# Results of Toxicological Studies

## Conducted for the American Petroleum Institute

HEALTH AND ENVIRONMENTAL SCIENCES DEPARTMENT
API PUBLICATION NUMBER 45592
JANUARY 1995

**American Petroleum Institute**
1220 L Street, Northwest
Washington, D.C. 20005

# PREFACE

This volume is a compilation of API toxicological studies performed on petroleum-based materials. The entries for the studies are organized by the category of test substances (gasoline and gasoline streams, middle distillates, lubes, heavy fuels, solvents, shale oils, miscellaneous products and oxygenates). Within each entry, information is included about the test performed, the species tested and the test results.

For some studies, an abstract number for the study is given, corresponding to the number appearing in the *Index and Abstracts to Reports and Other Publications of HESD* or the APILIT database. For other studies, a TR number or API Publication number is given. When ordering a report for a study referenced in this publication (see below), please furnish either the appropriate (1) abstract number , (2) the API publication number or (3) the TR number of the study. For those studies that are incomplete or the final report is not available at the time of publication, the phrase "Data on File" will appear.

Each year, updated entries (pages) will be made available to purchasers of this volume. The updates to *Results of Toxicological Studies* will be provided at a nominal cost.

**To order a report referenced by its abstract number, please contact:**

Information Specialist
The American Petroleum Institute
1220 L Street, N.W.
Washington, D.C. 20005

**Telephone: (202) 682-8319**

**To order a report designated by its "TR" or "Publ" number, please contact:**

Order Desk
The American Petroleum Institute
1220 L Street, N.W.
Washington, D.C. 20005

**Telephone: (202) 682-8375**

# FOREWORD

API PUBLICATIONS NECESSARILY ADDRESS PROBLEMS OF A GENERAL NATURE. WITH RESPECT TO PARTICULAR CIRCUMSTANCES, LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS SHOULD BE REVIEWED.

API IS NOT UNDERTAKING TO MEET THE DUTIES OF EMPLOYERS, MANUFACTURERS, OR SUPPLIERS TO WARN AND PROPERLY TRAIN AND EQUIP THEIR EMPLOYEES, AND OTHERS EXPOSED, CONCERNING HEALTH AND SAFETY RISKS AND PRECAUTIONS, NOR UNDERTAKING THEIR OBLIGATIONS UNDER LOCAL, STATE, OR FEDERAL LAWS.

NOTHING CONTAINED IN ANY API PUBLICATION IS TO BE CONSTRUED AS GRANTING ANY RIGHT, BY IMPLICATION OR OTHERWISE, FOR THE MANUFACTURE, SALE, OR USE OF ANY METHOD, APPARATUS, OR PRODUCT COVERED BY LETTERS PATENT. NEITHER SHOULD ANYTHING CONTAINED IN THE PUBLICATION BE CONSTRUED AS INSURING ANYONE AGAINST LIABILITY FOR INFRINGEMENT OF LETTERS PATENT.

# UNLEADED GASOLINE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-31048 | 2/85 | 28-Day Time Course Study: 0.5 to 2.0 g/kg, 5 d/wk x 4 wks, orally | rat (F344) | The sequence of renal lesions observed in male rats over the course of the study appeared as follows: occurrence of hyaline droplets in proximal tubule, increased foci of regenerative epithelium, and the presence of dilated tubules at the corticomedullary junction filled with granular material. No dose difference in severity of nephrosis among groups. see also Thomas, Halder, Holdsworth and Cockrell (1984) 33-31223 | PS-53 |
| 36-31430 | 3/89 | Absorption, Tissue Equilibria, and Excretion Routes of Inhaled Hydrocarbon Vapors and Their Metabolites | rat (F344) | Iso-octane excreted almost completely in urine with long half-life, octane eliminated to a large degree as CO2. Excretion of octane urinary metabolites more rapid than iso-octane. | PS-56 |
| 27-32130 | 7/80 | Acute Dermal Toxicity | rabbit (NZW) | 1/4 female dead at 5 ml/kg | PS-33 |
| 27-32130 | 7/80 | Acute Oral Toxicity | rat (SD) | LD50 = 18.75 ml/kg (95% CI = 16.30 ml/kg to 21.60 ml/kg, male and female combined) | PS-33 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul 2x/wk | mouse (C3H/HeJ) | Histopathology: 2 mice with tumors; FEN = 48; Mean Latency = 123 weeks Toluene Controls: 4 mice with tumors, FEN=43; Mean Latency = 111 weeks see also 33-31451 - 1/87 - PS-36 | PS-36 |
| 33-31451 | 1/87 | Chronic Dermal Carcinogenesis: 50 ul 2x/wk 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Locally dermatotoxic; no definitive chronic toxicity after 12 months of dosing. | PS-36 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32165 | 9/83 | Chronic Inhalation Toxicology/Carcinogenicity: 67, 292, and 2056 ppm, 6 hr/day, 5 d/wk, 2 yrs. | rat (F344) mouse (B6C3F1) | Body weight depressed at high dose. Kidney weights of male rats elevated. Histopathology of kidneys showed the following tumors in male rats: control - 0; 67 ppm - 1 carcinoma, 1 leukemic infiltrate; 292 ppm - 2 adenomas, 2 carcinomas & 1 sarcoma; 2056 ppm - 6 carcinomas & 1 adenoma. There was a sarcoma in the kidneys of 1 mid-dose female rat and liver tumors in high-dose female mice.<br><br>Also see:<br>30-31991 (McFarland Paper)<br>32-32227 (McFarland et al.)<br>30-32845 (Westpath report - Kidney Effects of Unleaded Gasoline) - 9/83 - PS-6 | PS-6 |
| 32-32227 | 9/83 | Chronic Inhalation Toxicology/Carcinogenicity (McFarland et al.) | rat (F344 mouse (B6C3F1) | see 32-32165 | PS-6 |
| 30-31991 | 9/83 | Chronic Inhalation Toxicology/Carcinogenicity (McFarland Paper) | N/A | see 32-32165 | PS-6 |
| 30-32845 | 9/83 | Chronic Inhalation Toxicology/Carcinogenicity (Westpath report - Kidney Effects of Unleaded Gasoline) | N/A | see 32-32165 | PS-6 |
| 27-32130 | 7/80 | Dermal Sensitization (0.5 ml neat; mineral oil, 50% solution for trial and challenge) | guinea pig | Nonsensitizing | PS-33 |
| 28-30173 | 3/77 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 28-31344 | 4/80 | Mutagenesis: Dominant Lethal Assay 400 and 1600 ppm via inhalation 6 hr/d, 5 d/wk, 8 wks. | mouse | Negative | PS-39 |

# UNLEADED GASOLINE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 34-33108 | 9/87 | Mutagenesis: in vitro mouse Lymphoma 220-280°F boiling cut | mouse | Negative with and without metabolic (S9) activation. | PS-61 |
| 34-33107 | 9/87 | Mutagenesis: in vitro mouse Lymphoma 2,2,4-Trimethylpentane | mouse | Negative with and without metabolic (S9) activation. | PS-61 |
| 34-33109 | 9/87 | Mutagenesis: in vitro mouse Lymphoma 2,3-Dimethylbutane | mouse | Negative with and without metabolic (S9) activation. | PS-61 |
| 28-30173 | 3/77 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-4 |
| 35-31365 | 12/87 | Mutagenesis: in vitro mouse Lymphoma n-Octane | mouse | Negative with and without metabolic (S9) activation. | PS-61 |
| 35-32431 | 4/88 | Mutagenesis: in vitro Unscheduled DNA Synthesis - rat hepatocytes DMSO extract of gasoline | rat | 1:5 Extract - negative | PS-61 |
| 35-32431 | 4/88 | Mutagenesis: in vitro Unscheduled DNA Synthesis - rat hepatocytes Evaporative residue of gasoline | rat | 30:1 Concentrate - positive | PS-61 |
| 35-32431 | 4/88 | Mutagenesis: in vitro Unscheduled DNA Synthesis - rat hepatocytes Gasoline | rat | Negative | PS-61 |
| 28-30173 | 3/77 | Mutagenesis: in vivo Bone Marrow Cytogenetics Assay acute = 0.03 ml/rat, 0.1 ml/rat, 0.3 ml/rat i.p., 1 exposure | rat | Negative | PS-4 |

# UNLEADED GASOLINE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60099 | 11/77 | Mutagenesis in vivo Bone Marrow Cytogenetics: Subchronic = 0.003 ml/rat, 0.04 ml/rat, 0.13 ml/rat, i.p., 5 exposures, 24 hr apart | rat | Negative | |
| 30-30225 | 10/82 | Neurotoxicity: (animals from chronic study, 2056 ppm, 6 hr/day, 5 day/week, up to 18 mo.) | rat (F344) | Analysis of spinal cords for neurotoxicity showed possible adverse effects. The small number of animals examined meant that results were not definitive. | PS-29 |
| Publ 4592 | 1/94 | Odor Threshold Studies on gasoline blends and gasoline oxygenate mixtures | human | Odor detection and recognition thresholds of gasoline blends and gasoline oxygenate mixtures in air were (expressed in ppm): | N/A |
| | | | | Odor Detection / Odor Recognition<br>Summer blend 0.578 / 0.802<br>Winter Blend 0.479 / 1.121<br>Composite blend 0.474 / 0.765<br>Summ. blend + 15%MTBE 0. 264 / 0.686<br>Wint. blend + 15% MTBE 0. 219 / 0.398<br>Comp. blend + 15 % MTBE 0.085 / 0.185<br>Summ. blend + 15% TAME 0.114 / 0.207<br>Summ. blend + 15% ETBE 0.064 / 0.139 | |
| 32-32749 | 12/84 | Percutaneous Absorption: 2,2,4-Trimethylpentane 0.04-0.05 ml subQ dose | monkey | Technical difficulty in administration; sample leaked out onto skin after administration. Urinary excretion detected for at least 3 weeks; could not restrain animals for this long. | PS-32 |
| 32-32749 | 12/84 | Percutaneous Absorption: 2,2,4-Trimethylpentane, i.v. dose | monkey | 38-49% of dose excreted in urine. | PS-32 |
| 32-32749 | 12/84 | Percutaneous Absorption: 2,2,4-Trimethylpentane Topical exposure (250 ul to 50 cm2) | monkey | Urinary excretion of 0.010±0.006% of dose. | PS-32 |

