERIAL UROGENITAL AREA

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-16-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
73686	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-08-10	7:44	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-09-10	8:00	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-11-10	7:49	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-16-10	7:56	1	WET YELLOW MATERIAL UROGENITAL AREA
73690	M	1000 MG/KG/DAY	NORMAL	06-02-10	9:06	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	8:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	8:14	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	8:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	9:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	7:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	8:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	8:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	7:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	8:20	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73690	M	1000 MG/KG/DAY	DISPOSITION	06-16-10	8:46	P	SCHEDULED EUTHANASIA
73690	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-07-10	7:50	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-13-10	7:56	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-14-10	7:54	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-15-10	7:50	1	WET YELLOW MATERIAL UROGENITAL AREA
				06-16-10	7:58	1	WET YELLOW MATERIAL UROGENITAL AREA

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I2 (MALES - AT TIME OF DOSING)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				AT TIME OF DOSING			
73670	M	100 MG/KG/DAY	ORAL/DENTAL	06-09-10	9:59	1	SALIVATION PRIOR TO DOSING
				06-10-10	9:51	1	SALIVATION PRIOR TO DOSING
73671	M	1000 MG/KG/DAY	ORAL/DENTAL	06-08-10	10:10	2	SALIVATION PRIOR TO DOSING
73677	M	1000 MG/KG/DAY	CARDIO-PULMONARY	06-12-10	9:59	P	GASPING
73677	M	1000 MG/KG/DAY	ORAL/DENTAL	06-10-10	10:04	2	SALIVATION PRIOR TO DOSING
				06-11-10	10:24	1	SALIVATION PRIOR TO DOSING
				06-12-10	9:56	2	SALIVATION PRIOR TO DOSING
73678	M	1000 MG/KG/DAY	ORAL/DENTAL	06-12-10	9:57	2	SALIVATION PRIOR TO DOSING
				06-15-10	10:17	1	SALIVATION PRIOR TO DOSING
73686	M	1000 MG/KG/DAY	ORAL/DENTAL	06-08-10	10:12	2	SALIVATION PRIOR TO DOSING
				06-11-10	10:25	2	SALIVATION PRIOR TO DOSING
				06-12-10	9:57	1	SALIVATION PRIOR TO DOSING
				06-13-10	9:42	1	SALIVATION PRIOR TO DOSING
				06-14-10	10:16	1	SALIVATION PRIOR TO DOSING
				06-15-10	10:18	2	SALIVATION PRIOR TO DOSING
73690	M	1000 MG/KG/DAY	ORAL/DENTAL	06-10-10	10:06	2	SALIVATION PRIOR TO DOSING
				06-15-10	10:19	1	SALIVATION PRIOR TO DOSING

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

PCRDv4.17
07/15/2010

TABLE I3 (MALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73665	M	0 MG/KG/DAY	NORMAL	06-02-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73666	M	0 MG/KG/DAY	NORMAL	06-02-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73676	M	0 MG/KG/DAY	NORMAL	06-02-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73676	M	0 MG/KG/DAY	NORMAL	06-03-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73691	M	0 MG/KG/DAY	NORMAL	06-02-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73692	M	0 MG/KG/DAY	NORMAL	06-02-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73692	M	0 MG/KG/DAY	NORMAL	06-04-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73668	M	30 MG/KG/DAY	NORMAL	06-02-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73669	M	30 MG/KG/DAY	NORMAL	06-02-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73669	M	30 MG/KG/DAY	NORMAL	06-05-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73682	M	30 MG/KG/DAY	NORMAL	06-02-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73687	M	30 MG/KG/DAY	NORMAL	06-02-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73687	M	30 MG/KG/DAY	NORMAL	06-06-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73688	M	30 MG/KG/DAY	NORMAL	06-02-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73663	M	100 MG/KG/DAY	NORMAL	06-02-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73663	M	100 MG/KG/DAY	NORMAL	06-07-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73670	M	100 MG/KG/DAY	NORMAL	06-02-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73670	M	100 MG/KG/DAY	ORAL/DENTAL	06-14-10	10:48	1	WET CLEAR MATERIAL AROUND MOUTH
73680	M	100 MG/KG/DAY	NORMAL	06-02-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73680	M	100 MG/KG/DAY	NORMAL	06-08-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73683	M	100 MG/KG/DAY	NORMAL	06-02-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73684	M	100 MG/KG/DAY	NORMAL	06-02-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73684	M	100 MG/KG/DAY	NORMAL	06-09-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73667	M	300 MG/KG/DAY	NORMAL	06-02-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:08	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73674	M	300 MG/KG/DAY	NORMAL	06-02-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I3 (MALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 9

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73674	M	300 MG/KG/DAY	NORMAL	06-10-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:09	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73675	M	300 MG/KG/DAY	NORMAL	06-02-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:09	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73681	M	300 MG/KG/DAY	NORMAL	06-02-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:09	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73681	M	300 MG/KG/DAY	ORAL/DENTAL	06-07-10	10:54	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-09-10	10:59	1	DRIED CLEAR MATERIAL AROUND MOUTH

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I3 (MALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73681	M	300 MG/KG/DAY	ORAL/DENTAL	06-10-10	10:48	1	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:44	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-13-10	10:40	1	WET CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:00	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:01	1	WET CLEAR MATERIAL AROUND MOUTH
73685	M	300 MG/KG/DAY	NORMAL	06-02-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:06	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73685	M	300 MG/KG/DAY	ORAL/DENTAL	06-05-10	10:47	1	WET CLEAR MATERIAL AROUND MOUTH
				06-07-10	10:55	2	WET CLEAR MATERIAL AROUND MOUTH
				06-08-10	10:56	2	WET CLEAR MATERIAL AROUND MOUTH
				06-10-10	10:49	1	WET CLEAR MATERIAL AROUND MOUTH
				06-11-10	11:09	2	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:44	2	WET CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:00	1	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:02	2	WET CLEAR MATERIAL AROUND MOUTH
73671	M	1000 MG/KG/DAY	NORMAL	06-02-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:20	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	11:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73671	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-14-10	11:03	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-14-10	11:03	1	WET CLEAR MATERIAL LEFT FORELIMB
73671	M	1000 MG/KG/DAY	EYES/EARS/NOSE	06-09-10	11:00	1	DRIED RED MATERIAL AROUND NOSE
				06-14-10	11:03	1	WET CLEAR MATERIAL AROUND NOSE
73671	M	1000 MG/KG/DAY	ORAL/DENTAL	06-04-10	10:56	1	WET CLEAR MATERIAL AROUND MOUTH

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73671	M	1000 MG/KG/DAY	ORAL/DENTAL	06-05-10	10:49	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-09-10	11:00	1	DRIED RED MATERIAL AROUND MOUTH
				06-10-10	10:49	1	WET CLEAR MATERIAL AROUND MOUTH
				06-11-10	11:11	2	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:45	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-13-10	10:41	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:02	2	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:02	1	WET CLEAR MATERIAL AROUND MOUTH
73677	M	1000 MG/KG/DAY	NORMAL	06-02-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73677	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-13-10	10:41	2	WET CLEAR MATERIAL VENTRAL NECK
				06-13-10	10:42	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-13-10	10:42	2	WET CLEAR MATERIAL LEFT FORELIMB
73677	M	1000 MG/KG/DAY	EYES/EARS/NOSE	06-12-10	10:46	3	WET CLEAR MATERIAL AROUND NOSE
				06-13-10	10:41	2	WET CLEAR MATERIAL AROUND NOSE
73677	M	1000 MG/KG/DAY	ORAL/DENTAL	06-03-10	10:51	1	WET CLEAR MATERIAL AROUND MOUTH
				06-04-10	10:56	1	WET CLEAR MATERIAL AROUND MOUTH
				06-05-10	10:49	2	WET CLEAR MATERIAL AROUND MOUTH
				06-06-10	11:21	1	WET CLEAR MATERIAL AROUND MOUTH
				06-07-10	11:04	1	WET CLEAR MATERIAL AROUND MOUTH
				06-08-10	10:59	2	WET CLEAR MATERIAL AROUND MOUTH
				06-09-10	11:01	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-10-10	10:49	2	WET CLEAR MATERIAL AROUND MOUTH
				06-11-10	11:12	1	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:45	3	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:46	1	SALIVATION
				06-13-10	10:41	3	WET CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:03	2	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:03	1	WET CLEAR MATERIAL AROUND MOUTH
73678	M	1000 MG/KG/DAY	NORMAL	06-02-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I3 (MALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73678	M	1000 MG/KG/DAY	NORMAL	06-04-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73678	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-12-10	10:47	3	WET CLEAR MATERIAL VENTRAL NECK
				06-12-10	10:47	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-12-10	10:47	2	WET CLEAR MATERIAL LEFT FORELIMB
				06-14-10	11:04	1	WET CLEAR MATERIAL VENTRAL NECK
				06-14-10	11:04	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-14-10	11:04	1	WET CLEAR MATERIAL LEFT FORELIMB
				06-15-10	11:03	1	WET CLEAR MATERIAL LEFT FORELIMB
73678	M	1000 MG/KG/DAY	EYES/EARS/NOSE	06-11-10	11:12	1	WET CLEAR MATERIAL AROUND NOSE
				06-14-10	11:04	1	WET CLEAR MATERIAL AROUND NOSE
73678	M	1000 MG/KG/DAY	ORAL/DENTAL	06-03-10	10:51	1	WET CLEAR MATERIAL AROUND MOUTH
				06-09-10	11:01	1	WET CLEAR MATERIAL AROUND MOUTH
				06-11-10	11:12	2	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:47	2	WET CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:04	2	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:03	2	WET CLEAR MATERIAL AROUND MOUTH
73686	M	1000 MG/KG/DAY	NORMAL	06-02-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	11:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I3 (MALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 13

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73686	M	1000 MG/KG/DAY	NORMAL	06-11-10	11:13	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	11:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73686	M	1000 MG/KG/DAY	EYES/EARS/NOSE	06-15-10	11:04	1	WET CLEAR MATERIAL AROUND NOSE
73686	M	1000 MG/KG/DAY	ORAL/DENTAL	06-03-10	10:52	1	WET CLEAR MATERIAL AROUND MOUTH
				06-09-10	11:02	1	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:48	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-13-10	10:42	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:04	2	WET CLEAR MATERIAL AROUND MOUTH
73690	M	1000 MG/KG/DAY	NORMAL	06-02-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	11:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73690	M	1000 MG/KG/DAY	BODY/INTEGUMENT	06-05-10	10:51	1	WET CLEAR MATERIAL VENTRAL NECK
				06-05-10	10:51	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-05-10	10:52	1	WET CLEAR MATERIAL LEFT FORELIMB
				06-12-10	10:49	3	WET CLEAR MATERIAL LEFT FORELIMB
				06-12-10	10:49	3	WET CLEAR MATERIAL RIGHT FORELIMB
				06-12-10	10:49	2	WET CLEAR MATERIAL VENTRAL NECK
				06-13-10	10:43	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-13-10	10:43	1	WET CLEAR MATERIAL LEFT FORELIMB
				06-15-10	11:04	2	WET CLEAR MATERIAL VENTRAL NECK
				06-15-10	11:05	2	WET CLEAR MATERIAL RIGHT FORELIMB
				06-15-10	11:05	2	WET CLEAR MATERIAL LEFT FORELIMB
73690	M	1000 MG/KG/DAY	EYES/EARS/NOSE	06-05-10	10:51	1	WET CLEAR MATERIAL AROUND NOSE
				06-06-10	11:23	1	WET CLEAR MATERIAL AROUND NOSE
				06-12-10	10:49	3	WET CLEAR MATERIAL AROUND NOSE
				06-13-10	10:43	2	WET CLEAR MATERIAL AROUND NOSE
				06-15-10	11:04	2	WET CLEAR MATERIAL AROUND NOSE
73690	M	1000 MG/KG/DAY	ORAL/DENTAL	06-03-10	10:52	2	WET CLEAR MATERIAL AROUND MOUTH

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-15-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73690	M	1000 MG/KG/DAY	ORAL/DENTAL	06-05-10	10:50	3	WET CLEAR MATERIAL AROUND MOUTH
				06-06-10	11:23	3	WET CLEAR MATERIAL AROUND MOUTH
				06-08-10	11:01	2	WET CLEAR MATERIAL AROUND MOUTH
				06-10-10	10:51	2	WET CLEAR MATERIAL AROUND MOUTH
				06-11-10	11:13	3	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:49	3	SALIVATION
				06-12-10	10:49	3	WET CLEAR MATERIAL AROUND MOUTH
				06-13-10	10:43	2	WET CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:05	2	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:04	3	WET CLEAR MATERIAL AROUND MOUTH

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I4 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS [G]

	MALES		
DAY	0	7	14
ANIMALS FROM GROUP 1: 0 MG/KG/DAY			
73665	327.	371.	421.
73666	318.	354.	398.
73676	326.	379.	433.
73691	304.	343.	383.
73692	302.	347.	393.
MEAN	315.	359.	406.
S.D.	11.9	15.3	20.6
S.E.	5.3	6.9	9.2
N	5	5	5

TABLE I4 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS [G]

	MALES		
DAY	0	7	14
ANIMALS FROM GROUP 2: 30 MG/KG/DAY			
73668	304.	341.	371.
73669	324.	367.	410.
73682	331.	377.	416.
73687	307.	349.	394.
73688	322.	358.	400.
MEAN	317.	359.	398.
S.D.	11.8	14.2	17.5
S.E.	5.3	6.3	7.8
N	5	5	5

TABLE I4 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS [G]

	MALES		
DAY	0	7	14
ANIMALS FROM GROUP 3: 100 MG/KG/DAY			
73663	335.	373.	414.
73670	327.	373.	423.
73680	308.	341.	375.
73683	300.	337.	372.
73684	315.	349.	394.
MEAN	317.	354.	396.
S.D.	13.9	17.6	22.8
S.E.	6.2	7.9	10.2
N	5	5	5

TABLE I4 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS [G]

	MALES		
DAY	0	7	14
ANIMALS FROM GROUP 4: 300 MG/KG/DAY			
73667	291.	325.	350.
73674	311.	346.	385.
73675	310.	355.	393.
73681	331.	393.	447.
73685	339.	380.	423.
MEAN	316.	360.	399.
S.D.	19.0	27.1	37.3
S.E.	8.5	12.1	16.7
N	5	5	5

	MALES		
DAY	0	7	14
ANIMALS FROM GROUP 5: 1000 MG/KG/DAY			
73671	330.	340.	365.
73677	308.	350.	374.
73678	352.	371.	427.
73686	318.	337.	343.
73690	281.	308.	337.
MEAN	318.	341.	369.
S.D.	26.2	23.1	35.8
S.E.	11.7	10.3	16.0
N	5	5	5

TABLE I5 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHT CHANGES [G]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 1: 0 MG/KG/DAY			
73665	44.	50.	93.
73666	36.	44.	79.
73676	53.	55.	108.
73691	40.	40.	80.
73692	45.	46.	91.
MEAN	43.	47.	90.
S.D.	6.5	5.6	11.6
S.E.	2.9	2.5	5.2
N	5	5	5

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 2: 30 MG/KG/DAY			
73668	38.	30.	67.
73669	43.	43.	86.
73682	46.	39.	85.
73687	42.	45.	87.
73688	37.	42.	79.
MEAN	41.	40.	81.
S.D.	3.9	6.1	8.2
S.E.	1.7	2.7	3.7
N	5	5	5

TABLE I5 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHT CHANGES [G]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 3: 100 MG/KG/DAY			
73663	38.	41.	79.
73670	46.	50.	96.
73680	33.	35.	67.
73683	36.	36.	72.
73684	34.	45.	79.
MEAN	37.	41.	79.
S.D.	5.3	6.5	11.1
S.E.	2.4	2.9	4.9
N	5	5	5

TABLE I5 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHT CHANGES [G]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 4: 300 MG/KG/DAY			
73667	34.	24.	58.
73674	35.	39.	74.
73675	45.	38.	83.
73681	62.	54.	116.
73685	41.	43.	83.
MEAN	43.	40.	83.
S.D.	11.6	10.6	21.3
S.E.	5.2	4.7	9.5
N	5	5	5

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 5: 1000 MG/KG/DAY			
73671	11.	25.	35.
73677	41.	24.	65.
73678	20.	56.	76.
73686	19.	6.	25.
73690	27.	29.	56.
MEAN	24.	28.	52.
S.D.	11.5	17.9	20.9
S.E.	5.1	8.0	9.3
N	5	5	5

TABLE I6 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION [G/ANIMAL/DAY]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 1: 0 MG/KG/DAY			
73665	22.	21.	21.
73666	19.	18.	19.
73676	22.	22.	22.
73691	17.	17.	17.
73692	20.	19.	20.
MEAN	20.	19.	20.
S.D.	2.1	2.2	2.1
S.E.	0.9	1.0	1.0
N	5	5	5

TABLE I6 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION [G/ANIMAL/DAY]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 2: 30 MG/KG/DAY			
73668	18.	16.	17.
73669	22.	20.	21.
73682	22.	21.	21.
73687	20.	21.	20.
73688	20.	20.	20.
MEAN	20.	20.	20.
S.D.	1.7	1.9	1.7
S.E.	0.7	0.8	0.8
N	5	5	5

TABLE I6 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION [G/ANIMAL/DAY]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 3: 100 MG/KG/DAY			
73663	20.	19.	19.
73670	22.	22.	22.
73680	19.	16.	18.
73683	19.	17.	18.
73684	20.	19.	19.
MEAN	20.	18.	19.
S.D.	1.4	2.0	1.7
S.E.	0.6	0.9	0.8
N	5	5	5

TABLE I6 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION [G/ANIMAL/DAY]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 4: 300 MG/KG/DAY			
73667	17.	14.	16.
73674	20.	18.	19.
73675	20.	19.	19.
73681	23.	23.	23.
73685	19.	17.	18.
MEAN	20.	18.	19.
S.D.	2.4	3.1	2.7
S.E.	1.1	1.4	1.2
N	5	5	5

MALES

DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 5: 1000 MG/KG/DAY			
73671	15.	14.	14.
73677	19.	16.	18.
73678	18.	20.	19.
73686	15.	15.	15.
73690	17.	16.	16.
MEAN	17.	16.	16.
S.D.	2.0	2.4	2.0
S.E.	0.9	1.1	0.9
N	5	5	5

TABLE I7 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION [G/KG/DAY]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 1: 0 MG/KG/DAY			
73665	62.	52.	56.
73666	57.	48.	52.
73676	63.	55.	59.
73691	53.	46.	49.
73692	63.	51.	57.
MEAN	59.	50.	55.
S.D.	4.6	3.5	4.0
S.E.	2.1	1.6	1.8
N	5	5	5

TABLE I7 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION [G/KG/DAY]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 2: 30 MG/KG/DAY			
73668	55.	46.	50.
73669	63.	52.	57.
73682	62.	52.	57.
73687	61.	55.	58.
73688	60.	53.	56.
MEAN	60.	52.	56.
S.D.	3.0	3.7	3.1
S.E.	1.3	1.6	1.4
N	5	5	5

TABLE I7 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION [G/KG/DAY]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 3: 100 MG/KG/DAY			
73663	56.	48.	52.
73670	64.	54.	59.
73680	59.	46.	52.
73683	58.	48.	53.
73684	60.	50.	55.
MEAN	60.	49.	54.
S.D.	2.8	3.1	2.8
S.E.	1.3	1.4	1.3
N	5	5	5

TABLE I7 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION [G/KG/DAY]

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 4: 300 MG/KG/DAY			
73667	55.	43.	48.
73674	60.	49.	54.
73675	61.	50.	55.
73681	65.	55.	59.
73685	53.	43.	48.
MEAN	59.	48.	53.
S.D.	4.8	5.0	4.9
S.E.	2.1	2.2	2.2
N	5	5	5

	MALES		
DAY	0- 7	7- 14	0- 14
ANIMALS FROM GROUP 5: 1000 MG/KG/DAY			
73671	43.	40.	41.
73677	58.	45.	51.
73678	50.	51.	50.
73686	44.	44.	45.
73690	57.	50.	53.
MEAN	50.	46.	48.
S.D.	6.8	4.4	4.9
S.E.	3.1	2.0	2.2
N	5	5	5

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73665 GROUP 1: 0 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	19.20	4.561	
KIDNEYS	3.57	0.848	
TESTIS, RIGHT	1.56	0.371	
TESTIS, LEFT	1.55	0.368	
THYMUS	0.4311	0.102	
FINAL BODY WT(G)	421.		

GRADE

GROSS:				
ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
EYES	HEART	INTESTINE	KIDNEYS	
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND	
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD	
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH	
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA	
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT	

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73666 GROUP 1: 0 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	18.27	4.590	
KIDNEYS	2.98	0.749	
TESTIS, RIGHT	1.68	0.422	
TESTIS, LEFT	1.72	0.432	
THYMUS	0.4517	0.113	
FINAL BODY WT(G)	398.		

GRADE

GROSS:				
ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
EYES	HEART	INTESTINE	KIDNEYS	
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND	
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD	
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH	
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA	
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT	

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73676 GROUP 1: 0 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	21.50	4.965	
KIDNEYS	3.41	0.788	
TESTIS, RIGHT	1.93	0.446	
TESTIS, LEFT	1.94	0.448	
THYMUS	0.7997	0.185	
FINAL BODY WT(G)	433.		

GRADE			
GROSS:	ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
	EYES	HEART	INTESTINE	KIDNEYS
	LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
	PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
	SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
	SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
	URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 4

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73691 GROUP 1: 0 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED	GRADE			
LIVER	15.25	3.982	GROSS:	ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
KIDNEYS	2.78	0.726		EYES	HEART	INTESTINE	KIDNEYS
TESTIS, RIGHT	1.64	0.428		LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
TESTIS, LEFT	1.62	0.423		PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
THYMUS	0.4888	0.128		SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
FINAL BODY WT(G)	383.			SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
				URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 5

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73692 GROUP 1: 0 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED	GRADE
LIVER	17.80	4.529		
KIDNEYS	3.22	0.819		
TESTIS, RIGHT	1.89	0.481		
TESTIS, LEFT	1.72	0.438		
THYMUS	0.5043	0.128		
FINAL BODY WT(G)	393.			

GROSS:				
ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
EYES	HEART	INTESTINE	KIDNEYS	
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND	
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD	
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH	
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA	
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT	

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

ANIMAL NO. 73668 GROUP 2: 30 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.
LIVER	16.87	4.547
KIDNEYS	3.07	0.827
TESTIS, RIGHT	1.76	0.474
TESTIS, LEFT	1.68	0.453
THYMUS	0.7645	0.206
FINAL BODY WT(G)	371.	

NO SIGNIFICANT CHANGES OBSERVED

GRADE

GROSS:				
	ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
	EYES	HEART	INTESTINE	KIDNEYS
	LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
	PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
	SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
	SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
	URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 7

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73669 GROUP 2: 30 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	18.77	4.578	
KIDNEYS	3.08	0.751	
TESTIS, RIGHT	1.64	0.400	
TESTIS, LEFT	1.62	0.395	
THYMUS	0.5729	0.140	
FINAL BODY WT(G)	410.		

GRADE			
GROSS:	ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
	EYES	HEART	INTESTINE	KIDNEYS
	LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
	PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
	SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
	SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
	URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

ANIMAL NO. 73682 GROUP 2: 30 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	KIDNEYS					GRADE
LIVER	19.05	4.579		GROSS: PALE				P
KIDNEYS	3.02	0.726	NO SIGNIFICANT	BILATERAL				
TESTIS, RIGHT	1.95	0.469	CHANGES OBSERVED	GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
TESTIS, LEFT	1.90	0.457		EYES	HEART	INTESTINE	LIVER	
THYMUS	0.5944	0.143		LN, MESENTERIC	LUNGS	MAMMARY GLAND	PANCREAS	
FINAL BODY WT(G)	416.			PITUITARY	PROSTATE	SPINAL CORD	SAL. GLAND MAND	
				SKIN	SPLEEN	STOMACH	SEMINAL VESICLES	
				THYMUS	THYROID GLANDS	TRACHEA	URINARY BLADDER	
				DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT		

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

ANIMAL NO. 73687 GROUP 2: 30 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.
LIVER	19.02	4.827
KIDNEYS	3.48	0.883
TESTIS, RIGHT	1.86	0.472
TESTIS, LEFT	1.87	0.475
THYMUS	0.6234	0.158
FINAL BODY WT(G)	394.	

NO SIGNIFICANT CHANGES OBSERVED

GRADE

GROSS:				
	ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
	EYES	HEART	INTESTINE	KIDNEYS
	LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
	PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
	SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
	SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
	URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

ANIMAL NO. 73688 GROUP 2: 30 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.
LIVER	16.77	4.193
KIDNEYS	3.59	0.897
TESTIS, RIGHT	1.94	0.485
TESTIS, LEFT	1.91	0.477
THYMUS	0.6785	0.170
FINAL BODY WT(G)	400.	

NO SIGNIFICANT CHANGES OBSERVED

GRADE			
GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73663 GROUP 3: 100 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	17.99	4.345	
KIDNEYS	3.81	0.920	
TESTIS, RIGHT	2.07	0.500	
TESTIS, LEFT	2.12	0.512	
THYMUS	0.7315	0.177	
FINAL BODY WT(G)	414.		

GRADE			
GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73670 GROUP 3: 100 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	18.68	4.416	
KIDNEYS	3.27	0.773	
TESTIS, RIGHT	1.70	0.402	
TESTIS, LEFT	1.68	0.397	
THYMUS	0.5558	0.131	
FINAL BODY WT(G)	423.		

GRADE			
GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73680 GROUP 3: 100 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	GRADE
LIVER	17.72	4.725	
KIDNEYS	3.06	0.816	
TESTIS, RIGHT	1.56	0.416	
TESTIS, LEFT	1.60	0.427	
THYMUS	0.8100	0.216	
FINAL BODY WT(G)	375.		

NO SIGNIFICANT CHANGES OBSERVED

GROSS:

ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

ANIMAL NO. 73683 GROUP 3: 100 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.
LIVER	16.91	4.546
KIDNEYS	3.19	0.858
TESTIS, RIGHT	1.68	0.452
TESTIS, LEFT	1.67	0.449
THYMUS	0.5300	0.142
FINAL BODY WT(G)	372.	

NO SIGNIFICANT CHANGES OBSERVED

GRADE

GROSS:				
ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
EYES	HEART	INTESTINE	KIDNEYS	
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND	
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD	
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH	
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA	
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT	

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73684 GROUP 3: 100 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	18.54	4.706	
KIDNEYS	2.89	0.734	
TESTIS, RIGHT	1.52	0.386	
TESTIS, LEFT	1.68	0.426	
THYMUS	0.5175	0.131	
FINAL BODY WT(G)	394.		

GRADE			
GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 16

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73667 GROUP 4: 300 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	17.00	4.857	
KIDNEYS	2.91	0.831	
TESTIS, RIGHT	1.54	0.440	
TESTIS, LEFT	1.52	0.434	
THYMUS	0.4702	0.134	
FINAL BODY WT(G)	350.		

GRADE			
GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

ANIMAL NO. 73674 GROUP 4: 300 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	18.98	4.930	
KIDNEYS	3.34	0.868	
TESTIS, RIGHT	1.73	0.449	
TESTIS, LEFT	1.60	0.416	
THYMUS	0.4546	0.118	
FINAL BODY WT(G)	385.		

GRADE			
GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 18

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73675 GROUP 4: 300 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	20.97	5.336	
KIDNEYS	3.22	0.819	
TESTIS, RIGHT	1.62	0.412	
TESTIS, LEFT	1.59	0.405	
THYMUS	0.8064	0.205	
FINAL BODY WT(G)	393.		

GRADE			
GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

ANIMAL NO. 73681 GROUP 4: 300 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	KIDNEYS					GRADE
LIVER	24.27	5.430		GROSS: PALE				P
KIDNEYS	3.89	0.870	NO SIGNIFICANT		BILATERAL			
TESTIS, RIGHT	1.71	0.383	CHANGES OBSERVED	GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
TESTIS, LEFT	1.75	0.391		EYES	HEART	INTESTINE	LIVER	
THYMUS	0.7538	0.169		LN, MESENTERIC	LUNGS	MAMMARY GLAND	PANCREAS	
FINAL BODY WT(G)	447.			PITUITARY	PROSTATE	SPINAL CORD	SAL. GLAND MAND	
				SKIN	SPLEEN	STOMACH	SEMINAL VESICLES	
				THYMUS	THYROID GLANDS	TRACHEA	URINARY BLADDER	
				DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT		

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 20

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73685 GROUP 4: 300 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	22.67	5.359	
KIDNEYS	3.54	0.837	
TESTIS, RIGHT	1.95	0.461	
TESTIS, LEFT	1.98	0.468	
THYMUS	0.8258	0.195	
FINAL BODY WT(G)	423.		

GRADE

GROSS:				
ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
EYES	HEART	INTESTINE	KIDNEYS	
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND	
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD	
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH	
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA	
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT	

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 21

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73671 GROUP 5: 1000 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.			GRADE
LIVER	22.79	6.244	KIDNEYS	GROSS: PALE	P
KIDNEYS	4.26	1.167		BILATERAL	
TESTIS, RIGHT	1.68	0.460	SKIN	GROSS: HAIR LOSS	P
TESTIS, LEFT	1.65	0.452		VENTRAL ABDOMINAL	
THYMUS	0.4357	0.119	NO SIGNIFICANT CHANGES OBSERVED		
FINAL BODY WT(G)	365.				

GROSS:

ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	LIVER
LN, MESENTERIC	LUNGS	MAMMARY GLAND	PANCREAS
PITUITARY	PROSTATE	SPINAL CORD	SAL. GLAND MAND
SPLEEN	STOMACH	SEMINAL VESICLES	THYMUS
THYROID GLANDS	TRACHEA	URINARY BLADDER	DIAPHRAGM
TESTIS, RIGHT	TESTIS, LEFT		

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73677 GROUP 5: 1000 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	GRADE
LIVER	25.81	6.901	
KIDNEYS	3.77	1.008	
TESTIS, RIGHT	1.90	0.508	
TESTIS, LEFT	1.75	0.468	
THYMUS	0.3647	0.098	
FINAL BODY WT(G)	374.		