# UNLEADED GASOLINE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32130 | 7/80 | Primary Dermal Irritation | rabbit (NZW) | Slightly irritating (Score 0.98) | PS-33 |
| TR 409 | 12/20/94 | Primary Dermal Irritation in rabbits following a 4 hr dermal application | rabbit (NZW) | 91-01(PII) PS-6(PII)<br>occluded 4.8 4.8<br>semi-occluded 4.3 3.7<br>(all moderate irritants) | |
| 27-32130 | 7/80 | Primary Eye Irritation | rabbit (NZW) | Nonirritating (rinsed and unrinsed eyes scored 0 at 24, 48 and 72 hrs) | PS-33 |
| 34-33036 | 9/87 | Pulmonary Absorption: % of inhaled hydrocarbon retained | rat (F344) | % Uptake<br>propylene 8.7a<br>2-butyne 12.9a<br>cis-2-butene 13.3<br>n-butane 7.2<br>iso-butane 5.4<br>n-pentane 19.0<br>iso-pentane 8.6<br>neopentane 5.4<br>benzene 57.1<br>methylcylopentane 30.8<br>n-hexane 34.2<br>iso-hexane 24.7<br>n-heptane 22.8<br>2,3-dimethylpentane 22.7<br>n-octane 36.7<br>2,3,4-trimethylpentane 28.9<br>2,2,3,3-tetramethylbutane 19.7<br>1,2,4-trimethylbenzene 66.8<br>n-nonane 38.2<br>a= means of all data obtained between 10 and 100 ppm for exposure times 50-70 minutes. | PS-56 |
| 27-32130 | 7/80 | Subchronic Dermal Toxicity: 24 hrs/d, 5 d/wk, 2 wks | rabbit (NZW) | 0% mortality at 2.5 ml/kg, 5.0 ml/kg and 8.0 ml/kg (emaciated, weight reduced at 8 ml/kg; slight systemic toxicity) Severe dermal reactions, histologically. | PS-33 |

# UNLEADED GASOLINE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32405 | 2/85 | Subchronic Inhalation: 0-145°F Gasoline Distillation Fraction 1000 and 4500 ppm, 6 hr/d, 5 d/wk, 13 wks | rat (F344) | No treatment-related effects in the monitored parameters (i.e., clinical observations, body weights, necropsy and organ weights) were reported for the 4- and 13-week sacrifice. | PS-53 |
| 32-31472 | 10/84 | Subchronic Inhalation: 50:50 mixtures of iso-butane:iso-pentane and n-butane:n-pentane 1000 and 4500 ppm, 6 hr/d, 5 d/wk, 13 wks | rat (F344) | Liver and kidney weights of rats sacrificed at either 4 or 13 weeks were unaffected by the exposure. All observed gross lesions were considered to be spontaneous and unrelated to the exposures. No evidence of HC nephropathy in male or female rats of any group. N-butane:n-pentane produced statistically significant reduction in BW by week 3 and 4 in both sexes. Males recovered by end of exposure period. | PS-53 |
| 27-32610 | 4/76 | Subchronic Inhalation Toxicity: 1.57 mg/l (384 ppm); 6.35 mg/l (1552 ppm); 6 hr/d, 5 d/wk, 3 mos. (90 days) | rat (SD) | Slight increase in platelet count and male liver weight at high dose.<br><br>Lab report and publication - same number | PS-6 |
| 27-32610 | 4/76 | Subchronic Inhalation Toxicity: 1.57 mg/l (384 ppm); 6.35 mg/l (1552 ppm); 6 hr/d, 5 d/wk, 3 mos. (90 days) | monkey | Small increase in respiratory rate.<br><br>Lab report and publication - same number | PS-6 |
| 33-31097 | 3/86 | Subchronic Oral Nephrotoxicity Screen - C8/C10: 2.0 g/kg, 5 d/wk for 4 wks. | rat (F344) | Positive- (Nephropathy score of slight to severe)<br>2,2,4,4-Tetramethyloctane<br>2,2,3-Trimethyloctane<br>2,2,4,4-Tetramethyldecane<br>PS-6 fuel<br><br>Negative- (no effect rating)<br>2,3-Dimethyloctane<br>2-Methyldecane<br>Decane<br>3-Methyloctane<br>Octane<br>2,2,3-Trimethyldecane<br>2,3-Dimethyldecane<br>2,2,4,4,5,5,7,7-Octamethyloctane | PS-53 |

# UNLEADED GASOLINE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-30966 | 2/85 | Subchronic Studies:<br>Oral 0.5 & 2.0 g/kg, 5 d/wk x 4 wks; gasoline, 16 component chemicals, refinery streams from PS-6 and distillation cuts from PS-6 gasoline | rat (F344) | • Negative-(HC Nephropathy)<br>Methylcyclopentane<br>Pentane<br>2-Methyl-2-pentene<br>m-Xylene<br>2-Methylbutane<br>1,2,4-Trimethylbenzene<br>Toluene<br>2-Methylhexane<br>Trans-2-Pentene<br>Light Catalytically Reformed Naphtha<br>API Gas Fraction 280°F+<br>Heavy Catalytically Cracked Naphtha<br>n-Hexane<br><br>• Positive-(HC Nephropathy)<br>API Gas Fraction 220-280°F<br>Light Alkylate Naphtha<br>2,2,4-Trimethylpentane<br>2,3-Dimethylpentane<br>2,2,5-Trimethylhexane<br>API PS-6 Fuel<br>API Gas Fraction 145-220°F<br>2,3-Dimethylbutane<br>Light Catalytically Cracked Naphtha<br>2-Methylpentane (questionable) | PS-53 |
| 26-60014 | 8/78 | Teratogenesis:<br>400 & 1600 ppm via inhalation days 6-15 of gestation | rat (SD) | Negative | PS-15 |

# 10% BOTTOMS FROM UNLEADED GASOLINE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31646 | 5/83 | Chronic Dermal Carcinogenesis: 0.05 ml 3x/wk for 2 yrs (15.6 ml total dose/mouse) | mouse (Swiss) | Significant skin irritation. No significant carcinogenicity. 10% survival to 2 years. | PS-36 |

# LEADED GASOLINE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32610 | 4/76 | Subchronic Inhalation Toxicity: 0.42 mg/l (103 ppm = 0.19 ug Pb/l), 1.53 mg/l (373 ppm = 0.72 ug Pb/l); 6 hr/day 5 days/wk, 3 mos (90 days) | rat | Urinary Pb excretion and tissue Pb levels increased. Slight increase in male liver weights at high dose. Increased platelet count. Subtle but exposure-related microscopic changes on reexamination of high-dose male rat kidneys.<br><br>Lab report and publication - same number | PS-6 |
| 27-32610 | 4/76 | Subchronic Inhalation Toxicity: 0.42 mg/l (103 ppm = 0.19 ug Pb/l), 1.53 mg/l (373 ppm = 0.72 ug Pb/l); 6 hr/day, 5 days/wk, 3 mos (90 days) | monkey | Data inconclusive, but no adverse renal changes on reexamination.<br><br>Lab report and publication - same number | PS-6 |

# LIGHT CATALYTICALLY CRACKED NAPHTHA

## Sample 81-03

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31988 | 8/82 | Acute Dermal Toxicity | rabbit (NZW) | No deaths at 2.0 g/kg. | PS-45 |
| 33-31902 | 10/82 | Acute Inhalation Toxicity LC50 | rat (SD) | No deaths at 5.2 mg/L; Females exhibited nasal discharge only during exposure. | PS-45 |
| 30-31988 | 8/82 | Acute LD50 | rat (SD) | No deaths at 5.0 g/kg (signs: hypoactivity, diarrhea, ataxia) | PS-45 |
| 33-31451 | 1/86 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H) | No definitive chronic toxicity after 12 months of dosing. See 36-31364 - 1/89 - PS-36 | PS-36 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul 2x/wk | mouse (C3H/HeJ) | At histopathological examination: 7 mice with tumors, Mean Latency - 118 weeks; FEN=47<br>Untreated Control: 0 tumors<br>Toluene Control: 4 mice with tumors, FEN=43; Mean Latency - 111 weeks<br>12-Month Toxicity Evaluation see 33-31451 - 1/86 - PS-36 | PS-36 |
| 31-31412 | 3/84 | Dermal Sensitization: 50 % v/v paraffin oil - sensitization<br>1% v/v paraffin oil - challenge | guinea pig | Nonsensitizing | PS-45 |
| 32-31300 | 3/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Negative | PS-4 |
| 36-30045 | 10/88 | Mutagenesis: in vitro SCE in CHO cells | CHO cells | Negative without S9.<br>Equivocal with S9. | PS-12 |
| 32-31300 | 3/85 | Mutagenesis: in vivo Bone Marrow Cytogenetics (Inhalation at 63, 297 & 2046 ppm for 6 hr/d x 5d) | rat (SD) | Negative | PS-4 |

# LIGHT CATALYTICALLY CRACKED NAPHTHA

## Sample 81-03

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 36-30044 | 9/88 | Mutagenesis:<br>in vivo SCE<br>200, 1200, 2400 mg/kg<br>(single ip injection) | mouse (B6C3F1) | Positive | PS-12 |
| 30-31988 | 8/82 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 1.7 | PS-45 |
| 30-31988 | 8/82 | Primary Eye Irritation | rabbit (NZW) | Unwashed / Washed (Irritation Index, Average)<br>1 hr. 4.0 / 2.0<br>24 hrs. 1.0 / 0.7 | PS-45 |
| 34-33173 | 11/87 | Subchronic Inhalation Study:<br>6 hrs/day, 5d/wk at 1500 ppm, 2600 ppm and 4500 ppm | rat (SD) | Decrease in weight gain for males at 2610 and 4540 ppm. Increased absolute or relative liver and kidney weights at 1510 ppm (males) and 2610 and 4540 ppm (both sexes). Centrilobular hepatocellular hypertrophy in males and females exposed to 4540 ppm. Evidence of light hydrocarbon nephropathy in males at 4540 ppm. | PS-45 |
| 32-30966 | 2/85 | Subchronic Toxicity:<br>0.5 or 2.0 g/kg, 5 d/wk x 4 wks via gavage | rat (F344) | See unleaded gasoline (Subchronic study) | PS-53 |