NO SIGNIFICANT CHANGES OBSERVED

GROSS:

ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73678 GROUP 5: 1000 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	27.28	6.389	
KIDNEYS	3.84	0.899	
TESTIS, RIGHT	1.49	0.349	
TESTIS, LEFT	1.46	0.342	
THYMUS	0.4200	0.098	
FINAL BODY WT(G)	427.		

GRADE			
GROSS: ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS
EYES	HEART	INTESTINE	KIDNEYS
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

TABLE I8 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MACROSCOPIC FINDINGS

ANIMAL NO. 73686 GROUP 5: 1000 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.	NO SIGNIFICANT CHANGES OBSERVED
LIVER	21.08	6.146	
KIDNEYS	2.93	0.854	
TESTIS, RIGHT	1.69	0.493	
TESTIS, LEFT	1.69	0.493	
THYMUS	0.5671	0.165	
FINAL BODY WT(G)	343.		

GRADE

GROSS:				
ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
EYES	HEART	INTESTINE	KIDNEYS	
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND	
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD	
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH	
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA	
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT	

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

ANIMAL NO. 73690 GROUP 5: 1000 MG/KG/DAY MALE SCHEDULED EUTH 06/16/10 DATE OF DEATH: 06/16/10

ORGAN WEIGHT	ABS.(G)	REL.
LIVER	22.39	6.644
KIDNEYS	3.60	1.068
TESTIS, RIGHT	2.00	0.593
TESTIS, LEFT	2.07	0.614
THYMUS	0.1993	0.059
FINAL BODY WT(G)	337.	

NO SIGNIFICANT CHANGES OBSERVED

GRADE

GROSS:				
ADRENAL GLANDS	BRAIN	EPIDIDYMIDES	ESOPHAGUS	
EYES	HEART	INTESTINE	KIDNEYS	
LIVER	LN, MESENTERIC	LUNGS	MAMMARY GLAND	
PANCREAS	PITUITARY	PROSTATE	SPINAL CORD	
SAL. GLAND MAND	SKIN	SPLEEN	STOMACH	
SEMINAL VESICLES	THYMUS	THYROID GLANDS	TRACHEA	
URINARY BLADDER	DIAPHRAGM	TESTIS, RIGHT	TESTIS, LEFT	

GROSS GRADE CODE: 1-SLIGHT, 2-MODERATE, 3-MARKED, P-PRESENT

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07/16/2010

TABLE I9 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WEIGHTS AND FINAL BODY WEIGHTS [G]

MALE GROUP: 0 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73665	421.	19.20	3.57	1.56	1.55	0.4311
73666	398.	18.27	2.98	1.68	1.72	0.4517
73676	433.	21.50	3.41	1.93	1.94	0.7997
73691	383.	15.25	2.78	1.64	1.62	0.4888
73692	393.	17.80	3.22	1.89	1.72	0.5043
MEAN	406.	18.40	3.19	1.74	1.71	0.5351
S.D.	20.7	2.267	0.319	0.162	0.147	0.15073
S.E.	9.3	1.014	0.142	0.072	0.066	0.06741
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I9 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WEIGHTS AND FINAL BODY WEIGHTS [G]

MALE GROUP: 30 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73668	371.	16.87	3.07	1.76	1.68	0.7645
73669	410.	18.77	3.08	1.64	1.62	0.5729
73682	416.	19.05	3.02	1.95	1.90	0.5944
73687	394.	19.02	3.48	1.86	1.87	0.6234
73688	400.	16.77	3.59	1.94	1.91	0.6785
MEAN	398.	18.10	3.25	1.83	1.80	0.6467
S.D.	17.4	1.170	0.266	0.131	0.136	0.07683
S.E.	7.8	0.523	0.119	0.058	0.061	0.03436
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I9 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WEIGHTS AND FINAL BODY WEIGHTS [G]

MALE GROUP: 100 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73663	414.	17.99	3.81	2.07	2.12	0.7315
73670	423.	18.68	3.27	1.70	1.68	0.5558
73680	375.	17.72	3.06	1.56	1.60	0.8100
73683	372.	16.91	3.19	1.68	1.67	0.5300
73684	394.	18.54	2.89	1.52	1.68	0.5175
MEAN	396.	17.97	3.24	1.71	1.75	0.6290
S.D.	22.8	0.710	0.348	0.217	0.210	0.13310
S.E.	10.2	0.317	0.155	0.097	0.094	0.05952
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I9 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WEIGHTS AND FINAL BODY WEIGHTS [G]

MALE GROUP: 300 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73667	350.	17.00	2.91	1.54	1.52	0.4702
73674	385.	18.98	3.34	1.73	1.60	0.4546
73675	393.	20.97	3.22	1.62	1.59	0.8064
73681	447.	24.27	3.89	1.71	1.75	0.7538
73685	423.	22.67	3.54	1.95	1.98	0.8258
MEAN	400.	20.78	3.38	1.71	1.69	0.6622
S.D.	37.1	2.886	0.365	0.154	0.183	0.18433
S.E.	16.6	1.291	0.163	0.069	0.082	0.08244
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

MALE GROUP: 1000 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73671	365.	22.79	4.26	1.68	1.65	0.4357
73677	374.	25.81	3.77	1.90	1.75	0.3647
73678	427.	27.28	3.84	1.49	1.46	0.4200
73686	343.	21.08	2.93	1.69	1.69	0.5671
73690	337.	22.39	3.60	2.00	2.07	0.1993
MEAN	369.	23.87	3.68	1.75	1.72	0.3974
S.D.	35.7	2.575	0.485	0.201	0.222	0.13331
S.E.	16.0	1.152	0.217	0.090	0.099	0.05962
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I10 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

MALE GROUP: 0 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73665	421.	4.561	0.848	0.371	0.368	0.102
73666	398.	4.590	0.749	0.422	0.432	0.113
73676	433.	4.965	0.788	0.446	0.448	0.185
73691	383.	3.982	0.726	0.428	0.423	0.128
73692	393.	4.529	0.819	0.481	0.438	0.128
MEAN	406.	4.530	0.790	0.430	0.420	0.131
S.D.	20.7	0.3517	0.0499	0.0401	0.0313	0.0320
S.E.	9.3	0.1573	0.0223	0.0179	0.0140	0.0143
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I10 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

MALE GROUP: 30 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73668	371.	4.547	0.827	0.474	0.453	0.206
73669	410.	4.578	0.751	0.400	0.395	0.140
73682	416.	4.579	0.726	0.469	0.457	0.143
73687	394.	4.827	0.883	0.472	0.475	0.158
73688	400.	4.193	0.897	0.485	0.477	0.170
MEAN	398.	4.540	0.820	0.460	0.450	0.163
S.D.	17.4	0.2271	0.0768	0.0341	0.0332	0.0267
S.E.	7.8	0.1016	0.0343	0.0153	0.0149	0.0119
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I10 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

MALE GROUP: 100 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73663	414.	4.345	0.920	0.500	0.512	0.177
73670	423.	4.416	0.773	0.402	0.397	0.131
73680	375.	4.725	0.816	0.416	0.427	0.216
73683	372.	4.546	0.858	0.452	0.449	0.142
73684	394.	4.706	0.734	0.386	0.426	0.131
MEAN	396.	4.550	0.820	0.430	0.440	0.159
S.D.	22.8	0.1694	0.0727	0.0456	0.0431	0.0368
S.E.	10.2	0.0757	0.0325	0.0204	0.0193	0.0165
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I10 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

MALE GROUP: 300 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73667	350.	4.857	0.831	0.440	0.434	0.134
73674	385.	4.930	0.868	0.449	0.416	0.118
73675	393.	5.336	0.819	0.412	0.405	0.205
73681	447.	5.430	0.870	0.383	0.391	0.169
73685	423.	5.359	0.837	0.461	0.468	0.195
MEAN	400.	5.180	0.850	0.430	0.420	0.164
S.D.	37.1	0.2672	0.0227	0.0316	0.0298	0.0377
S.E.	16.6	0.1195	0.0101	0.0141	0.0133	0.0169
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I10 (MALES)

PROJECT NO.:WIL-402010M ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

MALE GROUP: 1000 MG/KG/DAY

ANIMAL	FBW(G)	LIVER	KIDNEYS	TESTIS, RIGHT	TESTIS, LEFT	THYMUS
73671	365.	6.244	1.167	0.460	0.452	0.119
73677	374.	6.901	1.008	0.508	0.468	0.098
73678	427.	6.389	0.899	0.349	0.342	0.098
73686	343.	6.146	0.854	0.493	0.493	0.165
73690	337.	6.644	1.068	0.593	0.614	0.059
MEAN	369.	6.460	1.000	0.480	0.470	0.108
S.D.	35.7	0.3077	0.1265	0.0886	0.0974	0.0386
S.E.	16.0	0.1376	0.0566	0.0396	0.0436	0.0173
N	5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

TABLE I11 (FEMALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY 0 1 2 3 4 5 6 7 8 9	1 0	1 1	1 2	1 3	1 4	1 5	1 6	1 7	1 8	1 9	2 0
NO SIGNIFICANT CLINICAL OBSERVATIONS	73710	1	P P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73704	1	P P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73694	1	P P P P P P P P P P	P	P	P	P			P				
	73713	1	P P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73720	1	P P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73702	2	P P P											
	73697	2	P P P P P P P P											
	73706	2	P P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73709	2	P P P P P P P P P P	P	P	P	P	P						
	73719	2	P P P P P P P P P						P					
	73696	3	P P P P P P P P P P	P	P	P	P	P	P	P	P	P		
	73714	3	P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73705	3	P P P P P P P P P P	P	P	P	P					P		
	73708	4	P P P P P P P	P	P	P	P	P	P	P	P			
	73712	4	P P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73698	4	P P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73717	4	P P P P P P P P P P	P	P	P	P	P	P	P	P	P	P	P
	73693	4	P P P											
	73718	5	P P P P P P P P											
	73701	5	P P											
	73721	5	P P P P P P											
	73707	5	P P P											P
	73722	5	P P P P P P P P P	P		P	P	P	P	P	P	P	P	P
SCHEDULED EUTHANASIA; GESTATION DAY 20	73710	1												P
	73704	1												P
	73694	1												P

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE I11 (FEMALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY 0 1 2 3 4 5 6 7 8 9	1 1 1 1 1 1 1 1 1 1 2 0 1 2 3 4 5 6 7 8 9 0
SCHEDULED EUTHANASIA; GESTATION DAY 20	73713	1		P
	73720	1		P
	73702	2		P
	73697	2		P
	73706	2		P
	73709	2		P
	73719	2		P
	73696	3		P
	73699	3		P
	73714	3		P
	73705	3		P
	73700	3		P
	73708	4		P
	73712	4		P
	73698	4		P
	73717	4		P
	73693	4		P
	73718	5		P
	73701	5		P
	73721	5		P
	73707	5		P
	73722	5		P
HUNCHED POSTURE	73701	5	P P	
HAIR LOSS RIGHT FORELIMB	73694	1		1 1 1 1
	73702	2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HAIR LOSS RIGHT FORELIMB	73697	2									1	1	1	1	1	1	1	1	1	1	1	1	1
	73709	2																1	1	1	1	1	1
	73696	3																				1	1
	73699	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	73705	3															1	1	1	1		1	1
	73700	3	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	73708	4					1	1													1	1	1
HAIR LOSS LEFT FORELIMB	73694	1															1	1		1	1	1	1
	73702	2					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	73697	2								1	1	1	1	1	1	1	1	1	1	1	1	1	1
	73709	2																1	1	1	1	1	1
	73696	3																				1	1
	73699	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	73705	3																				1	
	73700	3	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	73708	4																				1	
HAIR LOSS RIGHT HINDLIMB	73697	2									1												
	73700	3														1	1	2	1	1	1	1	1
	73693	4					1	1	1	1	1	1	1	1	1	2	2	2	2	2	2		
	73718	5										1	1	1	1	1	1	1	1	2	1	1	1
	73701	5		1		1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1
HAIR LOSS VENTRAL ABDOMINAL AREA	73697	2																			1		
	73714	3							1		1												
	73700	3			1	1	1		1	1	2	2	2	2	2	2	3	3	2	2	2	2	

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE I11 (FEMALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 4

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HAIR LOSS VENTRAL ABDOMINAL AREA	73693	4															1		1	1	1	1	1
	73718	5								1	1	1	1	2	2	1	1	1	1	2	2	1	1
	73701	5		1							1	1	1	1	1	1	1	1	1	1	1	1	1
	73707	5																	1	1	1	1	
WET YELLOW MATERIAL ANOGENITAL AREA	73709	2																					2
	73700	3		1																			
	73701	5				1	2	2	2														
	73721	5							3	1													
HAIR LOSS VENTRAL NECK	73708	4					1	1	1														
	73707	5											1										
WET YELLOW MATERIAL VENTRAL ABDOMINAL AREA	73693	4			1	1																	
	73701	5			3	1	1	2	1														
	73707	5			1	1	1	1															
WET YELLOW MATERIAL UROGENITAL AREA	73709	2																					1
	73705	3																				1	
	73693	4			1	1	1																
	73701	5			3	2	2	2	2														
	73721	5					1	1															
	73707	5			1	1	1	1															
	73722	5												1	1								
WET YELLOW MATERIAL RIGHT INGUINAL AREA	73700	3																	1				
	73701	5			2	1	1	1	2														

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE I11 (FEMALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
WET YELLOW MATERIAL LEFT INGUINAL AREA	73700	3	1
	73718	5	1
	73701	5	2 1 1 1
HAIR LOSS LEFT HINDLIMB	73719	2	1 1 1 1 1 1
	73700	3	1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	73708	4	1
	73693	4	1 2
	73718	5	1 1 2 2 1 1 1 1 1 2 1 1 1
	73701	5	1 1 1 1 2 1 1 1 1
WET YELLOW MATERIAL RIGHT HINDLIMB	73701	5	1 1 2 1 1
WET YELLOW MATERIAL LEFT HINDLIMB	73701	5	1 1 1
HAIR LOSS RUMP	73719	2	1 1 1 1 1
	73700	3	1 1 1 1 1 1 1 1 1 1 1 1
	73693	4	1 1 1 1 1 1 1 1 1 1
	73718	5	1 1 1 1 1
	73701	5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
HAIR LOSS LEFT LATERAL ABDOMINAL AREA	73700	3	2 1 2 2 1 1 1 1 1 1 1 1 1 1
	73718	5	1 1 1
DRIED RED MATERIAL VENTRAL ABDOMINAL AREA	73707	5	2 1 1 1 1 1 1 1 1
DRIED RED MATERIAL UROGENITAL AREA	73721	5	1

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE I11 (FEMALES - DAILY EXAMINATIONS)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 6