# LIGHT CATALYTICALLY CRACKED NAPHTHA

## Sample 81-04

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-30747 | 2/86 | 28-Day Dermal:<br>200, 1000, & 2000 mg/kg x 3/wk, 12 applications | rabbit (NZW) | Dermal results:<br>erythema; edema; atonicity; and dry, flaking skin<br>200 mg/kg - moderate irritant<br>1000 mg/kg - severe irritant<br>2000 mg/kg - severe irritant<br>Proliferative and inflammatory changes in skin. Increased granulopoiesis of bone marrow, believed stress-related.<br>Statistically significant mean BW reduction in high-dose male and mid- and high-dose female. | PS-45 |
| 32-31708 | 2/85 | Acute Dermal LD50 | rabbit (NZW) | Greater than 2.0 g/kg | PS-45 |
| 31-30680 | 2/84 | Acute Inhalation Toxicity:<br>LC50<br>5.0 mg/l for 4 hours | rat (SD) | No deaths at 5.25 mg/L (no significant toxic signs) | PS-45 |
| 32-31708 | 2/85 | Acute Oral Toxicity<br>LD50 | rat (SD) | Greater than 5.0 g/kg | PS-45 |
| 33-30495 | 12/85 | Dermal Sensitization:<br>75% v/v in paraffin oil - sensitization<br>25% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 32-31710 | 2/86 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Negative without activation on repeat. Equivocal with activation on repeat. | PS-4 |
| 32-32288 | 4/85 | Mutagenesis:<br>in vivo Bone Marrow Cytogenetics<br>(3.0, 1, 0.3 gm/kg, i.p. single dose) | rat (SD) | Negative | PS-4 |
| 32-30966 | 2/85 | Nephropathy Screen | rat (F344) | See Unleaded Gasoline (Subchronic studies) | PS-53 |
| 32-31708 | 2/85 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 4.0 | PS-45 |

# LIGHT CATALYTICALLY CRACKED NAPHTHA

## Sample 81-04

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | | | Project Number |
|---|---|---|---|---|---|---|---|
| 32-31708 | 2/85 | Primary Eye Irritation | rabbit (NZW) | Unwashed | Washed | (Irritation Index) | PS-45 |
| | | | | 1 hr 4.3 | 6.0 | | |
| | | | | 24 hr 0.3 | 0.0 | | |

# LIGHT CATALYTICALLY CRACKED NAPHTHA

## Sample 83-20

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-32722 | 8/86 | Acute Dermal Toxicity LD50 | rabbit (NZW) | Greater than 3.0 g/kg | PS-45 |
| 34-32777 | 1/87 | Acute LC50 | rat (SD) | No deaths at 5.3 mg/L for 4 hours; languid behavior and squinted eyes during exposure. | PS-45 |
| 33-32722 | 8/86 | Acute Oral Toxicity LD50 | rabbit (NZW) | Greater than 5.0 g/kg | PS-45 |
| 33-32722 | 8/86 | Dermal Sensitization: Undiluted - sensitization; 25% v/v in paraffin oil - challenge | guinea pig | Nonsensitizing | PS-45 |
| 34-30633 | 1/87 | Mutagenesis: in vitro mouse Lymphoma 50-400 nl/ml | mouse | Negative over a wide range of toxicities. | PS-4 |
| 33-32722 | 8/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 3.7 | PS-45 |
| 33-32722 | 8/86 | Primary Eye Irritation | rabbit (NZW) | Unwashed Washed (Irritation Index)<br>1 hr 1.0 3.3<br>24 hr 0.0 0.0 | PS-45 |

# SWEETENED NAPHTHA

## Sample 81-08

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31990 | 8/82 | Acute Dermal Toxicity | rabbit (NZW) | No deaths at 2 g/kg | PS-45 |
| 33-31827 | 10/82 | Acute LC50:<br>5.2 mg/l, inhalation of vapor for 4 hours | rat (SD) | No deaths at 5.2 mg/L for 4 hrs. Signs: nasal discharge during exposure; reduced weight gain in females. | PS-45 |
| 30-31990 | 8/82 | Acute LD50 | rat (SD) | Greater than 5.0 g/kg (Signs: diarrhea) | PS-45 |
| 33-31451 | 1/86 | Chronic Dermal Carcinogenesis:<br>12-Month Toxicity Evaluation | mouse (C3H/HeJ) | see 36-31364 - 1/89 - PS-36 | PS-36 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis:<br>50 ul 2x/wk | mouse (C3H/HeJ) | At histopathological examination: 3 animals with tumors, FEN=46; Mean Latency = 113 weeks<br>Toluene Controls: 4 mice with tumors; FEN=43; Mean Latency = 111 weeks<br>12-Month Toxicity Evaluation see 33-31451 - 1/86 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay:<br>Short-Term (Initiation/Promotion) | mouse (CD-1) | No promotional or initiator activity. | PS-62 |
| 31-31351 | 3/84 | Dermal Sensitization:<br>50% v/v paraffin oil - sensitization<br>25% v/v paraffin oil - challenge | guinea pig | Nonsensitizing | PS-45 |
| 32-31233 | 2/85 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Negative, with and without metabolic activation. | PS-4 |
| 33-31093 | 3/86 | Mutagenesis:<br>in vivo Bone Marrow Cytogenetics<br>Inhalation exposures of 69, 293, 2012 ppm, 6 hr/day, 5 days | rat (SD) | Negative | PS-4 |

# SWEETENED NAPHTHA

## Sample 81-08

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31990 | 8/82 | Primary Dermal Irritation: (0.5 ml/area) | rabbit (NZW) | Irritation Index = 1.2 (slightly irritating) | PS-45 |
| 30-31990 | 8/82 | Primary Eye Irritation: (0.1 ml) | rabbit (NZW) | Unwashed Washed (Irritation Index)<br>1 hr 2.0 0.7<br>24 hr 0.3 0.0 | PS-45 |
| 32-30966 | 2/85 | Subchronic Toxicity: 0.5 or 2.0 g/kg, 5 d/wk x 4 wk via gavage | rat (F344) | See Unleaded Gasoline (Subchronic Studies) | PS-53 |

# LIGHT CATALYTICALLY REFORMED NAPHTHA

## Sample 83-04

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-30597 | 2/86 | 28-Day Dermal:<br>dose levels = 200, 2000 mg/kg, 3x/wk, 4 weeks | rabbit (NZW) | Dermal results: erythema; edema; atonicity; and dry, flaking skin. Statistically significant lower body weight gains at 2000 mg/kg with slight to moderate proliferative and inflammatory changes in treated skin.<br>200 mg/kg - moderate irritant<br>1000 mg/kg - severe irritant<br>2000 mg/kg - severe irritant | PS-45 |
| 32-31473 | 2/85 | Acute Dermal LD50 | rabbit (NZW) | Greater than 2.0 g/kg body weight | PS-45 |
| 31-30613 | 2/84 | Acute Inhalation LC50 | rat (SD) | No deaths at 5.05 mg/l for 4 hrs. | PS-45 |
| 32-31473 | 2/85 | Acute Oral LD50 | rat (SD) | Greater than 5.0 g/kg body weight | PS-45 |
| 33-30496 | 12/85 | Dermal Sensitization<br>75% v/v in paraffin oil - sensitization<br>25% v/v in paraffin oil - challenge | guinea pig | Nonsensitizing (closed patch technique) | PS-45 |
| 32-32168 | 6/85 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Negative with and without metabolic activation. | PS-4 |
| 33-31092 | 3/86 | Mutagenesis:<br>in vivo Bone Marrow Cytogenetics<br>(single i.p. inj. 0.25, 0.83 and 2.5 g/kg) | rat (SD) | Negative | PS-4 |
| 32-31473 | 2/85 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 2.0 (slight to moderate irritation) | PS-45 |
| 32-31473 | 2/85 | Primary Eye Irritation | rabbit (NZW) | Unwashed Washed (Irritation Index)<br>1 hr 8.0 6.0<br>24 hr 2.8 1.3 | PS-45 |
| 32-30966 | 2/85 | Subchronic Toxicity:<br>0.5 or 2.0 g/kg, 5 d/wk x 4 wks | rat (F344) | See Unleaded Gasoline (Subchronic studies) | PS-53 |

# FULL RANGE CATALYTICALLY REFORMED NAPHTHA

## Sample 83-05

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-30598 | 2/86 | 28-Day Dermal:<br>3 dose levels -- 200, 1000 & 2000 mg/kg, 3x/wk, 4 wks | rabbit (NZW) | Dermal findings: erythema; atonicity; and cracked, flaking skin.<br>200 mg/kg - moderate irritant<br>1000 mg/kg - moderate irritant<br>2000 mg/kg - severe irritant<br>Inflammatory changes in skin. Upon rereading of slides by EPL, two high-dose deaths were considered not to be treatment related and the renal tubule degeneration found was NOT hydrocarbon-induced nephropathy. Statistically significant reduced BW in high-dose males and females. Increased granulopoiesis of bone marrow, thought to be stress related. | PS-45 |
| 32-31474 | 12/85 | Acute Dermal LD50 | rabbit (NZW) | >2.0 g/kg body weight | PS-45 |
| 31-30681 | 2/84 | Acute LC50:<br>5.22 mg/L in vapor, 4 hours | rat (SD) | No deaths at 5.22 mg/L for 4 hrs. | PS-45 |
| 32-31474 | 12/85 | Acute Oral LD50 | rat (SD) | Male - 6.62 g/kg (95% CI= 6.2-7.08 g/kg)<br>Female - 5.39 g/kg (95% CI= 4.23-6.86 g/kg) | PS-45 |
| 33-30497 | 12/85 | Dermal Sensitization:<br>50% v/v in paraffin oil - sensitization<br>25% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 32-32459 | 6/85 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Positive with metabolic activation; negative w/o metabolic activation. | PS-4 |
| 32-32289 | 5/85 | Mutagenesis:<br>in vivo Bone Marrow Cytogenetics<br>0.25, 0.83, 2.5 g/kg, single ip dose | rat (SD) | Negative | PS-4 |
| 32-31474 | 12/85 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 3.1 (moderate irritation) | PS-45 |

# FULL RANGE CATALYTICALLY REFORMED NAPHTHA

## Sample 83-05

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | | | Project Number |
|---|---|---|---|---|---|---|---|
| 32-31474 | 12/85 | Primary Eye Irritation | rabbit (NZW) | Unwashed | Washed | (Irritation Index) | PS-45 |
| | | | | 1 hr | 7.2 | 7.3 | |
| | | | | 24 hr | 5.5 | 2.7 | |

# HEAVY CATALYTICALLY REFORMED NAPHTHA

## Sample 83-06

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32752 | 10/85 | 28-Day Dermal Toxicity: (200, 1000, 2000 mg/kg, 3x/wk for 4 wks) | rabbit (NZW) | 2000 mg/kg severe irritation, inflammation<br>1000 mg/kg severe irritation<br>200 mg/kg moderate irritation | PS-45 |
| 32-32860 | 11/85 | Acute Dermal LD50 | rabbit (NZW) | >6.0 g/kg | PS-45 |
| 32-32169 | 6/85 | Acute Inhalation Toxicity LC50 | rat (SD) | No deaths at 5.04 mg/L for 4 hrs. | PS-45 |
| 32-32860 | 11/85 | Acute Oral LD50 | rat (SD) | 4.82 g/kg (M); 5.80 g/kg (F)<br>95% CI = 4.06-5.71 g/kg (M); 4.71-7.15 g/kg (F) | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Locally dermatotoxic; no definitive chronic toxicity after 12 months of dosing. See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology: 0/50 mice with benign tumors.<br>Toluene Control: 0/50 mice with benign tumors.<br><br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 32-32860 | 11/85 | Dermal Sensitization:<br>50% v/v in paraffin oil - sensitization<br>25% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 32-32460 | 6/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Lab 1 -- Negative without activation. Positive with activation. | PS-4 |
| 33-31641 | 5/86 | Mutagenesis: in vitro mouse Lymphoma | mouse | Lab 2 -- Equivocal with and without activation. | PS-4 |
| 33-30494 | 5/85 | Mutagenesis: in vivo Bone Marrow Cytogenetics (0.3, 1.0, 3.0 g/kg, single ip injection) | rat (SD) | Negative | PS-4 |

# HEAVY CATALYTICALLY REFORMED NAPHTHA

## Sample 83-06

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-30966 | 2/85 | Nephropathy Screen | rat (F344) | See Unleaded Gasoline (Subchronic studies) | PS-53 |
| 32-32860 | 11/85 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 5.4 | PS-45 |
| 32-32860 | 11/85 | Primary Eye Irritation | rabbit (NZW) | Unwashed Washed (Irritation Index)<br>1 hr 4.3 4.7<br>24 hr 0.7 1.3 | PS-45 |

# HEAVY CATALYTICALLY CRACKED NAPHTHA

## Sample 83-18

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32748 | 11/85 | 28-Day Dermal Toxicity: (200, 1000, 2000 mg/kg, 3x/wk for 4 weeks) | rabbit (NZW) | 2000 mg/kg moderate irritant<br>1000 mg/kg moderate irritant<br>200 mg/kg slight to moderate irritant, males; slight, females. | PS-45 |
| 33-30593 | 1/86 | Acute Dermal LD50 | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 34-32776 | 7/87 | Acute Inhalation Toxicity LC50 | rat (SD) | No deaths at 5.74 mg/L for 4 hours. | PS-45 |
| 33-30593 | 1/86 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Locally dermatotoxic; no definitive chronic toxicity after 12 months of dosing. See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology: 6 mice with tumors; FEN = 46; Mean Latency = 72<br>Toluene Control: 0 mice with tumors<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 33-30593 | 1/86 | Dermal Sensitization: 75% v/v in paraffin oil - sensitization<br>25% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 33-32804 | 9/86 | Mutagenesis: in vitro mouse Lymphoma | mouse | Positive with and without metabolic activation. | PS-4 |
| 32-30966 | 2/85 | Nephropathy Screen | rat (F344) | See Unleaded Gasoline (Subchronic studies) | PS-53 |
| 33-30593 | 1/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 6.9 | PS-45 |
| 33-30593 | 1/86 | Primary Eye Irritation | rabbit (NZW) | Unwashed Washed (Irritation Index)<br>1 hr 3.7 2.7<br>24 hr 0.0 0.0 | PS-45 |

# LIGHT ALKYLATE NAPHTHA

## Sample 83-19

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-30498 | 1/86 | 28-Day Dermal Toxicity:<br>200, 1000, and 2000 mg/kg, 3x/wk for 4 wk | rabbit (NZW) | 2000 mg/kg - moderate irritation<br>1000 mg/kg - moderate irritation<br>200 mg/kg - minimal irritation<br>Significantly lower body weights (M&F) at high dose | PS-45 |
| 33-30594 | 1/86 | Acute Dermal LD50 | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 34-30636 | 1/87 | Acute Inhalation Toxicity | rat (SD) | >5.0 mg/L for 4 hours exposure | PS-45 |
| 33-30594 | 1/86 | Acute Oral LD50 | rat (SD) | >7.0 g/kg | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis:<br>12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Locally dermatotoxic; no definitive chronic toxicity seen after 12 months of dosing (1 papilloma noted). See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis:<br>50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology: 1 mouse with tumor; FEN = 46; Mean Latency = 104<br>Toluene Control: 0 mice with tumors.<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 33-30594 | 1/86 | Dermal Sensitization:<br>50% v/v in paraffin oil - sensitization<br>25% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 32-32746 | 7/85 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Negative in the presence and absence of metabolic activation. | PS-4 |
| 32-32409 | 5/85 | Mutagenesis:<br>in vivo Bone Marrow Cytogenetics Assay<br>3.0, 1.0, and 0.3 g/kg, i.p. injection | rat (SD) | Negative | PS-4 |
| 32-30966 | 2/85 | Nephropathy Screen | rat (F344) | See Unleaded Gasoline (Subchronic studies) | PS-53 |
| 33-30594 | 1/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 3.9 | PS-45 |
| 33-30594 | 1/86 | Primary Eye Irritation:<br>(score at 24 hrs) | rabbit (NZW) | Irritation Index:<br>Unwashed 0.0<br>Washed 0.0 | PS-45 |

# HEAVY THERMALLY CRACKED NAPHTHA

## Sample 84-02

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-31696 | 5/86 | 28-Day Dermal:<br>200, 1000, 2000 mg/kg 3x/wk for 4 wks | rabbit (NZW) | 2000 mg/kg - moderate irritant<br>1000 mg/kg - moderate irritant<br>200 mg/kg - slight irritant<br>Significant decrease in male and female body weights at high dose. Proliferative changes and slight to moderately severe inflammation in treated skin of the male and female high dose. | PS-45 |
| 33-30596 | 1/86 | Acute Dermal Toxicity | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 34-32778 | 7/87 | Acute Inhalation Toxicity | rat (SD) | No deaths at 5.24 mg/L, 4-hour exposure. Languid behavior, squinted eyes, respiratory distress, salivation at different post-exposure periods. | PS-45 |
| 33-30596 | 1/86 | Acute Oral Toxicity | rat (SD) | >5.0 g/kg | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis:<br>12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Locally dermatotoxic; no definitive chronic toxicity noted after 12 months of dosing. See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis:<br>50 ul 2x weekly | mouse (C3H/HeJ) | Histopathology: 6 mice with tumors; FEN = 45; Mean Latency = 88<br>Toluene Control: 0 mice with tumors<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 33-30596 | 1/86 | Dermal Sensitization:<br>25% v/v in paraffin oil - sensitization<br>1% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 34-30632 | 1/87 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Positive with and without metabolic activation in a wide range of toxicities. | PS-4 |
| 33-30596 | 1/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 4.9 | PS-45 |
| 33-30596 | 1/86 | Primary Eye Irritation | rabbit (NZW) | Unwashed Washed (Irritation Index)<br>1 hr 3.0 2.7<br>24 hr 0.0 0.0 | PS-45 |

# JET FUEL A

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32815 | 9/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg | PS-33 |
| 27-32815 | 9/80 | Acute Oral LD50 | rat (SD) | >25 ml/kg | PS-33 |
| 27-32815 | 9/80 | Dermal Sensitization: 0.5 ml, neat, both sensitization and challenge doses | guinea pig | Nonsensitizing | PS-33 |
| 27-30051 | 8/79 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-39 |
| 27-30051 | 8/79 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Positive | PS-39 |
| 27-30051 | 8/79 | Mutagenesis: in vivo Bone Marrow Cytogenetics Assay Inhalation of 100 ppm, 6 hr/day, 5 day/wk, 19 days or 400 ppm, 6 hr/day, 5 days | rat | Original study was "Positive," but findings from this study are considered suspect on the basis of technical errors found in subsequent studies. | PS-39 |
| 28-31345 | 12/80 | Mutagenesis: in vivo Dominant Lethal Assay 100/400 ppm, 6 hr/day, 5 day/wk, 8 wks | mouse | Negative | PS-39 |
| 30-31037 | 5/82 | Mutagenic Evaluation: in vivo/in vitro Urine Assay | rat | Negative | PS-50 |
| 27-32815 | 9/80 | Primary Dermal Irritation | rabbit (NZW) | Mildly irritating (Draize scale) | PS-33 |
| 27-32815 | 9/80 | Primary Eye Irritation | rabbit (NZW) | Mildly irritating (Draize scale) | PS-33 |

# JET FUEL A

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32815 | 9/80 | Subchronic Dermal: 8 ml/kg, 5 days/week for 2 weeks | rabbit (NZW) | Acute dermal corrosion; dermal and hepatic toxicity; hyperplastic changes in urinary bladder epithelium not corroborated by 2 independent pathologists. | PS-33 |
| 27-32173 | 5/79 | Teratogenesis: 0, 100, & 400 ppm days 6-15 of gestation (inhalation) | rat (SD) | Negative | |