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY 0 1 2 3 4 5 6 7 8 9	1 0	1 1 2 3 4 5 6 7 8 9	2 0
DRIED RED MATERIAL UROGENITAL AREA	73707	5	2 1 1 1 1 1			
DRIED RED MATERIAL RIGHT INGUINAL AREA	73707	5	1			
DRIED RED MATERIAL ANOGENITAL AREA	73721	5		1 2 1 1 1	1 1	
HAIR LOSS VENTRAL THORACIC AREA	73700	3			1	1 1
	73693	4				1
	73718	5		1	1	
	73707	5		1		
SCABBING VENTRAL ABDOMINAL AREA	73700	3		P P P P		
SCABBING LEFT HINDLIMB	73700	3		P P		
HAIR LOSS UROGENITAL AREA	73700	3		1	1	2 2 2
	73701	5				1
	73721	5			1 1 1 1	
HAIR LOSS BASE OF TAIL	73700	3			2 1 1 1 1	
	73693	4			1 1 1 1 1	
	73701	5			1 1 1 1	
HAIR LOSS ANOGENITAL AREA	73700	3			1 1 2 2 2	
	73701	5				1 1
DRIED RED MATERIAL AROUND RIGHT EYE	73701	5	1 1			

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

OBSERVATION	ANIMAL	GROUP	GESTATIONAL DAY 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
DRIED RED MATERIAL AROUND LEFT EYE	73701	5	1 1 1
DRIED RED MATERIAL AROUND NOSE	73693	4	1
	73701	5	1 1 1
	73707	5	1
	73722	5	1 1 1
DECREASED DEFECATION	73701	5	P P P P P
	73707	5	P P P
HAIR LOSS LEFT INGUINAL AREA	73700	3	2 2 1 2 2 2 2
	73701	5	1
	73721	5	1 1
HAIR LOSS RIGHT INGUINAL AREA	73700	3	2 2 2
	73693	4	1 1 1 1 1
	73701	5	1
	73721	5	1 1
DRIED RED MATERIAL AROUND MOUTH	73693	4	1
	73701	5	1 2
	73707	5	1 1
SALIVATION	73707	5	1

GRADE CODE: P = PRESENT 1 = SLIGHT 2 = MODERATE 3 = SEVERE

1- 0 MG/KG/DAY 2- 30 MG/KG/DAY 3- 100 MG/KG/DAY 4- 300 MG/KG/DAY 5- 1000 MG/KG/DAY

TABLE I12 (FEMALES - AT TIME OF DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				AT TIME OF DOSING			
73721	F	1000 MG/KG/DAY	ORAL/DENTAL	06-13-10	9:46	1	SALIVATION PRIOR TO DOSING
73707	F	1000 MG/KG/DAY	ORAL/DENTAL	06-13-10	9:46	2	SALIVATION PRIOR TO DOSING
				06-14-10	10:19	1	SALIVATION PRIOR TO DOSING
				06-17-10	10:02	1	SALIVATION PRIOR TO DOSING
				06-18-10	9:57	2	SALIVATION PRIOR TO DOSING
				06-21-10	9:54	2	SALIVATION PRIOR TO DOSING

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73710	F	0 MG/KG/DAY	NORMAL	06-02-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73704	F	0 MG/KG/DAY	NORMAL	06-03-10	10:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73704	F	0 MG/KG/DAY	NORMAL	06-12-10	10:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73694	F	0 MG/KG/DAY	NORMAL	06-04-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:22	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:28	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:20	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73694	F	0 MG/KG/DAY	NORMAL	06-22-10	9:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-23-10	9:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73713	F	0 MG/KG/DAY	NORMAL	06-04-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:22	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:20	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-23-10	9:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73720	F	0 MG/KG/DAY	NORMAL	06-05-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73720	F	0 MG/KG/DAY	NORMAL	06-12-10	10:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-23-10	9:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-24-10	9:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73702	F	30 MG/KG/DAY	NORMAL	06-03-10	10:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 5

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73702	F	30 MG/KG/DAY	NORMAL	06-19-10	10:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73697	F	30 MG/KG/DAY	NORMAL	06-03-10	10:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:29	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73706	F	30 MG/KG/DAY	NORMAL	06-03-10	10:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 6

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73706	F	30 MG/KG/DAY	NORMAL	06-08-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:21	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73709	F	30 MG/KG/DAY	NORMAL	06-04-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 7

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73709	F	30 MG/KG/DAY	NORMAL	06-19-10	10:22	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-23-10	9:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73709	F	30 MG/KG/DAY	ORAL/DENTAL	06-08-10	10:45	1	DRIED RED MATERIAL AROUND MOUTH
73719	F	30 MG/KG/DAY	NORMAL	06-05-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:22	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-23-10	9:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-24-10	9:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73696	F	100 MG/KG/DAY	NORMAL	06-02-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 8

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73696	F	100 MG/KG/DAY	NORMAL	06-05-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:22	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73696	F	100 MG/KG/DAY	ORAL/DENTAL	06-21-10	10:34	1	WET CLEAR MATERIAL AROUND MOUTH
73699	F	100 MG/KG/DAY	NORMAL	06-03-10	10:30	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 9

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73699	F	100 MG/KG/DAY	NORMAL	06-15-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73714	F	100 MG/KG/DAY	NORMAL	06-03-10	10:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73714	F	100 MG/KG/DAY	BODY/INTEGUMENT	06-22-10	9:49	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-22-10	9:49	1	WET CLEAR MATERIAL LEFT FORELIMB
73714	F	100 MG/KG/DAY	EYES/EARS/NOSE	06-22-10	9:49	1	WET CLEAR MATERIAL AROUND NOSE

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73714	F	100 MG/KG/DAY	ORAL/DENTAL	06-14-10	10:53	1	WET CLEAR MATERIAL AROUND MOUTH
				06-22-10	9:49	2	WET CLEAR MATERIAL AROUND MOUTH
73705	F	100 MG/KG/DAY	NORMAL	06-04-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:34	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:23	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73705	F	100 MG/KG/DAY	ORAL/DENTAL	06-14-10	10:53	1	WET CLEAR MATERIAL AROUND MOUTH
				06-16-10	10:48	1	WET CLEAR MATERIAL AROUND MOUTH
				06-21-10	10:35	1	WET CLEAR MATERIAL AROUND MOUTH
				06-22-10	9:50	2	WET CLEAR MATERIAL AROUND MOUTH
				06-23-10	9:45	1	WET CLEAR MATERIAL AROUND MOUTH
73700	F	100 MG/KG/DAY	NORMAL	06-05-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:56	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:42	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 11

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73700	F	100 MG/KG/DAY	NORMAL	06-13-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:48	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:24	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:35	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-24-10	9:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73700	F	100 MG/KG/DAY	EYES/EARS/NOSE	06-23-10	9:46	1	WET CLEAR MATERIAL AROUND NOSE
73700	F	100 MG/KG/DAY	BODY/INTEG II	06-15-10	10:51	1	WET CLEAR MATERIAL VENTRAL NECK
73700	F	100 MG/KG/DAY	ORAL/DENTAL	06-08-10	10:47	1	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	10:51	1	WET CLEAR MATERIAL AROUND MOUTH
				06-17-10	10:51	2	WET CLEAR MATERIAL AROUND MOUTH
				06-23-10	9:46	2	WET CLEAR MATERIAL AROUND MOUTH
73708	F	300 MG/KG/DAY	NORMAL	06-02-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-03-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:18	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:43	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:24	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73708	F	300 MG/KG/DAY	NORMAL	06-20-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73708	F	300 MG/KG/DAY	EYES/EARS/NOSE	06-15-10	10:52	1	WET CLEAR MATERIAL AROUND NOSE
				06-21-10	10:36	1	WET CLEAR MATERIAL AROUND NOSE
73708	F	300 MG/KG/DAY	BODY/INTEG II	06-15-10	10:52	1	WET CLEAR MATERIAL VENTRAL NECK
73708	F	300 MG/KG/DAY	ORAL/DENTAL	06-08-10	10:53	1	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:35	2	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	10:52	2	WET CLEAR MATERIAL AROUND MOUTH
				06-16-10	10:49	1	WET CLEAR MATERIAL AROUND MOUTH
				06-21-10	10:36	2	WET CLEAR MATERIAL AROUND MOUTH
73712	F	300 MG/KG/DAY	NORMAL	06-03-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:18	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:57	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:24	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:38	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73712	F	300 MG/KG/DAY	EYES/EARS/NOSE	06-18-10	10:44	1	WET CLEAR MATERIAL AROUND NOSE
73712	F	300 MG/KG/DAY	ORAL/DENTAL	06-17-10	10:52	2	WET CLEAR MATERIAL AROUND MOUTH
				06-18-10	10:44	2	WET CLEAR MATERIAL AROUND MOUTH
				06-21-10	10:37	1	DRIED CLEAR MATERIAL AROUND MOUTH

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 13

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73712	F	300 MG/KG/DAY	ORAL/DENTAL	06-22-10	9:50	1	DRIED RED MATERIAL AROUND MOUTH
73698	F	300 MG/KG/DAY	NORMAL	06-03-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-04-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:32	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73717	F	300 MG/KG/DAY	NORMAL	06-04-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:58	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73717	F	300 MG/KG/DAY	NORMAL	06-12-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:44	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-23-10	9:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73693	F	300 MG/KG/DAY	NORMAL	06-05-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:19	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-13-10	10:33	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-15-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:49	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:45	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:37	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73693	F	300 MG/KG/DAY	BODY/INTEGUMENT	06-24-10	9:55	2	WET YELLOW MATERIAL ANOGENITAL AREA

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73693	F	300 MG/KG/DAY	EYES/EARS/NOSE	06-22-10	9:52	2	WET CLEAR MATERIAL AROUND NOSE
73693	F	300 MG/KG/DAY	BODY/INTEG II	06-22-10	9:52	1	WET CLEAR MATERIAL VENTRAL NECK
73693	F	300 MG/KG/DAY	ORAL/DENTAL	06-14-10	10:55	1	WET CLEAR MATERIAL AROUND MOUTH
				06-22-10	9:52	2	WET CLEAR MATERIAL AROUND MOUTH
				06-23-10	9:48	1	WET CLEAR MATERIAL AROUND MOUTH
				06-24-10	9:55	1	WET CLEAR MATERIAL AROUND MOUTH
73718	F	1000 MG/KG/DAY	NORMAL	06-03-10	10:47	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:24	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	10:59	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	11:02	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	11:03	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-14-10	11:06	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:25	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73718	F	1000 MG/KG/DAY	ORAL/DENTAL	06-04-10	11:00	1	WET CLEAR MATERIAL AROUND MOUTH
				06-05-10	10:53	1	WET CLEAR MATERIAL AROUND MOUTH
				06-11-10	11:14	1	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:51	1	WET CLEAR MATERIAL AROUND MOUTH
				06-13-10	10:34	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:08	1	WET RED MATERIAL AROUND MOUTH
				06-18-10	10:45	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-22-10	9:52	1	WET CLEAR MATERIAL AROUND MOUTH
73701	F	1000 MG/KG/DAY	NORMAL	06-04-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73701	F	1000 MG/KG/DAY	NORMAL	06-11-10	11:14	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:52	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-18-10	10:46	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:39	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73701	F	1000 MG/KG/DAY	BEHAVIOR/CNS	06-05-10	11:04	P	HUNCHED POSTURE
				06-05-10	11:05	1	ROCKS, LURCHES, OR SWAYS AS IT WALKS
				06-06-10	11:26	P	HUNCHED POSTURE
				06-07-10	11:00	P	HUNCHED POSTURE
73701	F	1000 MG/KG/DAY	BODY/INTEGUMENT	06-13-10	10:35	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-13-10	10:36	1	WET CLEAR MATERIAL LEFT FORELIMB
				06-14-10	11:08	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-14-10	11:08	1	WET CLEAR MATERIAL LEFT FORELIMB
				06-15-10	11:09	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-15-10	11:09	1	WET CLEAR MATERIAL LEFT FORELIMB
				06-23-10	9:49	2	WET CLEAR MATERIAL RIGHT FORELIMB
				06-23-10	9:49	2	WET CLEAR MATERIAL LEFT FORELIMB
73701	F	1000 MG/KG/DAY	EYES/EARS/NOSE	06-14-10	11:07	1	WET CLEAR MATERIAL AROUND NOSE
				06-16-10	10:51	1	DRIED RED MATERIAL AROUND NOSE
				06-23-10	9:48	2	WET CLEAR MATERIAL AROUND NOSE
73701	F	1000 MG/KG/DAY	BODY/INTEG II	06-14-10	11:08	1	WET CLEAR MATERIAL VENTRAL NECK
				06-23-10	9:49	2	WET CLEAR MATERIAL VENTRAL NECK
73701	F	1000 MG/KG/DAY	ORAL/DENTAL	06-08-10	11:04	2	DRIED RED MATERIAL AROUND MOUTH
				06-13-10	10:34	2	WET CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:07	2	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:09	2	WET CLEAR MATERIAL AROUND MOUTH
				06-16-10	10:51	1	WET CLEAR MATERIAL AROUND MOUTH

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I13 (FEMALES - 1 HOUR POST-DOSING)

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL CLINICAL OBSERVATIONS

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73701	F	1000 MG/KG/DAY	ORAL/DENTAL	06-22-10	9:53	1	WET CLEAR MATERIAL AROUND MOUTH
				06-23-10	9:48	2	WET CLEAR MATERIAL AROUND MOUTH
73721	F	1000 MG/KG/DAY	NORMAL	06-04-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-05-10	11:06	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-07-10	11:01	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:54	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:15	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-16-10	10:51	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:26	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-20-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-22-10	9:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-23-10	9:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73721	F	1000 MG/KG/DAY	BODY/INTEGUMENT	06-15-10	11:09	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-15-10	11:09	1	WET CLEAR MATERIAL LEFT FORELIMB
73721	F	1000 MG/KG/DAY	ORAL/DENTAL	06-12-10	10:52	1	DRIED RED MATERIAL AROUND MOUTH
				06-13-10	10:36	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:09	1	DRIED RED MATERIAL AROUND MOUTH
				06-15-10	11:09	2	WET CLEAR MATERIAL AROUND MOUTH
				06-17-10	10:54	1	WET CLEAR MATERIAL AROUND MOUTH
				06-18-10	10:47	1	DRIED CLEAR MATERIAL AROUND MOUTH
73707	F	1000 MG/KG/DAY	NORMAL	06-04-10	11:00	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	11:04	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-11-10	11:15	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-12-10	10:53	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73707	F	1000 MG/KG/DAY	NORMAL	06-13-10	10:36	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73707	F	1000 MG/KG/DAY	BEHAVIOR/CNS	06-05-10	11:07	P	PROSTRATE
				06-06-10	11:28	P	HUNCHED POSTURE
				06-06-10	11:28	1	ROCKS, LURCHES, OR SWAYS AS IT WALKS
73707	F	1000 MG/KG/DAY	BODY/INTEGUMENT	06-15-10	11:10	1	WET CLEAR MATERIAL LEFT FORELIMB
73707	F	1000 MG/KG/DAY	EYES/EARS/NOSE	06-05-10	11:13	2	LACRIMATION RIGHT EYE
				06-05-10	11:13	2	LACRIMATION LEFT EYE
				06-15-10	11:10	1	WET CLEAR MATERIAL AROUND NOSE
73707	F	1000 MG/KG/DAY	ORAL/DENTAL	06-06-10	11:30	1	DRIED RED MATERIAL AROUND MOUTH
				06-07-10	11:02	2	DRIED RED MATERIAL AROUND MOUTH
				06-08-10	11:05	1	DRIED RED MATERIAL AROUND MOUTH
				06-14-10	11:09	1	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:10	2	WET CLEAR MATERIAL AROUND MOUTH
				06-16-10	10:51	2	SALIVATION
				06-17-10	10:54	1	WET CLEAR MATERIAL AROUND MOUTH
				06-18-10	10:47	2	SALIVATION
				06-18-10	10:47	1	WET CLEAR MATERIAL AROUND MOUTH
				06-19-10	10:27	1	WET CLEAR MATERIAL AROUND MOUTH
				06-20-10	10:40	2	WET RED MATERIAL AROUND MOUTH
				06-21-10	10:40	2	WET CLEAR MATERIAL AROUND MOUTH
				06-22-10	9:53	1	WET CLEAR MATERIAL AROUND MOUTH
				06-23-10	9:50	2	WET CLEAR MATERIAL AROUND MOUTH
73722	F	1000 MG/KG/DAY	NORMAL	06-05-10	11:13	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-06-10	11:31	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-08-10	11:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-09-10	11:05	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-10-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-17-10	10:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-19-10	10:27	P	NO SIGNIFICANT CLINICAL OBSERVATIONS

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE RANGE: 06-02-10 TO 06-24-10

ANIMAL	SEX	GROUP	CATEGORY	DATE	TIME	GRADE	OBSERVATIONS
				POST-DOSING OBSERVATIONS			
73722	F	1000 MG/KG/DAY	NORMAL	06-20-10	10:40	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-21-10	10:41	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-23-10	9:50	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
				06-24-10	9:55	P	NO SIGNIFICANT CLINICAL OBSERVATIONS
73722	F	1000 MG/KG/DAY	BODY/INTEGUMENT	06-14-10	11:10	1	WET CLEAR MATERIAL RIGHT FORELIMB
				06-14-10	11:10	1	WET CLEAR MATERIAL LEFT FORELIMB
73722	F	1000 MG/KG/DAY	EYES/EARS/NOSE	06-22-10	9:54	1	WET CLEAR MATERIAL AROUND NOSE
73722	F	1000 MG/KG/DAY	ORAL/DENTAL	06-07-10	11:02	1	DRIED RED MATERIAL AROUND MOUTH
				06-11-10	11:15	1	WET CLEAR MATERIAL AROUND MOUTH
				06-12-10	10:53	1	WET CLEAR MATERIAL AROUND MOUTH
				06-13-10	10:37	1	DRIED CLEAR MATERIAL AROUND MOUTH
				06-14-10	11:09	1	WET CLEAR MATERIAL AROUND MOUTH
				06-15-10	11:10	1	DRIED RED MATERIAL AROUND MOUTH
				06-16-10	10:52	1	DRIED RED MATERIAL AROUND MOUTH
				06-18-10	10:48	2	WET CLEAR MATERIAL AROUND MOUTH
				06-22-10	9:54	2	WET CLEAR MATERIAL AROUND MOUTH

GRADE CODE: 1 - SLIGHT 2 - MODERATE 3 - SEVERE P - PRESENT

TABLE I14

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0	6	7	10	14	17	20	
DAMS FROM GROUP 1: 0 MG/KG/DAY									
73710	G	251.	266.	271.	280.	305.	334.	375.	SCHEDULED NECROPSY DAY 20
73704	G	257.	280.	276.	297.	317.	351.	397.	SCHEDULED NECROPSY DAY 20
73694	G	243.	255.	263.	274.	282.	310.	345.	SCHEDULED NECROPSY DAY 20
73713	G	247.	268.	271.	291.	311.	350.	385.	SCHEDULED NECROPSY DAY 20
73720	G	268.	289.	292.	293.	302.	344.	392.	SCHEDULED NECROPSY DAY 20
MEAN		253.	272.	275.	287.	303.	338.	379.	
S.D.		9.8	13.2	10.8	9.6	13.3	16.9	20.6	
S.E.		4.4	5.9	4.8	4.3	5.9	7.6	9.2	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I14

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0	6	7	10	14	17	20	
DAMS FROM GROUP 2: 30 MG/KG/DAY									
73702	G	257.	280.	286.	302.	322.	356.	414.	SCHEDULED NECROPSY DAY 20
73697	G	251.	254.	263.	276.	300.	327.	373.	SCHEDULED NECROPSY DAY 20
73706	G	225.	249.	250.	263.	279.	308.	353.	SCHEDULED NECROPSY DAY 20
73709	G	257.	280.	276.	291.	307.	347.	380.	SCHEDULED NECROPSY DAY 20
73719	G	252.	272.	269.	295.	306.	359.	406.	SCHEDULED NECROPSY DAY 20
MEAN		248.	267.	269.	285.	303.	339.	385.	
S.D.		13.4	14.6	13.6	15.7	15.6	21.5	24.9	
S.E.		6.0	6.5	6.1	7.0	7.0	9.6	11.1	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I14

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0	6	7	10	14	17	20	
DAMS FROM GROUP 3: 100 MG/KG/DAY									
73696	G	251.	281.	280.	301.	323.	357.	393.	SCHEDULED NECROPSY DAY 20
73699	G	251.	289.	295.	299.	316.	343.	400.	SCHEDULED NECROPSY DAY 20
73714	G	244.	242.	259.	267.	285.	306.	344.	SCHEDULED NECROPSY DAY 20
73705	G	272.	297.	298.	314.	330.	371.	424.	SCHEDULED NECROPSY DAY 20
73700	G	290.	294.	290.	308.	314.	357.	401.	SCHEDULED NECROPSY DAY 20
MEAN		262.	281.	284.	298.	314.	347.	392.	
S.D.		19.0	22.4	15.8	18.2	17.2	24.9	29.5	
S.E.		8.5	10.0	7.0	8.1	7.7	11.1	13.2	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I14

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0	6	7	10	14	17	20	
DAMS FROM GROUP 4: 300 MG/KG/DAY									
73708	G	290.	305.	305.	316.	341.	372.	418.	SCHEDULED NECROPSY DAY 20
73712	G	246.	259.	264.	280.	293.	305.	349.	SCHEDULED NECROPSY DAY 20
73698	G	235.	244.	261.	277.	298.	331.	363.	SCHEDULED NECROPSY DAY 20
73717	G	262.	275.	274.	297.	301.	332.	370.	SCHEDULED NECROPSY DAY 20
73693	G	249.	257.	256.	279.	289.	335.	366.	SCHEDULED NECROPSY DAY 20
MEAN		256.	268.	272.	290.	304.	335.	373.	
S.D.		21.1	23.4	19.6	16.7	21.0	23.9	26.3	
S.E.		9.4	10.5	8.8	7.5	9.4	10.7	11.7	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I14

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHTS DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0	6	7	10	14	17	20	
DAMS FROM GROUP 5: 1000 MG/KG/DAY									
73718	G	273.	291.	293.	300.	319.	302.	300.	SCHEDULED NECROPSY DAY 20
73701	G	245.	225.	231.	255.	246.	273.	280.	SCHEDULED NECROPSY DAY 20
73721	G	254.	259.	263.	281.	298.	324.	360.	SCHEDULED NECROPSY DAY 20
73707	G	279.	252.	276.	290.	310.	316.	319.	SCHEDULED NECROPSY DAY 20
73722	G	247.	259.	257.	265.	278.	305.	339.	SCHEDULED NECROPSY DAY 20
MEAN		260.	257.	264.	278.	290.	304.	320.	
S.D.		15.5	23.5	23.0	18.3	29.1	19.4	31.5	
S.E.		6.9	10.5	10.3	8.2	13.0	8.7	14.1	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I15

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7- 10	10- 14	14- 17	17- 20	0- 20	
DAMS FROM GROUP 1: 0 MG/KG/DAY									
73710	G	15.	5.	9.	25.	29.	41.	124.	SCHEDULED NECROPSY DAY 20
73704	G	23.	-4.	21.	20.	34.	46.	140.	SCHEDULED NECROPSY DAY 20
73694	G	12.	8.	11.	8.	28.	35.	102.	SCHEDULED NECROPSY DAY 20
73713	G	21.	3.	20.	20.	39.	35.	138.	SCHEDULED NECROPSY DAY 20
73720	G	21.	3.	1.	9.	42.	48.	124.	SCHEDULED NECROPSY DAY 20
MEAN		18.	3.	12.	16.	34.	41.	126.	
S.D.		4.7	4.4	8.3	7.5	6.1	6.0	15.2	
S.E.		2.1	2.0	3.7	3.4	2.7	2.7	6.8	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I15

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7- 10	10- 14	14- 17	17- 20	0- 20	
DAMS FROM GROUP 2: 30 MG/KG/DAY									
73702	G	23.	6.	16.	20.	34.	58.	157.	SCHEDULED NECROPSY DAY 20
73697	G	3.	9.	13.	24.	27.	46.	122.	SCHEDULED NECROPSY DAY 20
73706	G	24.	1.	13.	16.	29.	45.	128.	SCHEDULED NECROPSY DAY 20
73709	G	23.	-4.	15.	16.	40.	33.	123.	SCHEDULED NECROPSY DAY 20
73719	G	20.	-3.	26.	11.	53.	47.	154.	SCHEDULED NECROPSY DAY 20
MEAN		19.	2.	17.	17.	37.	46.	137.	
S.D.		8.8	5.6	5.4	4.9	10.5	8.9	17.3	
S.E.		4.0	2.5	2.4	2.2	4.7	4.0	7.7	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I15

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7- 10	10- 14	14- 17	17- 20	0- 20	
DAMS FROM GROUP 3: 100 MG/KG/DAY									
73696	G	30.	-1.	21.	22.	34.	36.	142.	SCHEDULED NECROPSY DAY 20
73699	G	38.	6.	4.	17.	27.	57.	149.	SCHEDULED NECROPSY DAY 20
73714	G	-2.	17.	8.	18.	21.	38.	100.	SCHEDULED NECROPSY DAY 20
73705	G	25.	1.	16.	16.	41.	53.	152.	SCHEDULED NECROPSY DAY 20
73700	G	4.	-4.	18.	6.	43.	44.	111.	SCHEDULED NECROPSY DAY 20
MEAN		19.	4.	13.	16.	33.	46.	131.	
S.D.		17.2	8.2	7.1	5.9	9.3	9.2	23.7	
S.E.		7.7	3.7	3.2	2.7	4.2	4.1	10.6	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I15

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7- 10	10- 14	14- 17	17- 20	0- 20	
DAMS FROM GROUP 4: 300 MG/KG/DAY									
73708	G	15.	0.	11.	25.	31.	46.	128.	SCHEDULED NECROPSY DAY 20
73712	G	13.	5.	16.	13.	12.	44.	103.	SCHEDULED NECROPSY DAY 20
73698	G	9.	17.	16.	21.	33.	32.	128.	SCHEDULED NECROPSY DAY 20
73717	G	13.	-1.	23.	4.	31.	38.	108.	SCHEDULED NECROPSY DAY 20
73693	G	8.	-1.	23.	10.	46.	31.	117.	SCHEDULED NECROPSY DAY 20
MEAN		12.	4.	18.	15.	31.	38.	117.	
S.D.		3.0	7.7	5.2	8.4	12.1	6.8	11.4	
S.E.		1.3	3.4	2.3	3.8	5.4	3.0	5.1	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I15

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL BODY WEIGHT CHANGES DURING GESTATION [G]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7- 10	10- 14	14- 17	17- 20	0- 20	
DAMS FROM GROUP 5: 1000 MG/KG/DAY									
73718	G	18.	2.	7.	19.	-17.	-2.	27.	SCHEDULED NECROPSY DAY 20
73701	G	-20.	6.	24.	-9.	27.	7.	35.	SCHEDULED NECROPSY DAY 20
73721	G	5.	4.	18.	17.	26.	36.	106.	SCHEDULED NECROPSY DAY 20
73707	G	-27.	24.	14.	20.	6.	3.	40.	SCHEDULED NECROPSY DAY 20
73722	G	12.	-2.	8.	13.	27.	34.	92.	SCHEDULED NECROPSY DAY 20
MEAN		-2.	7.	14.	12.	14.	16.	60.	
S.D.		20.0	10.1	7.1	12.0	19.4	18.0	36.2	
S.E.		8.9	4.5	3.2	5.4	8.7	8.1	16.2	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I16

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS
SPONSOR:AMERICAN PETROLEUM INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

DAM #	PREGNANCY STATUS	INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
GROUP 1: 0 MG/KG/DAY						
73710	G	251.	375.	66.1	308.9	57.9
73704	G	257.	397.	81.6	315.4	58.4
73694	G	243.	345.	74.0	271.0	28.0
73713	G	247.	385.	83.2	301.8	54.8
73720	G	268.	392.	68.6	323.4	55.4
MEAN		253.	379.	74.7	304.1	50.9
S.D.		9.8	20.6	7.61	20.15	12.89
S.E.		4.4	9.2	3.40	9.01	5.77
N		5	5	5	5	5

G = GRAVID

TABLE I16

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

DAM #	PREGNANCY STATUS	INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
GROUP 2: 30 MG/KG/DAY						
73702	G	257.	414.	76.6	337.4	80.4
73697	G	251.	373.	79.8	293.2	42.2
73706	G	225.	353.	66.4	286.6	61.6
73709	G	257.	380.	79.8	300.2	43.2
73719	G	252.	406.	90.3	315.7	63.7
MEAN		248.	385.	78.6	306.6	58.2
S.D.		13.4	24.9	8.55	20.32	15.93
S.E.		6.0	11.1	3.82	9.09	7.13
N		5	5	5	5	5

G = GRAVID

TABLE I16

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

DAM #	PREGNANCY STATUS	INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
GROUP 3: 100 MG/KG/DAY						
73696	G	251.	393.	85.1	307.9	56.9
73699	G	251.	400.	84.2	315.8	64.8
73714	G	244.	344.	63.7	280.3	36.3
73705	G	272.	424.	93.0	331.0	59.0
73700	G	290.	401.	85.8	315.2	25.2
MEAN		262.	392.	82.4	310.0	48.4
S.D.		19.0	29.5	11.00	18.63	16.87
S.E.		8.5	13.2	4.92	8.33	7.54
N		5	5	5	5	5

G = GRAVID

TABLE I16

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

DAM #	PREGNANCY STATUS	INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
GROUP 4: 300 MG/KG/DAY						
73708	G	290.	418.	83.4	334.6	44.6
73712	G	246.	349.	59.9	289.1	43.1
73698	G	235.	363.	73.4	289.6	54.6
73717	G	262.	370.	75.5	294.5	32.5
73693	G	249.	366.	81.3	284.7	35.7
MEAN		256.	373.	74.7	298.5	42.1
S.D.		21.1	26.3	9.23	20.48	8.61
S.E.		9.4	11.7	4.13	9.16	3.85
N		5	5	5	5	5

G = GRAVID

TABLE I16

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS
SPONSOR:AMERICAN PETROLEUM INDIVIDUAL GRAVID UTERINE WTS. AND NET BODY WT. CHANGES [G]