# DIESEL FUEL

## API 79-6

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32817 | 9/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg | PS-33 |
| 27-32817 | 9/80 | Acute Oral LD50 | rat (SD) | 9.0 ml/kg (95% CI = 5.58-14.51 ml/kg) | PS-33 |
| 30-31646 | 5/83 | Chronic Dermal Carcinogenesis: 0.05 ml 3x/wk; sacrificed after 62 weeks | mouse (Swiss) | Extreme skin irritation. No significant carcinogenesis. | PS-36 |
| 27-32817 | 9/80 | Dermal Sensitization: 0.5 ml dose - sensitization 0.5 ml dose - challenge | guinea pig | Nonsensitizing | PS-33 |
| 26-60102 | 2/78 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 26-60102 | 2/78 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-4 |
| 26-60102 | 2/78 | Mutagenesis: in vivo Bone Marrow Cytogenetics Assay 0.6 ml/kg, 2.0 ml/kg, 6.0 ml/kg i.p.; acute = 1 exposure; subchronic = 5 exposures, 24 hr apart | rat | Positive: clastogenic at 2.0 ml/kg and 6.0 ml/kg. | PS-4 |
| 28-31346 | 2/81 | Mutagenesis: in vivo Dominant Lethal Assay 100 ppm/400 ppm, 6 hr/day, 5 days/wk, 8 wks (inhalation) | mouse | Negative | PS-39 |
| 27-32817 | 9/80 | Primary Dermal Irritation | rabbit (NZW) | Extremely irritating (Draize scale) | PS-33 |
| 27-32817 | 9/80 | Primary Eye Irritation | rabbit (NZW) | Nonirritating (Draize scale) | PS-33 |

# DIESEL FUEL

## API 79-6

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32817 | 9/80 | Subchronic Dermal Toxicity: 24 hrs/day, 5 days/wk, 2 wks | rabbit (NZW) | 0% mortality at 4 ml/kg<br>67% mortality at 8 ml/kg | PS-33 |
| 27-32174 | 3/79 | Teratogenesis: 100 & 400 ppm via inhalation days 6-15 of gestation | rat (SD) | Negative (significant decrease in food consumption of dams in 400-ppm exposure group). | |

# KEROSENE/DEODORIZED KEROSENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60089 | 6/75 | Acute Inhalation Toxicity (Deodorized Kerosene): Air at 25°C substantially saturated with vapors 0.10 mg/l (14 ppm) for 8 hrs | rat/dog/cat | No mortality, no signs of discomfort. | |
| 26-60089 | 6/75 | Human Sensory Response (Deodorized Kerosene): Odor Threshold | human | Approximately 0.0006 mg/l (0.09 ppm) | |
| 26-60089 | 6/75 | Human Sensory Response (Deodorized Kerosene): Vapor saturated air at 25°C, 0.14 mg/l (20 ppm) | human | No eye, nose, or throat irritation reported. | |
| 26-60103 | 1978 | Mutagenesis: Ames Assay (Deoderized Kerosene) | Salmonella typhimurium | Negative | PS-4 |
| 26-60017 | 3/77 | Mutagenesis: Ames Assay (Kerosene) | Salmonella typhimurium | Negative | PS-4 |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay (Deodorized Kerosene) 1.0 mg/kg of a 10% dilution in corn oil, subQ | mouse | Negative | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay (Deodorized Kerosene) 1.0 mg/kg, i.p. | rat | Negative | |
| 26-60017 | 3/77 | Mutagenesis: in vitro mouse Lymphoma Assay (Kerosene) | mouse | Negative | PS-4 |

# KEROSENE/DEODORIZED KEROSENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60017 | 3/77 | Mutagenesis: in vivo Bone Marrow Cytogenetics Assay (Kerosene) Acute - 0.04 ml/rat, 0.13 ml/rat, or 0.40 ml/rat via a single i.p. injection | rat | Negative | PS-4 |
| 26-60017 | 3/77 | Mutagenesis: in vivo Bone Marrow Cytogenetics Assay (Kerosene) Subchronic 0.02 ml/rat, 0.06 ml/rat, or 0.18 ml/rat; 5 i.p. administrations 24 hrs apart (doses <0.05 ml were given as 0.1 ml of dilutions in acetone) | rat | Negative | PS-4 |
| 26-60089 | 6/75 | Subchronic Inhalation Toxicity (Deodorized Kerosene): 7.5 mg/l (as aerosol) 6 hr/day, 4 days | rat/cat | Skin irritation of extremities. Slight loss of coordination. Cats not affected at 6.5 mg/l after 6 hours in similarly generated aerosol. | |
| 26-60089 | 6/75 | Subchronic Inhalation Toxicity (Deodorized Kerosene): Air at 25°C substantially saturated with vapors 6 hr/day, 5 days/wk, 13 wks, 0.10 mg/l (14 ppm) | rat | No statistically significant deviations from control groups. | |
| 27-32175 | 3/79 | Teratogenesis (Kerosene): 100 and 365 ppm via inhalation days 6-15 of gestation | rat (SD) | Negative | |

# HYDRODESULFURIZED KEROSENE

## Sample 81-07

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32297 | 4/83 | 28-Day Dermal Toxicity: 200, 1000, 2000 mg/kg/d, 3x/wk, 4 wks | rabbit (NZW) | High dose: severe irritant<br>Mid dose: moderate irritant<br>Low dose: moderate irritant<br>[One death (high-dose male) and several sacrifices (1 low-dose male, 2 mid-dose males, 1 mid-dose female, 3 high-dose males, and 3 high-dose females) due to severe dermal reactions] | PS-45 |
| 30-31986 | 8/82 | Acute Dermal Toxicity | rabbit (NZW) | No deaths at 2.0 g/kg. | PS-45 |
| 30-32855 | 10/83 | Acute Inhalation Toxicity LC50 | rat (SD) | No deaths at 5.2 mg/L for 4 hrs (Signs: dyspnea). | PS-45 |
| 30-31986 | 8/82 | Acute Oral LD50 | rat (SD) | Greater than 5.0 g/kg for males and females (Signs: hypoactivity, excess salivation, diarrhea, urine-stained abdomen, hair loss around anal area.) | PS-45 |
| 33-31451 | 1/86 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H) | Considered a skin carcinogen after 12 months of dosing (1/10 squamous cell carcinoma—female). See 36-31364 - 1/89 - PS-36 | PS-36 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul 2x/wk | mouse (C3H/HeJ) | Histopathology: 24 mice with tumors, all mice dead.<br>FEN = 41; Mean Latency = 76<br>Toluene Controls: 4 mice with tumors, FEN=43; Mean Latency = 111 weeks.<br>12-Month Toxicity Evaluation see 33-31451 - 1/86 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay: Short-Term (Initiation/Promotion) | mouse (CD-1) | Promotional activity but not initiator. | PS-62 |
| 31-31413 | 3/84 | Dermal Sensitization: 50% v/v in paraffin oil - sensitization<br>10% v/v paraffin oil - challenge | guinea pig | Nonsensitizing | PS-45 |
| Data on File | N/A | Irritation and epidermal hyperplasia in human skin-grafted to athymic nude mice | Athymic mouse/human | Data on File | Middle Distillates |

# HYDRODESULFURIZED KEROSENE

## Sample 81-07

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| Data on File | N/A | Irritation and epidermal hyperplasia in mouse skin | CD-1 | Data on File | Middle Distillates |
| 32-30240 | 11/84 | Mutagenesis: in vitro mouse Lymphoma | mouse | Negative | PS-4 |
| 35-32482 | 4/88 | Mutagenesis: in vitro SCE in CHO cells | hamster | Positive with and negative without S9 activation. | PS-12 |
| 32-30240 | 11/84 | Mutagenesis: in vivo Bone Marrow Cytogenetics 3, 1, 0.3 gm/kg single i.p. inj | rat (SD) | Negative | PS-4 |
| 36-30043 | 10/88 | Mutagenesis: in vivo SCE 4000, 2000, 400 mg/kg i.p. | mouse | Positive | PS-12 |
| 30-31986 | 8/82 | Primary Dermal Irritation: (0.5-ml dose) | rabbit (NZW) | Irritation Index = 4.4 (Signs: blanching, subcutaneous hemorrhage, fissuring at application site.) | PS-45 |
| 30-31986 | 8/82 | Primary Eye Irritation | rabbit (NZW) | Unwashed Washed (Irritation Index)<br>1 hr 3.0 2.7<br>24 hr 0.3 0.7 | PS-45 |
| 33-32724 | 8/86 | Subchronic 4-Week Inhalation Toxicity: 6 hrs/day, 5d/wk for 4 wks at 24 mg/m3 | rat (SD) | No significant treatment-related effects were observed. (Parameters evaluated included body weight, clinical chemistry/hematology, and histopathology) | PS-45 |

## MINERAL SEAL OIL B.P. 490-610 deg F

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| Data on File | N/A | Irritation and Epidermal Hyperplasia in Human Skin Grafted to Athymic Nude Mice | athymic mouse/ human | Data on File | Middle Distillates |
| Data on File | N/A | Irritation and Epidermal Hyperplasia in Mouse Skin | mouse (CD-1) | Data on File | Middle Distillates |

# ODORLESS LIGHT PETROLEUM HYDROCARBON

## (Meets FDA Specification 21CFR, Section 172.884)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| Data on file | N/A | Irritation and Epidermal Hyperplasia in Human Skin Grafted to Athymic Nude Mice | athymic mouse/ human | Data on file | Middle Distillates |
| Data on File | N/A | Irritation and Epidermal Hyperplasia in Mouse Skin | mouse (CD-1) | Data on File | Middle Distillates |

## LIGHT VACUUM DISTILLATE (severely hydrotreated)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| Data on File | N/A | Irritation and Epidermal Hyperplasia in Human Shin Grafted to Athymic Nude Mice | athymic mouse/ human | Data on File | Middle Distillates |
| Data on File | N/A | Irritation and Epidermal Hyperplasia in Mouse Skin | mouse (CD-1) | Data on File | Middle Distillates |

# STRAIGHT RUN KEROSENE

## Sample 83-09

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-30443 | 11/85 | 28-Day Dermal Toxicity: (200, 1000, 2000 mg/kg, 3x/wk, 4 wks) | rabbit (NZW) | 2000 mg/kg - moderate irritant<br>1000 mg/kg - moderate irritant<br>200 mg/kg - minimal to slight irritant<br>Significantly lower body weights (M&F) and 2 treatment-related deaths at high dose. Increased spleen weight (relative and absolute) in low- and mid-dose females. | PS-45 |
| 32-32858 | 11/85 | Acute Dermal LD50 | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 34-30634 | 1/87 | Acute Inhalation LC50 | rat (SD) | No deaths at >5 mg/L for a 4-hour exposure. | PS-45 |
| 32-32858 | 11/85 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Dermal neoplasm noted after 12 months of dosing (1 squamous cell carcinoma—female). See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology: 30 mice with tumors; FEN = 45; Mean Latency = 77<br>Toluene Control: 0 mice with tumors.<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 32-32858 | 11/85 | Dermal Sensitization: 75% v/v in paraffin oil - sensitization<br>10% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 32-32745 | 10/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Equivocal with and positive without activation. | PS-4 |
| 32-31769 | 5/85 | Mutagenesis: in vivo Bone Marrow Cytogenetics (0.3, 1.0, 3.0 g/kg, single i.p. dose) | rat (SD) | Negative | PS-4 |
| 32-32858 | 11/85 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 5.5 | PS-45 |

# STRAIGHT RUN KEROSENE

## Sample 83-09

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | | | Project Number |
|---|---|---|---|---|---|---|---|
| 32-32858 | 11/85 | Primary Eye Irritation (Score at 24 hrs) | rabbit (NZW) | | Unwashed | Washed (Irritation Index) | PS-45 |
| | | | | 1 hr | 0.7 | 2.0 | |
| | | | | 24 hr | 0.0 | 0.0 | |

# LIGHT CATALYTICALLY CRACKED DISTILLATE

## Sample 83-07

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32751 | 10/85 | 28-Day Dermal Toxicity: (doses as indicated, 3x/wk, 4 wks) | rabbit (NZW) | 1000 mg/kg - severe irritation<br>500 mg/kg - severe (male) irritation<br>500 mg/kg - moderate (female) irritation<br>250 mg/kg - moderate irritation<br><br>No treatment-related clinical signs. Mean body weight gains in 500 and 1000 mg/kg males noted to be lower than controls; no definite conclusions drawn. | PS-45 |
| 33-30162 | 11/85 | Acute Dermal LD50 | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 33-30549 | 12/85 | Acute Inhalation LC50: (1.56-8.13 mg/L, 4 hours) | rat (SD) | LC50 = 5.4 mg/L combined (3.35 mg/l for males; female data inadequate to calculate LC50 for females alone). | PS-45 |
| 33-30162 | 11/85 | Acute Oral LD50 | rat (SD) | 4.66 g/kg (M)<br>3.2 g/kg (F) | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Dermal neoplasms noted (males—3/10 squamous cell carcinomas, 2/10 papillomas; females—2/10 squamous cell carcinomas, 1/10 fibrosarcoma, 5/10 papillomas); prominent increases in liver weights and liver-to-body weight ratios. See also 36-33220 - 6/89 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology: 39 mice with tumors; FEN = 45; Mean Latency = 40<br>Toluene Control: 0 mice with tumors<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay: Short-Term (Initiation/Promotion) | mouse (CD-1) | Promotion activity, possible initiator. | PS-62 |
| 33-30162 | 11/85 | Dermal Sensitization: (undiluted - sensitization; 10% v/v in paraffin oil - challenge) | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |

# LIGHT CATALYTICALLY CRACKED DISTILLATE

## Sample 83-07

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32167 | 5/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Positive with activation; negative without activation. | PS-4 |
| 35-32432 | 9/88 | Mutagenesis: in vitro SCE in CHO cells | hamster | Equivocal - incidences above background but no dose response, both with and without metabolic activation. | PS-12 |
| 33-30929 | 3/86 | Mutagenesis: in vivo Bone Marrow Cytogenesis (0.3, 1.0, 3.0 g/kg in single, ip dose) | rat (SD) | Negative | PS-12 |
| 36-31429 | 11/88 | Mutagenesis: in vivo SCE 340, 1700, 3400 mg/kg i.p. | mouse | Positive | PS-12 |
| 33-30162 | 11/85 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 5.6 | PS-45 |
| 33-30162 | 11/85 | Primary Eye Irritation: (Score at 24 hrs) | rabbit (NZW) | Unwashed 1.7<br>Washed 2.0 | PS-45 |

# LIGHT CATALYTICALLY CRACKED DISTILLATE

## Sample 83-08

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32753 | 10/85 | 28-Day Dermal Toxicity: (doses as indicated, 3x/wk, 4 wks) | rabbit (NZW) | 2000 - severe irritation<br>1000 - severe irritation<br>200 - moderate irritation<br>Significant lower body weights (M&F) at mid and high dose; treatment-related moribund death (1) at high dose. | PS-45 |
| 32-32859 | 11/85 | Acute Dermal LD50 | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 33-30444 | 12/85 | Acute Inhalation LC50: (1.56-8.13 mg/L, 4 hours) | rat (SD) | No deaths during exposure at 5.06+0.29 mg/l aerosol; however, 3 males and 1 female from this group died during 14-day observation period. (Repeated at 2.34-7.29 mg/L) LC50 of 4.65 mg/L (3.89-5.55) combined; female data insufficient for LC50. | PS-45 |
| 32-32859 | 11/85 | Acute Oral LD50 | rat (SD) | 7.18 g/kg (M)<br>6.79 g/kg (F) | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Reduced survivability (females—5/15 dead). See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology: 26 mice with tumors; FEN = 41; Mean Latency = 79<br>Toluene Control: 0 mice with tumors<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 32-32859 | 11/85 | Dermal Sensitization: (undiluted - sensitization; 10% v/v in paraffin oil - challenge) | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 32-31709 | 4/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Positive with and without activation. | PS-4 |

# LIGHT CATALYTICALLY CRACKED DISTILLATE

## Sample 83-08

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-30493 | 5/85 | Mutagenesis: in vivo Bone Marrow Cytogenesis (0.3, 1.0, 3.0 g/kg in single, ip dose) | rat (SD) | Negative | PS-12 |
| 32-32859 | 11/85 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 6.9 | PS-45 |
| 32-32859 | 11/85 | Primary Eye Irritation: (Score at 24 hrs) | rabbit (NZW) | Unwashed 3.2<br>Washed 0.0 | PS-45 |

# STRAIGHT RUN MIDDLE DISTILLATE

## Sample 83-11

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32747 | 11/85 | 28-Day Dermal Toxicity: 200, 1000, 2000 mg/kg, 3x/wk, 4 wks | rabbit (NZW) | 2000 mg/kg - moderate irritation<br>1000 mg/kg - slight to moderate irritation<br>200 mg/kg - minimal irritation<br><br>No treatment-related clinical observations or body weight changes attributed to test article. | PS-45 |
| 32-32857 | 11/85 | Acute Dermal LD50 | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 34-30635 | 1/87 | Acute Inhalation LC50: (0.01, 1.05, 1.6, 2.25, 3.22, 5.39 mg/L for 4 hours) | rat (SD) | 1.82 mg/L for females (95% CI = 1.45 - 2.28)<br>1.72 mg/L for males (95% CI = 1.22 - 2.42)<br>1.78 mg/L both sexes (95% CI = 1.44 - 2.2) | PS-45 |
| 32-32857 | 11/85 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Study | mouse (C3H/HeJ) | Dermal neoplasms noted after 12 months of dosing (1/10 malignant melanoma—female). See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology: 10 mice with tumors; FEN = 44; Mean Latency = 93<br>Toluene Control: 0 mice with tumors<br>12-Month Toxicity Study see 34-32865 - 4/87 - PS-36 | PS-36 |
| 32-32857 | 11/85 | Dermal Sensitization: Undiluted - sensitization 1% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 32-32166 | 6/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Lab 1: negative without activation; positive with activation.<br><br>also see 32-31768 | PS-4 |
| 32-31768 | 4/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Lab 2: positive without activation; positive with activation.<br><br>also see 32-32166 | PS-4 |

# STRAIGHT RUN MIDDLE DISTILLATE

## Sample 83-11

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32408 | 5/85 | Mutagenesis: in vivo Bone Marrow Cytogenetics (0.3, 1.0, 3.0 g/kg single i.p. dose) | rat (SD) | Lab 1: Negative<br>also see 33-30930 | PS-4 |
| 33-30930 | 3/86 | Mutagenesis: in vivo Bone Marrow Cytogenetics (0.3, 1.0, 3.0 g/kg single i.p. dose) | rat (SD) | Lab 2: Negative<br>also see 32-32408 | PS-4 |
| 32-32857 | 11/85 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 3.2 | PS-45 |
| 32-32857 | 11/85 | Primary Eye Irritation; (Score at 24 hrs) | rabbit (NZW) | Irritation Index:<br>Unwashed 1.0<br>Washed 0.0 | PS-45 |

# MIDDLE DISTILLATE: LOW CATALYTIC CRACKED STOCK (10% CAT.)

## Sample 78-3 (Home Heating Oil)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32773 | 8/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg | PS-33 |
| 27-32773 | 8/80 | Acute Oral LD50 | rat | 14.5 ml/kg (95% CI = 12.3 ml/kg to 17.0 ml/kg) | PS-33 |
| 30-31646 | 5/83 | Chronic Dermal Carcinogenesis: 0.05 ml, 3x/wk for 62 weeks. | mouse (Swiss) | Severe skin irritation. No significant carcinogenesis. 32% survival at 62 weeks. | PS-36 |
| 27-32773 | 8/80 | Dermal Sensitization: 0.5-ml sensitization and challenge doses | guinea pig | Nonsensitizing | PS-33 |
| 27-32773 | 8/80 | Primary Dermal Irritation | rabbit (NZW) | Moderately irritating (Draize scale) MIS=3.98 | PS-33 |
| 27-32773 | 8/80 | Primary Eye Irritation | rabbit (NZW) | Mildly irritating (Draize scale)<br>Rinsed / Unrinsed<br>24 hr: 0 / 1.33<br>48 hr: 0.67 / 2.0 | PS-33 |
| 27-32773 | 8/80 | Subchronic Dermal LD50: 2.5, 4.0, 10.0 ml/kg, 5 days | rabbit (NZW) | 4.7 ml/kg (95% CI = 2.50 ml/kg to 8.79 ml/kg) | PS-33 |