DAM #	PREGNANCY STATUS	INITIAL BODY WT.	TERMINAL BODY WT.	GRAVID UTERINE WT.	NET BODY WT.	NET BODY WT. CHANGE
GROUP 5: 1000 MG/KG/DAY						
73718	G	273.	300.	1.0	299.0	26.0
73701	G	245.	280.	3.9	276.1	31.1
73721	G	254.	360.	63.2	296.8	42.8
73707	G	279.	319.	1.3	317.7	38.7
73722	G	247.	339.	70.9	268.1	21.1
MEAN		260.	320.	28.1	291.5	31.9
S.D.		15.5	31.5	35.71	19.72	8.90
S.E.		6.9	14.1	15.97	8.82	3.98
N		5	5	5	5	5

G = GRAVID

TABLE I17

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 1: 0 MG/KG/DAY									
73710	G	11.	13.	13.	16.	17.	18.	14.	SCHEDULED NECROPSY DAY 20
73704	G	15.	12.	13.	18.	19.	20.	17.	SCHEDULED NECROPSY DAY 20
73694	G	12.	16.	12.	12.	14.	14.	13.	SCHEDULED NECROPSY DAY 20
73713	G	14.	12.	15.	15.	19.	16.	15.	SCHEDULED NECROPSY DAY 20
73720	G	16.	15.	11.	11.	19.	21.	15.	SCHEDULED NECROPSY DAY 20
MEAN		14.	14.	13.	14.	18.	18.	15.	
S.D.		2.1	1.8	1.5	2.9	2.2	2.9	1.5	
S.E.		0.9	0.8	0.7	1.3	1.0	1.3	0.7	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I17

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 2: 30 MG/KG/DAY									
73702	G	14.	21.	17.	17.	17.	22.	17.	SCHEDULED NECROPSY DAY 20
73697	G	11.	15.	15.	16.	16.	18.	15.	SCHEDULED NECROPSY DAY 20
73706	G	13.	15.	14.	17.	17.	20.	16.	SCHEDULED NECROPSY DAY 20
73709	G	17.	16.	17.	17.	20.	20.	18.	SCHEDULED NECROPSY DAY 20
73719	G	15.	4.	15.	16.	22.	21.	17.	SCHEDULED NECROPSY DAY 20
MEAN		14.	14.	16.	17.	18.	20.	17.	
S.D.		2.2	6.2	1.3	0.5	2.5	1.5	1.1	
S.E.		1.0	2.8	0.6	0.2	1.1	0.7	0.5	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I17

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS
SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 3: 100 MG/KG/DAY									
73696	G	15.	13.	16.	17.	19.	15.	16.	SCHEDULED NECROPSY DAY 20
73699	G	15.	16.	12.	14.	17.	19.	15.	SCHEDULED NECROPSY DAY 20
73714	G	10.	16.	14.	13.	14.	15.	13.	SCHEDULED NECROPSY DAY 20
73705	G	17.	16.	17.	17.	20.	21.	18.	SCHEDULED NECROPSY DAY 20
73700	G	15.	11.	15.	14.	19.	18.	16.	SCHEDULED NECROPSY DAY 20
MEAN		14.	14.	15.	15.	18.	18.	16.	
S.D.		2.6	2.3	1.9	1.9	2.4	2.6	1.8	
S.E.		1.2	1.0	0.9	0.8	1.1	1.2	0.8	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I17

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS
SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 4: 300 MG/KG/DAY									
73708	G	15.	15.	14.	17.	19.	18.	16.	SCHEDULED NECROPSY DAY 20
73712	G	12.	16.	16.	14.	13.	16.	14.	SCHEDULED NECROPSY DAY 20
73698	G	11.	18.	15.	16.	18.	14.	15.	SCHEDULED NECROPSY DAY 20
73717	G	11.	12.	15.	12.	15.	14.	13.	SCHEDULED NECROPSY DAY 20
73693	G	10.	11.	14.	12.	21.	14.	13.	SCHEDULED NECROPSY DAY 20
MEAN		12.	14.	15.	14.	17.	15.	14.	
S.D.		1.9	2.9	0.8	2.3	3.2	1.8	1.3	
S.E.		0.9	1.3	0.4	1.0	1.4	0.8	0.6	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I17

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 5

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/ANIMAL/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 5: 1000 MG/KG/DAY									
73718	G	13.	17.	15.	18.	15.	13.	15.	SCHEDULED NECROPSY DAY 20
73701	G	5.	8.	18.	11.	18.	NA	NA	SCHEDULED NECROPSY DAY 20
73721	G	11.	9.	15.	14.	16.	19.	14.	SCHEDULED NECROPSY DAY 20
73707	G	7.	15.	18.	NA	14.	17.	13.	SCHEDULED NECROPSY DAY 20
73722	G	10.	11.	11.	13.	16.	15.	13.	SCHEDULED NECROPSY DAY 20
MEAN		9.	12.	15.	14.	16.	16.	14.	
S.D.		3.2	3.9	2.9	2.9	1.5	2.6	1.0	
S.E.		1.4	1.7	1.3	1.5	0.7	1.3	0.5	
N		5	5	5	4	5	4	4	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

NA = NOT APPLICABLE

TABLE I18

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 1: 0 MG/KG/DAY									
73710	G	42.	48.	47.	55.	53.	51.	47.	SCHEDULED NECROPSY DAY 20
73704	G	56.	43.	45.	59.	57.	53.	55.	SCHEDULED NECROPSY DAY 20
73694	G	48.	62.	45.	43.	47.	43.	46.	SCHEDULED NECROPSY DAY 20
73713	G	54.	44.	53.	50.	57.	43.	50.	SCHEDULED NECROPSY DAY 20
73720	G	57.	52.	38.	37.	59.	57.	48.	SCHEDULED NECROPSY DAY 20
MEAN		51.	50.	46.	49.	55.	49.	49.	
S.D.		6.3	7.7	5.4	8.9	4.8	6.2	3.6	
S.E.		2.8	3.4	2.4	4.0	2.1	2.8	1.6	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I18

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 2: 30 MG/KG/DAY									
73702	G	52.	74.	58.	54.	50.	57.	54.	SCHEDULED NECROPSY DAY 20
73697	G	43.	58.	56.	56.	51.	51.	51.	SCHEDULED NECROPSY DAY 20
73706	G	55.	60.	54.	63.	58.	60.	58.	SCHEDULED NECROPSY DAY 20
73709	G	63.	58.	60.	57.	61.	55.	59.	SCHEDULED NECROPSY DAY 20
73719	G	57.	15.	53.	53.	66.	55.	55.	SCHEDULED NECROPSY DAY 20
MEAN		54.	53.	56.	57.	57.	56.	55.	
S.D.		7.3	22.3	2.9	3.9	6.8	3.3	3.2	
S.E.		3.3	10.0	1.3	1.7	3.0	1.5	1.4	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I18

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 3: 100 MG/KG/DAY									
73696	G	56.	46.	55.	54.	56.	40.	51.	SCHEDULED NECROPSY DAY 20
73699	G	56.	55.	40.	45.	52.	51.	48.	SCHEDULED NECROPSY DAY 20
73714	G	41.	64.	53.	47.	47.	46.	47.	SCHEDULED NECROPSY DAY 20
73705	G	60.	54.	56.	53.	57.	53.	55.	SCHEDULED NECROPSY DAY 20
73700	G	51.	38.	50.	45.	57.	47.	50.	SCHEDULED NECROPSY DAY 20
MEAN		53.	51.	51.	49.	54.	47.	50.	
S.D.		7.3	9.8	6.5	4.4	4.3	5.0	3.1	
S.E.		3.3	4.4	2.9	2.0	1.9	2.2	1.4	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I18

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 4: 300 MG/KG/DAY									
73708	G	50.	49.	45.	52.	53.	46.	48.	SCHEDULED NECROPSY DAY 20
73712	G	47.	61.	59.	49.	43.	49.	49.	SCHEDULED NECROPSY DAY 20
73698	G	46.	71.	56.	56.	57.	40.	52.	SCHEDULED NECROPSY DAY 20
73717	G	41.	44.	52.	40.	47.	40.	43.	SCHEDULED NECROPSY DAY 20
73693	G	40.	43.	52.	42.	67.	40.	45.	SCHEDULED NECROPSY DAY 20
MEAN		45.	54.	53.	48.	53.	43.	47.	
S.D.		4.2	12.1	5.3	6.7	9.3	4.2	3.5	
S.E.		1.9	5.4	2.4	3.0	4.2	1.9	1.6	
N		5	5	5	5	5	5	5	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN

TABLE I18

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS
SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FOOD CONSUMPTION DURING GESTATION [G/KG/DAY]

	PREGNANCY STATUS	DAY 0- 6	6- 7	7-10	10-14	14-17	17-20	0-20	
DAMS FROM GROUP 5: 1000 MG/KG/DAY									
73718	G	46.	58.	51.	58.	48.	43.	51.	SCHEDULED NECROPSY DAY 20
73701	G	21.	35.	74.	44.	69.	NA	NA	SCHEDULED NECROPSY DAY 20
73721	G	43.	34.	55.	48.	51.	56.	48.	SCHEDULED NECROPSY DAY 20
73707	G	26.	57.	64.	NA	45.	53.	45.	SCHEDULED NECROPSY DAY 20
73722	G	40.	43.	42.	48.	55.	47.	47.	SCHEDULED NECROPSY DAY 20
MEAN		35.	45.	57.	50.	54.	50.	48.	
S.D.		11.0	11.6	12.3	6.0	9.4	5.9	2.5	
S.E.		4.9	5.2	5.5	3.0	4.2	2.9	1.3	
N		5	5	5	4	5	4	4	

G = GRAVID NG = NONGRAVID - WEIGHT(S) NOT INCLUDED IN CALCULATION OF MEAN
NA = NOT APPLICABLE

TABLE I19

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MATERNAL MACROSCOPIC FINDINGS

DAMS FROM GROUP 1: 0 MG/KG/DAY	MATERNAL GROSS OBSERVATION
73710	NO SIGNIFICANT CHANGES OBSERVED
73704	NO SIGNIFICANT CHANGES OBSERVED
73694	NO SIGNIFICANT CHANGES OBSERVED
73713	NO SIGNIFICANT CHANGES OBSERVED
73720	NO SIGNIFICANT CHANGES OBSERVED

TABLE I19

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MATERNAL MACROSCOPIC FINDINGS

DAMS FROM GROUP 2: 30 MG/KG/DAY	MATERNAL GROSS OBSERVATION
73702	NO SIGNIFICANT CHANGES OBSERVED
73697	NO SIGNIFICANT CHANGES OBSERVED
73706	NO SIGNIFICANT CHANGES OBSERVED
73709	NO SIGNIFICANT CHANGES OBSERVED
73719	NO SIGNIFICANT CHANGES OBSERVED

TABLE I19

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MATERNAL MACROSCOPIC FINDINGS

DAMS FROM GROUP 3: 100 MG/KG/DAY	MATERNAL GROSS OBSERVATION
73696	NO SIGNIFICANT CHANGES OBSERVED
73699	NO SIGNIFICANT CHANGES OBSERVED
73714	NO SIGNIFICANT CHANGES OBSERVED
73705	NO SIGNIFICANT CHANGES OBSERVED
73700	NO SIGNIFICANT CHANGES OBSERVED

TABLE I19

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 4

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL MATERNAL MACROSCOPIC FINDINGS

DAMS FROM GROUP 4: 300 MG/KG/DAY	MATERNAL GROSS OBSERVATION
73708	NO SIGNIFICANT CHANGES OBSERVED
73712	NO SIGNIFICANT CHANGES OBSERVED
73698	NO SIGNIFICANT CHANGES OBSERVED
73717	NO SIGNIFICANT CHANGES OBSERVED
73693	NO SIGNIFICANT CHANGES OBSERVED

DAMS FROM GROUP 5: 1000 MG/KG/DAY	MATERNAL GROSS OBSERVATION
73718	GRAVID -- AMMONIUM SULFIDE POSITIVE
73701	NO SIGNIFICANT CHANGES OBSERVED
73721	NO SIGNIFICANT CHANGES OBSERVED
73707	GRAVID -- AMMONIUM SULFIDE POSITIVE
73722	NO SIGNIFICANT CHANGES OBSERVED

TABLE I20

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WEIGHTS AND FINAL BODY WEIGHTS [G]

FEMALE GROUP: 0 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73710	G	375.	16.02	1.83	0.3019	0.0649	0.0843
73704	G	397.	15.58	2.05	0.2845	0.0801	0.0899
73694	G	345.	12.33	1.51	0.2581	0.0542	0.0693
73713	G	385.	15.15	1.90	0.2039	0.0638	0.1032
73720	G	392.	15.00	1.90	0.1920	0.0808	0.0730
MEAN		379.	14.82	1.84	0.2481	0.0688	0.0839
S.D.		20.6	1.446	0.200	0.04853	0.01146	0.01361
S.E.		9.2	0.646	0.090	0.02170	0.00512	0.00609
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE I20

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WEIGHTS AND FINAL BODY WEIGHTS [G]

FEMALE GROUP: 30 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73702	G	414.	16.35	2.07	0.2791	0.0669	0.0726
73697	G	373.	15.83	1.94	0.2734	0.0692	0.0744
73706	G	353.	13.61	1.65	0.2062	0.0550	0.0831
73709	G	380.	15.05	2.11	0.2463	0.0845	0.0809
73719	G	406.	16.60	2.07	0.3182	0.0877	0.0900
MEAN		385.	15.49	1.97	0.2646	0.0727	0.0802
S.D.		24.9	1.206	0.189	0.04155	0.01345	0.00701
S.E.		11.1	0.539	0.085	0.01858	0.00601	0.00313
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE I20

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WEIGHTS AND FINAL BODY WEIGHTS [G]

FEMALE GROUP: 100 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73696	G	393.	15.90	1.77	0.3802	0.0756	0.1070
73699	G	400.	16.04	1.81	0.2078	0.0707	0.0747
73714	G	344.	14.33	1.67	0.2601	0.0650	0.0686
73705	G	424.	17.73	2.18	0.2702	0.0847	0.1073
73700	G	401.	16.88	1.90	0.3269	0.0767	0.0877
MEAN		392.	16.18	1.87	0.2890	0.0745	0.0891
S.D.		29.5	1.266	0.194	0.06621	0.00733	0.01790
S.E.		13.2	0.566	0.087	0.02961	0.00328	0.00800
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE I20

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 4

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WEIGHTS AND FINAL BODY WEIGHTS [G]

FEMALE GROUP: 300 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73708	G	418.	17.80	2.24	0.3266	0.1068	0.0962
73712	G	349.	15.18	1.87	0.1831	0.0593	0.0739
73698	G	363.	15.97	1.93	0.2637	0.0882	0.0817
73717	G	370.	16.09	1.80	0.2265	0.0920	0.0692
73693	G	366.	14.99	1.96	0.2750	0.0738	0.0553
MEAN		373.	16.01	1.96	0.2550	0.0840	0.0753
S.D.		26.3	1.111	0.168	0.05381	0.01814	0.01514
S.E.		11.7	0.497	0.075	0.02407	0.00811	0.00677
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

FEMALE GROUP: 1000 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73718	G	300.	20.19	2.41	0.2600	0.0691	0.0667
73701	G	280.	19.10	2.02	0.2081	0.0650	0.0432
73721	G	360.	21.41	2.07	0.0890	0.0636	0.0736
73707	G	319.	20.80	2.14	0.2789	0.0436	0.0685
73722	G	339.	19.05	1.82	0.1360	0.0713	0.0574
MEAN		320.	20.11	2.09	0.1944	0.0625	0.0619
S.D.		31.5	1.039	0.214	0.08086	0.01102	0.01197
S.E.		14.1	0.465	0.096	0.03616	0.00493	0.00535
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT
G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE I21

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

FEMALE GROUP: 0 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73710	G	375.	4.272	0.488	0.081	0.017	0.022
73704	G	397.	3.924	0.516	0.072	0.020	0.023
73694	G	345.	3.574	0.438	0.075	0.016	0.020
73713	G	385.	3.935	0.494	0.053	0.017	0.027
73720	G	392.	3.827	0.485	0.049	0.021	0.019
MEAN		379.	3.910	0.480	0.066	0.018	0.022
S.D.		20.6	0.2509	0.0287	0.0140	0.0022	0.0031
S.E.		9.2	0.1122	0.0128	0.0062	0.0010	0.0014
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE I21

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

FEMALE GROUP: 30 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73702	G	414.	3.949	0.500	0.067	0.016	0.018
73697	G	373.	4.244	0.520	0.073	0.019	0.020
73706	G	353.	3.856	0.467	0.058	0.016	0.024
73709	G	380.	3.961	0.555	0.065	0.022	0.021
73719	G	406.	4.089	0.510	0.078	0.022	0.022
MEAN		385.	4.020	0.510	0.068	0.019	0.021
S.D.		24.9	0.1504	0.0319	0.0077	0.0030	0.0022
S.E.		11.1	0.0673	0.0143	0.0034	0.0014	0.0010
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE I21

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

FEMALE GROUP: 100 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73696	G	393.	4.046	0.450	0.097	0.019	0.027
73699	G	400.	4.010	0.452	0.052	0.018	0.019
73714	G	344.	4.166	0.485	0.076	0.019	0.020
73705	G	424.	4.182	0.514	0.064	0.020	0.025
73700	G	401.	4.209	0.474	0.082	0.019	0.022
MEAN		392.	4.120	0.480	0.074	0.019	0.023
S.D.		29.5	0.0887	0.0262	0.0171	0.0008	0.0034
S.E.		13.2	0.0397	0.0117	0.0076	0.0004	0.0015
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE I21

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 4

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

FEMALE GROUP: 300 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73708	G	418.	4.258	0.536	0.078	0.026	0.023
73712	G	349.	4.350	0.536	0.052	0.017	0.021
73698	G	363.	4.399	0.532	0.073	0.024	0.023
73717	G	370.	4.349	0.486	0.061	0.025	0.019
73693	G	366.	4.096	0.536	0.075	0.020	0.015
MEAN		373.	4.290	0.530	0.068	0.022	0.020
S.D.		26.3	0.1202	0.0216	0.0108	0.0037	0.0033
S.E.		11.7	0.0537	0.0097	0.0048	0.0016	0.0015
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

TABLE I21

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 5

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL ORGAN WTS. RELATIVE TO FINAL BODY WTS. [G/100 G]

FEMALE GROUP: 1000 MG/KG/DAY

ANIMAL	PREGNANCY STATUS	FBW(G):	LIVER	KIDNEYS	THYMUS	OVARY/OD, LEFT	OVARY/OD, RIGHT
73718	G	300.	6.730	0.803	0.087	0.023	0.022
73701	G	280.	6.821	0.721	0.074	0.023	0.015
73721	G	360.	5.947	0.575	0.025	0.018	0.020
73707	G	319.	6.520	0.671	0.087	0.014	0.021
73722	G	339.	5.619	0.537	0.040	0.021	0.017
MEAN		320.	6.330	0.660	0.063	0.020	0.019
S.D.		31.5	0.5218	0.1082	0.0286	0.0041	0.0029
S.E.		14.1	0.2334	0.0484	0.0128	0.0018	0.0013
N		5	5	5	5	5	5

FBW = FINAL BODY WEIGHT

G = GRAVID, NG = NONGRAVID - WEIGHTS NOT INCLUDED IN CALCULATION OF THE MEAN

POFBWv4.21
07/16/2010

TABLE I22

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 1: 0 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT	
DAM#	M	F	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	OVARY		TOTAL
73710	5	6	4	7	11	0	0	0	1	1	2	0	0	0	5	8	13	5	8	13
73704	9	6	7	8	15	0	0	0	0	0	0	0	0	0	7	8	15	7	8	15
73694	9	4	5	8	13	0	0	0	0	0	0	0	0	0	5	8	13	5	9	14
73713	8	8	4	12	16	0	0	0	0	0	0	0	0	0	4	12	16	12	15	27
73720	8	4	5	7	12	0	0	0	1	0	1	0	0	0	6	7	13	6	7	13
TOTAL	39	28	25	42	67	0	0	0	2	1	3	0	0	0	27	43	70	35	47	82
MEAN	7.8	5.6	5.0	8.4	13.4	0.0	0.0	0.0	0.4	0.2	0.6	0.0	0.0	0.0	5.4	8.6	14.0	7.0	9.4	16.4
S.D.	1.64	1.67	1.22	2.07	2.07	0.00	0.00	0.00	0.55	0.45	0.89	0.00	0.00	0.00	1.14	1.95	1.41	2.92	3.21	5.98
S.E.	0.73	0.75	0.55	0.93	0.93	0.00	0.00	0.00	0.24	0.20	0.40	0.00	0.00	0.00	0.51	0.87	0.63	1.30	1.44	2.68
N =	5																			

TABLE I22

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 2: 30 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT	
DAM#	M	F	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	OVARY		TOTAL
73702	3	12	7	8	15	0	0	0	1	0	1	0	0	0	8	8	16	10	8	18
73697	7	7	7	7	14	0	0	0	0	0	0	0	0	0	7	7	14	7	8	15
73706	6	6	5	7	12	0	0	0	0	1	1	0	0	0	5	8	13	5	8	13
73709	5	9	6	8	14	0	0	0	0	0	0	0	0	0	6	8	14	6	8	14
73719	9	9	9	9	18	0	0	0	1	0	1	0	0	0	10	9	19	11	11	22
TOTAL	30	43	34	39	73	0	0	0	2	1	3	0	0	0	36	40	76	39	43	82
MEAN	6.0	8.6	6.8	7.8	14.6	0.0	0.0	0.0	0.4	0.2	0.6	0.0	0.0	0.0	7.2	8.0	15.2	7.8	8.6	16.4
S.D.	2.24	2.30	1.48	0.84	2.19	0.00	0.00	0.00	0.55	0.45	0.55	0.00	0.00	0.00	1.92	0.71	2.39	2.59	1.34	3.65
S.E.	1.00	1.03	0.66	0.37	0.98	0.00	0.00	0.00	0.24	0.20	0.24	0.00	0.00	0.00	0.86	0.32	1.07	1.16	0.60	1.63
N =	5																			

TABLE I22

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 3: 100 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT	
DAM#	M	F	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	OVARY		TOTAL
73696	3	12	5	10	15	0	0	0	0	1	1	0	0	0	5	11	16	5	11	16
73699	9	5	7	7	14	0	0	0	0	2	2	0	0	0	7	9	16	8	10	18
73714	8	4	6	6	12	0	0	0	0	0	0	0	0	0	6	6	12	6	9	15
73705	9	8	7	10	17	0	0	0	0	2	2	0	0	0	7	12	19	8	13	21
73700	8	8	7	9	16	0	0	0	1	0	1	0	0	0	8	9	17	8	9	17
TOTAL	37	37	32	42	74	0	0	0	1	5	6	0	0	0	33	47	80	35	52	87
MEAN	7.4	7.4	6.4	8.4	14.8	0.0	0.0	0.0	0.2	1.0	1.2	0.0	0.0	0.0	6.6	9.4	16.0	7.0	10.4	17.4
S.D.	2.51	3.13	0.89	1.82	1.92	0.00	0.00	0.00	0.45	1.00	0.84	0.00	0.00	0.00	1.14	2.30	2.55	1.41	1.67	2.30
S.E.	1.12	1.40	0.40	0.81	0.86	0.00	0.00	0.00	0.20	0.45	0.37	0.00	0.00	0.00	0.51	1.03	1.14	0.63	0.75	1.03
N =	5																			

TABLE I22

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 4: 300 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT	
DAM#	M	F	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	OVARY		TOTAL
73708	10	6	7	9	16	0	0	0	0	0	0	0	0	0	7	9	16	8	9	17
73712	6	4	7	3	10	0	0	0	1	0	1	0	0	0	8	3	11	8	4	12
73698	5	8	6	7	13	0	0	0	1	0	1	0	0	0	7	7	14	7	9	16
73717	9	6	9	6	15	0	0	0	0	0	0	0	0	0	9	6	15	9	6	15
73693	10	5	9	6	15	0	0	0	0	0	0	0	0	0	9	6	15	9	6	15
TOTAL	40	29	38	31	69	0	0	0	2	0	2	0	0	0	40	31	71	41	34	75
MEAN	8.0	5.8	7.6	6.2	13.8	0.0	0.0	0.0	0.4	0.0	0.4	0.0	0.0	0.0	8.0	6.2	14.2	8.2	6.8	15.0
S.D.	2.35	1.48	1.34	2.17	2.39	0.00	0.00	0.00	0.55	0.00	0.55	0.00	0.00	0.00	1.00	2.17	1.92	0.84	2.17	1.87
S.E.	1.05	0.66	0.60	0.97	1.07	0.00	0.00	0.00	0.24	0.00	0.24	0.00	0.00	0.00	0.45	0.97	0.86	0.37	0.97	0.84
N =	5																			

TABLE I22

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY

DAMS FROM GROUP 5: 1000 MG/KG/DAY

			VIABLE FETUSES			DEAD FETUSES			EARLY RESORPTIONS			LATE RESORPTIONS			IMPLANTATION SITES			CORPORA LUTEA		
	SEX		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT		LEFT	RIGHT	
DAM#	M	F	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	HORN	HORN	TOTAL	OVARY		TOTAL
73718	0	0	0	0	0	0	0	0	3	2	5	0	0	0	3	2	5	6	10	16
73701	0	0	0	0	0	2	0	2	1	0	1	0	0	0	3	0	3	5	4	9
73721	7	5	4	8	12	0	0	0	0	0	0	0	0	0	4	8	12	5	8	13
73707	0	0	0	0	0	0	0	0	1	4	5	0	0	0	1	4	5	3	5	8
73722	6	8	9	5	14	0	0	0	0	0	0	0	0	0	9	5	14	9	5	14
TOTAL	13	13	13	13	26	2	0	2	5	6	11	0	0	0	20	19	39	28	32	60
MEAN	2.6	2.6	2.6	2.6	5.2	0.4	0.0	0.4	1.0	1.2	2.2	0.0	0.0	0.0	4.0	3.8	7.8	5.6	6.4	12.0
S.D.	3.58	3.71	3.97	3.71	7.16	0.89	0.00	0.89	1.22	1.79	2.59	0.00	0.00	0.00	3.00	3.03	4.87	2.19	2.51	3.39
S.E.	1.60	1.66	1.78	1.66	3.20	0.40	0.00	0.40	0.55	0.80	1.16	0.00	0.00	0.00	1.34	1.36	2.18	0.98	1.12	1.52
N =	5																			

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07/15/2010

TABLE I23

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

DAMS FROM GROUP 1: 0 MG/KG/DAY

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
	#	#	%	%	%	%	%	%	%	%	%
73710	13.0	13.0	84.6	0.0	15.4	0.0	15.4	0.0	15.4	45.5	54.5
73704	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	40.0
73694	14.0	13.0	100.0	0.0	0.0	0.0	0.0	7.1	0.0	69.2	30.8
73713	27.0	16.0	100.0	0.0	0.0	0.0	0.0	40.7	0.0	50.0	50.0
73720	13.0	13.0	92.3	0.0	7.7	0.0	7.7	0.0	7.7	66.7	33.3
MEAN	16.4	14.0	95.4	0.0	4.6	0.0	4.6	9.6	4.6	58.3	41.7
S.D.	5.98	1.41	6.89	0.00	6.89	0.00	6.89	17.68	6.89	10.32	10.32
S.E.	2.68	0.63	3.08	0.00	3.08	0.00	3.08	7.91	3.08	4.62	4.62
N	5	5	5	5	5	5	5	5	5	5	5

TABLE I23

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

DAMS FROM GROUP 2: 30 MG/KG/DAY

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
	#	#	%	%	%	%	%	%	%	%	%
73702	18.0	16.0	93.8	0.0	6.3	0.0	6.3	11.1	6.3	20.0	80.0
73697	15.0	14.0	100.0	0.0	0.0	0.0	0.0	6.7	0.0	50.0	50.0
73706	13.0	13.0	92.3	0.0	7.7	0.0	7.7	0.0	7.7	50.0	50.0
73709	14.0	14.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	35.7	64.3
73719	22.0	19.0	94.7	0.0	5.3	0.0	5.3	13.6	5.3	50.0	50.0
MEAN	16.4	15.2	96.2	0.0	3.9	0.0	3.9	6.3	3.9	41.1	58.9
S.D.	3.65	2.39	3.61	0.00	3.63	0.00	3.63	6.24	3.63	13.34	13.34
S.E.	1.63	1.07	1.61	0.00	1.62	0.00	1.62	2.79	1.62	5.97	5.97
N	5	5	5	5	5	5	5	5	5	5	5

DAMS FROM GROUP 3: 100 MG/KG/DAY

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
	#	#	%	%	%	%	%	%	%	%	%
73696	16.0	16.0	93.8	0.0	6.3	0.0	6.3	0.0	6.3	20.0	80.0
73699	18.0	16.0	87.5	0.0	12.5	0.0	12.5	11.1	12.5	64.3	35.7
73714	15.0	12.0	100.0	0.0	0.0	0.0	0.0	20.0	0.0	66.7	33.3
73705	21.0	19.0	89.5	0.0	10.5	0.0	10.5	9.5	10.5	52.9	47.1
73700	17.0	17.0	94.1	0.0	5.9	0.0	5.9	0.0	5.9	50.0	50.0
MEAN	17.4	16.0	93.0	0.0	7.0	0.0	7.0	8.1	7.0	50.8	49.2
S.D.	2.30	2.55	4.83	0.00	4.83	0.00	4.83	8.42	4.83	18.62	18.62
S.E.	1.03	1.14	2.16	0.00	2.16	0.00	2.16	3.77	2.16	8.33	8.33
N	5	5	5	5	5	5	5	5	5	5	5

DAMS FROM GROUP 4: 300 MG/KG/DAY

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
	#	#	%	%	%	%	%	%	%	%	%
73708	17.0	16.0	100.0	0.0	0.0	0.0	0.0	5.9	0.0	62.5	37.5
73712	12.0	11.0	90.9	0.0	9.1	0.0	9.1	8.3	9.1	60.0	40.0
73698	16.0	14.0	92.9	0.0	7.1	0.0	7.1	12.5	7.1	38.5	61.5
73717	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	40.0
73693	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	33.3
MEAN	15.0	14.2	96.8	0.0	3.2	0.0	3.2	5.3	3.2	57.5	42.5
S.D.	1.87	1.92	4.49	0.00	4.49	0.00	4.49	5.42	4.49	11.00	11.00
S.E.	0.84	0.86	2.01	0.00	2.01	0.00	2.01	2.42	2.01	4.92	4.92
N	5	5	5	5	5	5	5	5	5	5	5