# MIDDLE DISTILLATE: MEDIUM CATALYTIC CRACKED STOCK (30% CAT.)

## Sample 78-2 (Home Heating Oil)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32771 | 5/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg | PS-33 |
| 27-32771 | 5/80 | Acute Oral LD50 | rat | 19 ml/kg (95% CI = 16.81 ml/kg to 21.47 ml/kg) | PS-33 |
| 30-31646 | 5/83 | Chronic Dermal Carcinogenesis: 0.05 ml 3x/wk for 62 weeks | mouse (Swiss) | Severe skin irritation. No significant carcinogenesis. 30% survival at 62 weeks. | PS-36 |
| 27-32771 | 5/80 | Dermal Sensitization | guinea pig | Nonsensitizing | PS-33 |
| 27-32771 | 5/80 | Primary Dermal Irritation | rabbit (NZW) | Moderately irritating (Draize scale) MIS=3.37 | PS-33 |
| 27-32771 | 5/80 | Primary Eye Irritation | rabbit (NZW) | Practically nonirritating (Draize scale)<br>Rinsed / Unrinsed<br>24 hr 0.7 / 0.7<br>48 hr 0.0 / 0.0 | PS-33 |
| 27-32771 | 5/80 | Subchronic Dermal LD50 | rabbit (NZW) | 5.9 ml/kg (95% CI = 3.49 ml/kg to 9.97 ml/kg) combined sexes | PS-33 |

# MIDDLE DISTILLATE: MEDIUM CATALYTIC CRACKED STOCK (30% CAT.)

## Sample 83-02

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-31451 | 1/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Locally dermatotoxic; liver and liver-to-body weight ratios increased in male and female mice. Kidney weights and body weight ratios increased in female mice. See 36-31364 - 1/89 - PS-36 | PS-36 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul 2x/wk | mouse (C3H/HeJ) | Histopathology: 12 mice with tumors; FEN=43; Mean Latency = 80<br>Toluene Controls: 4 mice with tumors; FEN=43; Mean Latency = 111 weeks<br>12-Month Toxicity Evaluation see 33-31451 - 1/87 - PS-36 | PS-36 |

# MIDDLE DISTILLATE: HIGH CATALYTIC CRACKED STOCK (50% CAT.)

## Sample 78-4

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32068 | 7/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg | PS-33 |
| 27-32068 | 7/80 | Acute Oral LD50 | rat (SD) | 21.2 ml/kg (95% CI = 18.7 ml/kg to 24.9 ml/kg) | PS-33 |
| 30-31646 | 5/83 | Chronic Dermal Carcinogenesis: 0.05 ml, 3x/wk for 62 weeks | mouse (Swiss) | Severe skin irritation; no significant carcinogenesis. 22% survival at 62 weeks. | PS-36 |
| 27-32068 | 7/80 | Dermal Sensitization | guinea pig | Nonsensitizing | PS-33 |
| 27-30140 | 7/79 | Mutagenesis: Ames Assay | Salmonella typhimurium | Equivocal | |
| 27-30140 | 7/79 | Mutagenesis: in vitro mouse Lymphoma | mouse | Positive with and without activation. | |
| 27-30140 | 7/79 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 125.0, 417.0, or 1250.0 mg/kg/day orally in corn oil for 5 consecutive days | rat | Original study was positive, but findings from this study are considered suspect on the basis of technical errors noted in subsequent studies. | |
| 27-32068 | 7/80 | Primary Dermal Irritation | rabbit (NZW) | Moderately irritating (Draize scale) MIS = 3.83 | PS-33 |
| 27-32068 | 7/80 | Primary Eye Irritation | rabbit (NZW) | Practically nonirritating (Draize scale)<br>Rinsed / Unrinsed<br>24 hr 0.0 0.33<br>48 hr 0.0 0.33 | PS-33 |
| 27-32068 | 7/80 | Subchronic Dermal Toxicity: 24 hr/day, 5 days/wk for 2 wks | rabbit (NZW) | 0% mortality at 1 ml/kg<br>25% mortality at 3 ml/kg<br>87.5% mortality at 10 ml/kg<br>Severe weight loss and skin lesions at 3 and 10 ml/kg.<br>LD50=4.72 (CI=2.18 - 10.22) | PS-33 |

# MIDDLE DISTILLATE: HIGH CATALYTIC CRACKED STOCK (50% CAT.)

## Sample 78-4

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-30483 | 9/79 | Teratogenesis: 85 and 410 ppm via inhalation days 6-15 of gestation, 6 hrs/day | rat (SD) | Negative | |

# MIDDLE DISTILLATE: HIGH CATALYTIC CRACKED STOCK (50% CAT.)

## Sample 83-03

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-31451 | 1/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H) | Increased liver and liver-to-body weight ratios in male and female mice. Increased kidney and kidney-to-body weight ratio in female mice. Dermatotoxic. See 36-31364 - 1/89 - PS-36 | PS-36 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul 2x/wk | mouse (C3H/HeJ) | Histopathology: 16 mice with tumors; FEN = 41; Mean Latency = 70<br>Toluene Controls: 4 mice with tumors; FEN=43; Mean Latency = 111 weeks<br>12-Month Toxicity Evaluation see 33-31451 - 1/87 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay: Short-Term (Initiation/Promotion) | mouse (CD-1) | Promotion activity but not initiator. | PS-62 |

# HYDRODESULFURIZED MIDDLE DISTILLATE

## Sample 81-09

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32298 | 4/83 | 28-Day Dermal Toxicity: 200, 1000, 2000 mg/kg/d, 3x/wk, 4 wks | rabbit (NZW) | High dose: severe (F) moderate (M) irritation<br>Mid dose: moderate irritation<br>Low dose: minimal irritation | PS-45 |
| 30-32347 | 8/82 | Acute Dermal Toxicity | rabbit (NZW) | No deaths at 2.0 g/kg. | PS-45 |
| 30-32856 | 10/83 | Acute Inhalation LC50: 3.1, 3.3, 4.4, 4.5, 5.0, 10.9 mg/l for 4 hrs (vapors and aerosol) | rat (SD) | 4.60 mg/l<br>Signs: (3.92-5.4) dyspnea, nasal discharge, alopecia. | PS-45 |
| 30-32347 | 8/82 | Acute Oral LD50 | rat (SD) | No deaths at 5.0g/kg.<br>Signs: hypoactivity, urine-stained abdomen, oily fur. | PS-45 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 0.05 ml, 3x/wk, 62 wk | mouse (C3H/HeJ) | Histopathology: 24 mice with tumors; FEN = 38; Mean Latency = 73 weeks<br>Toluene Controls: 4 mice with tumors; FEN=43; Mean Latency = 111 weeks<br>12-Month Toxicity Evaluation see 33-31451 - 1/87 - PS-36 | PS-36 |
| 33-31451 | 1/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (Swiss) | Considered a skin carcinogen after 12 months of dosing (1/10 squamous cell carcinoma—female). See 36-31364 - 1/89 - PS-36 | PS-36 |
| 31-31352 | 3/84 | Dermal Sensitization: 25% v/v in paraffin oil - sensitization<br>10% v/v in paraffin oil - challenge | guinea pig | Nonsensitizing | PS-45 |
| 32-30965 | 2/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Positive only at high toxicity without metabolic activation. | PS-4 |

# HYDRODESULFURIZED MIDDLE DISTILLATE

## Sample 81-09

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-30965 | 2/85 | Mutagenesis:<br>in vivo Bone Marrow Cytogenetics<br>3.0,1.0, 0.3 g/kg single i.p injection | rat (SD) | Negative | PS-4 |
| 30-32347 | 8/82 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 4.3<br>Signs: blanching, subcutaneous hemorrhage. | PS-45 |
| 30-32347 | 8/82 | Primary Eye Irritation | rabbit (NZW) | (Irritation Index)<br><br>Unwashed<br>1 hr. 2.7<br>24 hr. 2.0<br><br>Washed<br>1 hr. 2.7<br>24 hr. 0.0 | PS-45 |
| 33-32724 | 8/86 | Subchronic Inhalation:<br>4 wks, 6 hr/day for 5 days at 23 mg/m3 | rat (SD) | No treatment-related effects except mild inflammatory changes in nasal tissues in males & females. Study parameters included body weight, clinical chemistry/hematology and histopathology. | PS-45 |

# HYDRODESULFURIZED MIDDLE DISTILLATE

## Sample 81-10

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32296 | 4/83 | 28-Day Dermal Toxicity: 200, 1000, 2000 mg/kd/d 3x/wk, 4 wks | rabbit (NZW) | High dose: severe irritant<br>Mid dose: moderate irritant<br>Low dose: slight irritant | PS-45 |
| 30-32348 | 8/82 | Acute Dermal Toxicity | rabbit (NZW) | No deaths at 2.0 g/kg. | PS-45 |
| 30-32857 | 10/83 | Acute Inhalation LC50: 3.1–10.9 mg/l for 4 hr | rat (SD) | 7.64 mg/l<br>Signs: (5.51-10.58) dyspnea, nasal discharge, salivation. | PS-45 |
| 30-32348 | 8/82 | Acute Oral LD50 | rat (SD) | No deaths at 5.0g/kg.<br>Signs: diarrhea; ptosis. | PS-45 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis | mouse (C3H/HeJ) | Histopathology: 27 mice with tumors; FEN = 40; Mean Latency = 72 weeks<br>Toluene Controls: 4 mice with tumors; FEN=43; Mean Latency = 111 weeks<br>12-Month Toxicity Evaluation see 33-31451 - 1/87 - PS-36 | PS-36 |
| 33-31451 | 1/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H) | Considered a skin carcinogen (female—1/10 squamous cell carcinoma, 1 malignant melanoma). Increased liver and liver-to-body weight ratios in male and female mice. Kidney and kidney-to-body weight ratios increased in female mice. See 36-31364 - 1/89 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay: Short-Term (Initiation/Promotion) | mouse (CD-1) | Promoter but not initiator. | PS-62 |
| 31-31414 | 3/84 | Dermal Sensitization: undiluted - sensitization 10% v/v in paraffin oil - challenge | guinea pig | Nonsensitizing | PS-45 |
| Data on File | N/A | Irritation and epidermal hyperplasia in human skin grafted to athymic nude mice | athymic mouse/human | Data on File | Middle Distillates |