TABLE I23

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 5

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL DATA AT SCHEDULED NECROPSY [% PER LITTER]

DAMS FROM GROUP 5: 1000 MG/KG/DAY

DAM #	CORPORA LUTEA	IMPLANTATION SITES	FETUSES VIABLE	FETUSES DEAD	RESORPTIONS EARLY	RESORPTIONS LATE	RESORPTIONS TOTAL	PRE-IMPLANTATION LOSS	POST-IMPLANTATION LOSS	MALES	FEMALES
	#	#	%	%	%	%	%	%	%	%	%
73718	16.0	5.0	0.0	0.0	100.0	0.0	100.0	68.8	100.0	0.0	0.0
73701	9.0	3.0	0.0	66.7	33.3	0.0	33.3	66.7	100.0	0.0	0.0
73721	13.0	12.0	100.0	0.0	0.0	0.0	0.0	7.7	0.0	58.3	41.7
73707	8.0	5.0	0.0	0.0	100.0	0.0	100.0	37.5	100.0	0.0	0.0
73722	14.0	14.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	42.9	57.1
MEAN	12.0	7.8	40.0	13.3	46.7	0.0	46.7	36.1	60.0	50.6	49.4
S.D.	3.39	4.87	54.77	29.83	50.55	0.00	50.55	32.08	54.77	10.94	10.94
S.E.	1.52	2.18	24.49	13.34	22.61	0.00	22.61	14.35	24.49	7.74	7.74
N	5	5	5	5	5	5	5	5	5	2	2

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TABLE I24

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL WEIGHTS [G]

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP 1: 0 MG/KG/DAY																						
73710 3.9	4.1	3.8	E	3.9	3.8/	4.2	3.7	4.0	3.7	E	3.7	4.0	4.1										
73704 3.7	3.6	3.8	3.9	3.6	3.5	3.9	3.9/	3.9	3.7	3.4	3.6	3.8	3.4	3.6	3.6								
73694 3.9	3.7	4.1	3.8	3.8	4.3/	4.1	3.8	3.8	3.5	4.2	4.0	3.9	3.7										
73713 3.5	3.3	3.6	3.7	3.8/	3.7	3.4	3.7	3.4	3.8	3.6	3.5	3.5	3.4	3.5	3.4	2.7							
73720 3.9	3.6	3.9	4.1	E	3.6	4.1/	4.3	3.9	4.0	4.1	3.8	3.5	4.0										
MEAN 3.8																							
S.D. 0.18																							
S.E. 0.08																							
N 5																							

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

TABLE I24

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL WEIGHTS [G]

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP 2: 30 MG/KG/DAY																						
73702 3.4	2.9	3.1	E	3.5	3.4	3.5	3.4	3.2/	3.8	3.8	3.5	3.2	3.8	3.8	3.3	3.1							
73697 3.8	4.0	3.9	3.7	4.0	3.8	3.9	1.8/	3.6	4.0	3.8	4.2	4.2	3.9	4.2									
73706 3.8	3.9	3.3	3.5	4.0	4.0/	4.0	3.5	E	4.2	3.7	4.0	3.9	3.5										
73709 3.9	3.8	3.9	4.0	4.0	4.1	3.7/	3.7	3.8	3.8	4.0	4.0	3.9	4.0	3.6									
73719 3.3	3.3	E	3.1	3.3	3.1	3.1	3.0	3.0	3.4	3.2/	3.6	3.6	3.3	3.3	3.3	3.5	3.2	3.7	3.2				

MEAN	3.6
S.D.	0.27
S.E.	0.12
N	5

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

TABLE I24

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL WEIGHTS [G]

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP 3: 100 MG/KG/DAY																						
73696 3.9	4.0	4.0	3.4	3.8	4.2/	4.3	4.0	3.3	4.1	E	3.7	3.7	3.9	3.6	4.0	3.9							
73699 4.1	4.0	4.2	4.1	4.1	4.1	4.1	4.1/	4.3	4.1	E	E	4.2	4.1	4.2	3.7	4.1							
73714 3.5	3.3	3.3	3.3	3.7	3.8	3.6/	3.4	3.5	3.8	3.2	3.6	3.4											
73705 3.6	3.7	3.3	3.8	3.4	3.8	3.9	4.0/	E	3.4	3.8	3.5	E	3.7	3.7	3.6	3.6	3.5	3.6	3.4				
73700 3.5	3.8	3.4	3.5	3.8	3.5	3.8	E	3.5/	3.5	3.5	3.1	3.3	3.4	3.4	3.7	3.2	3.3						
MEAN 3.7																							
S.D. 0.27																							
S.E. 0.12																							
N 5																							

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

TABLE I24

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL WEIGHTS [G]

FETUS #		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM #	MEAN	GROUP 4: 300 MG/KG/DAY																						
73708	3.6	3.6	3.8	3.3	3.7	3.7	3.5	3.2/	3.9	3.6	3.9	3.4	3.3	3.8	3.7	3.7	3.3							
73712	4.1	3.2	4.2	E	4.2	4.2	3.9	4.3	3.9/	4.1	4.6	4.1												
73698	3.9	4.0	3.8	3.8	E	3.6	4.1	3.7/	4.2	4.2	3.2	3.6	4.2	4.0	3.7									
73717	3.3	3.3	3.4	3.2	3.3	3.4	3.2	3.0	3.4	3.4/	3.2	3.4	3.4	3.2	3.6	3.2								
73693	3.9	4.0	3.8	3.4	3.8	4.1	4.0	4.0	3.8	4.2/	4.2	4.4	3.6	3.7	3.7	3.6								
MEAN	3.8																							
S.D.	0.31																							
S.E.	0.14																							
N	5																							

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

TABLE I24

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL WEIGHTS [G]

FETUS #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DAM # MEAN	GROUP 5: 1000 MG/KG/DAY																						
73718 0.0	E	E	E /	E	E																		
73701 0.0	E	D	D /																				
73721 3.6	3.6	3.5	3.7	3.6/	3.5	3.4	3.5	3.1	3.9	4.1	3.6	3.7											
73707 0.0	E /	E	E	E	E																		
73722 3.3	3.2	3.2	3.1	3.2	3.0	3.2	3.1	3.4	3.3/	3.6	3.6	3.7	3.2	3.7									
MEAN 3.5																							
S.D. 0.21																							
S.E. 0.15																							
N 2																							

E = EARLY RESORPTION L = LATE RESORPTION D = DEAD FETUS '/' DENOTES POSITION OF CERVIX

PFWTv4.15
07/15/2010

TABLE I25

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 1

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL EXTERNAL FINDINGS

DAMS FROM GROUP 1: 0 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73710	1	M	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3		EARLY RESORPTION
	4	F	NO REMARKABLE OBSERVATIONS
	5	F	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	F	NO REMARKABLE OBSERVATIONS
	10		EARLY RESORPTION
	11	M	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	M	NO REMARKABLE OBSERVATIONS
73704	1	F	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	M	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	F	NO REMARKABLE OBSERVATIONS
	15	M	NO REMARKABLE OBSERVATIONS
73694	1	F	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	M	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

TABLE I25

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 2

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL EXTERNAL FINDINGS

DAMS FROM GROUP 1: 0 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73694	6	M	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8	F	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	M	NO REMARKABLE OBSERVATIONS
	11	M	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
73713	1	F	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3	M	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	F	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
	13	M	NO REMARKABLE OBSERVATIONS
	14	F	NO REMARKABLE OBSERVATIONS
	15	M	NO REMARKABLE OBSERVATIONS
	16	F	NO REMARKABLE OBSERVATIONS
73720	1	F	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	M	NO REMARKABLE OBSERVATIONS
	4		EARLY RESORPTION
	5	F	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

TABLE I25

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 3

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL EXTERNAL FINDINGS

DAMS FROM GROUP 1: 0 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73720	10	M	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

DAMS FROM GROUP 2: 30 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73702	1	F	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3		EARLY RESORPTION
	4	F	NO REMARKABLE OBSERVATIONS
	5	F	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS
	8	F	NO REMARKABLE OBSERVATIONS
	9	F	NO REMARKABLE OBSERVATIONS
	10	M	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	M	NO REMARKABLE OBSERVATIONS
	14	M	NO REMARKABLE OBSERVATIONS
	15	F	NO REMARKABLE OBSERVATIONS
	16	F	NO REMARKABLE OBSERVATIONS
73697	1	F	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	F	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	M	M OMPHALOCELE SEVERAL LOOPS OF INTESTINE PROTRUDE THROUGH AN OPENING IN THE UMBILICUS, REMNANTS OF A MEMBRANOUS SAC
	8	F	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	M	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
	13	M	NO REMARKABLE OBSERVATIONS
	14	M	NO REMARKABLE OBSERVATIONS
73706	1	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

DAMS FROM GROUP 2: 30 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73706	2	F	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	M	NO REMARKABLE OBSERVATIONS
	5	F	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8		EARLY RESORPTION
	9	M	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	M	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
73709	1	M	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	M	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS
	8	F	NO REMARKABLE OBSERVATIONS
	9	F	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	M	NO REMARKABLE OBSERVATIONS
	14	F	NO REMARKABLE OBSERVATIONS
73719	1	M	NO REMARKABLE OBSERVATIONS
	2		EARLY RESORPTION
	3	M	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	F	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

DAMS FROM GROUP 2: 30 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73719	8	M	NO REMARKABLE OBSERVATIONS
	9	F	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	M	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	F	NO REMARKABLE OBSERVATIONS
	15	F	NO REMARKABLE OBSERVATIONS
	16	M	NO REMARKABLE OBSERVATIONS
	17	F	NO REMARKABLE OBSERVATIONS
	18	M	NO REMARKABLE OBSERVATIONS
	19	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

DAMS FROM GROUP 3: 100 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73696	1	F	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8	F	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10		EARLY RESORPTION
	11	F	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	F	NO REMARKABLE OBSERVATIONS
	15	F	NO REMARKABLE OBSERVATIONS
	16	F	NO REMARKABLE OBSERVATIONS
73699	1	F	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10		EARLY RESORPTION
	11		EARLY RESORPTION
	12	M	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	M	NO REMARKABLE OBSERVATIONS
	15	M	NO REMARKABLE OBSERVATIONS
	16	M	NO REMARKABLE OBSERVATIONS
73714	1	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

DAMS FROM GROUP 3: 100 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73714	2	F	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	M	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	M	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
73705	1	M	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	M	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8		EARLY RESORPTION
	9	F	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12		EARLY RESORPTION
	13	F	NO REMARKABLE OBSERVATIONS
	14	M	NO REMARKABLE OBSERVATIONS
	15	F	NO REMARKABLE OBSERVATIONS
	16	M	NO REMARKABLE OBSERVATIONS
	17	F	NO REMARKABLE OBSERVATIONS
	18	M	NO REMARKABLE OBSERVATIONS
	19	F	NO REMARKABLE OBSERVATIONS
73700	1	M	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

TABLE I25

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 9

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL EXTERNAL FINDINGS

DAMS FROM GROUP 3: 100 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73700	4	M	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7		EARLY RESORPTION
	8	F	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	M	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	F	NO REMARKABLE OBSERVATIONS
	15	M	NO REMARKABLE OBSERVATIONS
	16	F	NO REMARKABLE OBSERVATIONS
	17	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

DAMS FROM GROUP 4: 300 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73708	1	M	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	M	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	M	NO REMARKABLE OBSERVATIONS
	14	M	NO REMARKABLE OBSERVATIONS
	15	M	NO REMARKABLE OBSERVATIONS
	16	F	NO REMARKABLE OBSERVATIONS
73712	1	F	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3		EARLY RESORPTION
	4	M	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	M	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8	F	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	M	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
73698	1	M	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4		EARLY RESORPTION
	5	F	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

DAMS FROM GROUP 4: 300 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73698	7	M	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	F	NO REMARKABLE OBSERVATIONS
73717	1	M	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	F	NO REMARKABLE OBSERVATIONS
	11	M	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	M	NO REMARKABLE OBSERVATIONS
	15	M	NO REMARKABLE OBSERVATIONS
73693	1	M	NO REMARKABLE OBSERVATIONS
	2	M	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	M	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	M	NO REMARKABLE OBSERVATIONS
	8	F	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

TABLE I25

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 12

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL EXTERNAL FINDINGS

DAMS FROM GROUP 4: 300 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73693	11	M	NO REMARKABLE OBSERVATIONS
	12	F	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	M	NO REMARKABLE OBSERVATIONS
	15	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

TABLE I25

PROJECT NO.:WIL-402010F ORAL 14-DAY/PILOT DEV TOX STUDY OF NAPHTHENIC ACID IN RATS PAGE 13

SPONSOR:AMERICAN PETROLEUM INDIVIDUAL FETAL EXTERNAL FINDINGS

DAMS FROM GROUP 5: 1000 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73718	1		EARLY RESORPTION
	2		EARLY RESORPTION
	3		EARLY RESORPTION
	4		EARLY RESORPTION
	5		EARLY RESORPTION
73701	1		EARLY RESORPTION
	2		DEAD FETUS CROWN-RUMP LENGTH: 1.2 CM, OPEN EYELID, BILATERAL, VENTRAL MIDLINE NOT CLOSED, MALE, WEIGHT: 0.32 G
	3		DEAD FETUS CROWN-RUMP LENGTH: 1.1 CM, OPEN EYELID, BILATERAL, VENTRAL MIDLINE NOT CLOSED, FEMALE, WEIGHT: 0.22 G
73721	1	M	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3	M	NO REMARKABLE OBSERVATIONS
	4	M	NO REMARKABLE OBSERVATIONS
	5	M	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS
	8	F	NO REMARKABLE OBSERVATIONS
	9	M	NO REMARKABLE OBSERVATIONS
	10	M	NO REMARKABLE OBSERVATIONS
	11	F	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
73707	1		EARLY RESORPTION
	2		EARLY RESORPTION
	3		EARLY RESORPTION
	4		EARLY RESORPTION
	5		EARLY RESORPTION
73722	1	M	NO REMARKABLE OBSERVATIONS
	2	F	NO REMARKABLE OBSERVATIONS
	3	F	NO REMARKABLE OBSERVATIONS
	4	F	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION

DAMS FROM GROUP 5: 1000 MG/KG/DAY	FETUS#	SEX	FETAL GROSS OBSERVATION
73722	5	F	NO REMARKABLE OBSERVATIONS
	6	F	NO REMARKABLE OBSERVATIONS
	7	F	NO REMARKABLE OBSERVATIONS
	8	M	NO REMARKABLE OBSERVATIONS
	9	F	NO REMARKABLE OBSERVATIONS
	10	M	NO REMARKABLE OBSERVATIONS
	11	M	NO REMARKABLE OBSERVATIONS
	12	M	NO REMARKABLE OBSERVATIONS
	13	F	NO REMARKABLE OBSERVATIONS
	14	M	NO REMARKABLE OBSERVATIONS

OBSERVATION CODE: M = MALFORMATION V = VARIATION