# HYDRODESULFURIZED MIDDLE DISTILLATE

## Sample 81-10

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| Data on File | N/A | Irritation and epidermal hyperplasia in mouse skin | mouse (CD-1) | Data on File | Middle Distillates |
| 34-32644 | 3/87 | Mutagenesis: in vitro mouse Lymphoma (Sample separated chromatographically into aromatic fractions) (81-10 ARO) | mouse | Aromatic samples were negative with and without metabolic activation over a wide range of toxicities. | PS-4/12 |
| 34-32645 | 3/87 | Mutagenesis: in vitro mouse Lymphoma (Sample separated chromatographically into saturate fractions) | mouse | Saturate samples were negative with and without metabolic activation over a wide range of toxicities. | PS-4/12 |
| 32-30535 | 1/85 | Mutagenesis: in vitro mouse Lymphoma Test #1 | mouse | Positive at moderate to high toxicity with metabolic activation only. | PS-4 |
| 33-31224 | 4/86 | Mutagenesis: in vitro mouse Lymphoma Test #2 | mouse | "Weakly" positive with and without metabolic activation. | PS-4 |
| 34-32643 | 3/87 | Mutagenesis: in vitro mouse Lymphoma Test #3 | mouse | Positive with metabolic activation only. | PS-4/12 |
| 35-32433 | 4/88 | Mutagenesis: in vitro SCE in CHO cells | hamster | Negative without S9. Equivocal with S9 (no dose relationship). | PS-12 |
| 32-30535 | 1/85 | Mutagenesis: in vivo Bone Marrow Cytogenetic 3.0, 1.0, 0.3 g/kg single i.p inj. | rat (SD) | Negative | PS-4 |

# HYDRODESULFURIZED MIDDLE DISTILLATE

## Sample 81-10

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 35-32479 | 4/88 | Mutagenesis:<br>in vivo SCE<br>5, 2.5, 0.5 g/kg | mouse | Negative | PS-12 |
| 30-32348 | 8/82 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 5.9<br>Signs: blanching, subcutaneous hemorrhage, fissuring desquamation. | PS-45 |
| 30-32348 | 8/82 | Primary Eye Irritation | rabbit (NZW) | (Irritation Index)<br><br>Unwashed<br>1 hr. 2.7<br>24 hrs. 1.0<br><br>Washed<br>1 hr. 0.7<br>24 hrs. 0.0 | PS-45 |
| 33-32724 | 8/86 | Subchronic Inhalation:<br>4 wks, 6 hr/day for 5 days at 24 mg/m3 | rat | No treatment-related effects except increase in leukocytes (moderate). Study parameters included body weight, clinical chemistry/hematology, and histopathology. | PS-45 |

# PARAFFINIC BASE STOCKS

## Sample 78-9 Viscosity (SUS/100°F) 65

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33104 | 6/82 | Acute Dermal Toxicity | rabbit (NZW) | >5.0 g/kg | PS-45 |
| 29-33104 | 6/82 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 30-32847 | 11/82 | Carcinogenesis: 50 mg, 2x/wk for 2 yrs via skin painting | mouse (Swiss) | 1 fibroma, 2 hemangiomas seen microscopically in 2 animals. In summary, tumors not in excess of those seen in negative controls according to Kettering investigators, May 1987. This assessment is consistent with results of other highly refined base stocks. | PS-36 |
| 29-33104 | 6/82 | Dermal Sensitization: 1 ml dose | guinea pig | Nonsensitizing | PS-45 |
| 28-31864 | 6/81 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative (solubility limited evaluation) | PS-4 |
| 28-31864 | 6/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Equivocal (no dose-response relationship) | PS-4 |
| 28-31864 | 6/81 | Mutagenesis: in vivo Bone Marrow Cytogenetics (Oral doses of 500, 1000, 2000 mg/kg for 5 days) | rat | Negative | PS-4 |
| 36-33219 | 9/89 | Mutagenesis: Modified Ames Assay | Salmonella typhimurium | Negative (Mobil Studies) | |
| 29-33104 | 6/82 | Primary Dermal Irritation | rabbit (NZW) | Slight<br>MIS=0.6<br>24-hr score: 0.00 | PS-45 |
| 29-33104 | 6/82 | Primary Eye Irritation | rabbit (NZW) | Nonirritating (Irritation Index)<br>Washed / Unwashed<br>24-hr score 0 / 0<br>48-hr score 0 / 0.33 | PS-45 |

# PARAFFINIC BASE STOCKS

## Sample 78-9 Viscosity (SUS/100°F) 65

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33104 | 6/82 | Subacute Dermal: 5 g/kg, 6 hr/day, 3 days/wk for 3 wks | rabbit (NZW) | Skin irritation; no deaths. | PS-45 |

# PARAFFINIC BASE STOCKS

## Sample 78-10 Viscosity (SUS/100°F) 133

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33105 | 6/82 | Acute Dermal Toxicity | rabbit (NZW) | >5.0 g/kg | PS-45 |
| 29-33105 | 6/82 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 30-32847 | 11/82 | Carcinogenesis: 50 mg, 2x/wk for 2 yrs via skin painting | mouse (Swiss) | 1 gross tumor. Histopathology: 3 papillomas, 1 fibroma, 1 squamous cell carcinoma, 1 fibrosarcoma in 2 animals. In summary, tumors not in excess of those seen in negative controls according to Kettering investigators, May 1987. This assessment is consistent with results of other highly refined base stocks. | PS-36 |
| 29-33105 | 6/82 | Dermal Sensitization: 0.5 ml dose | guinea pig | Nonsensitizing | PS-45 |
| 28-31868 | 6/81 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative (solubility limited evaluation) | PS-4 |
| 33-30599 | 2/86 | Mutagenesis: Ames Salmonella Assay Methods Development Project Standard Ames Assay | Salmonella typhimurium | Negative | PS-12 |
| 33-30599 | 2/86 | Mutagenesis: Ames Salmonella Assay Methods Development Project Modified Ames Assay | Salmonella typhimurium | Negative | PS-12 |
| 28-31868 | 6/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Equivocal (no dose-response relationship) | PS-4 |
| 28-31868 | 6/81 | Mutagenesis: in vivo Bone Marrow Cytogenetics (Oral doses of 500, 1000, 2000 mg/kg for 5 days) | rat | Negative | PS-4 |

# PARAFFINIC BASE STOCKS

## Sample 78-10 Viscosity (SUS/100°F) 133

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 36-33219 | 9/89 | Mutagenesis: Modified Ames Assay | Salmonella typhimurium | Negative (Mobil Studies) | |
| 29-33105 | 6/82 | Primary Dermal Irritation | rabbit (NZW) | Minimal<br>MIS=0.27<br>24-hr score: 0.00 | PS-45 |
| 29-33105 | 6/82 | Primary Eye Irritation | rabbit (NZW) | Nonirritating (Irritation Index)<br>Washed / Unwashed<br>24-hr score 0 / 0<br>48-hr score 0 / 0 | PS-45 |
| 29-33105 | 6/82 | Subacute Dermal: 5 g/kg, 6 hr/day, 3 days/wk for 3 wks | rabbit (NZW) | Mild skin irritation; no deaths. | PS-45 |

# PARAFFINIC BASE STOCKS

## Sample 79-3 Viscosity (SUS/100°F) 331

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33067 | 6/82 | Acute Dermal Toxicity | rabbit (NZW) | >5.0 g/kg | PS-45 |
| 29-33067 | 6/82 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 30-32847 | 11/82 | Carcinogenesis: 50 mg, 2x/wk for 2 yrs via skin painting | mouse (Swiss) | Histopathology: 2 squamous cell carcinomas in 2 animals. In summary, tumors not in excess of those seen in negative controls according to Kettering investigators, May 1987. This assessment is consistent with results of other highly refined base stocks. | PS-36 |
| 29-33067 | 6/82 | Dermal Sensitization: 2 ml dose | guinea pig | Nonsensitizing | PS-45 |
| 28-31865 | 6/81 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative (solubility limited evaluation) | PS-4 |
| 33-30599 | 2/86 | Mutagenesis: Ames Salmonella Assay Methods Development Project: Standard Ames Assay | Salmonella typhimurium | Negative | PS-12 |
| 33-30599 | 2/86 | Mutagenesis: Ames Salmonella Assay Methods Development Project: Modified Ames Assay | Salmonella typhimurium | Negative | PS-12 |
| 28-31865 | 6/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Equivocal (no dose-response relationship) | PS-4 |
| 28-31865 | 6/81 | Mutagenesis: in vivo Bone Marrow Cytogenetics (Oral doses of 500, 1000, 2000 mg/kg for 5 days) | rat | Positive (only 1 at high-dose level) | PS-4 |
| 36-33219 | 9/89 | Mutagenesis: Modified Ames Assay | Salmonella typhimurium | Negative (Mobil Studies) | |

# PARAFFINIC BASE STOCKS

## Sample 79-3 Viscosity (SUS/100°F) 331

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33067 | 6/82 | Primary Dermal Irritation | rabbit (NZW) | Minimal<br>MIS=0.33<br>24-hr score: 0.00 | PS-45 |
| 29-33067 | 6/82 | Primary Eye Irritation | rabbit (NZW) | Nonirritating (Irritation Index)<br>Washed / Unwashed<br>24-hr score 0 / 0<br>48-hr score 0 / 0 | PS-45 |
| 29-33067 | 6/82 | Subacute Dermal:<br>5 g/kg, 6 hr/day, 3 days/wk for 3 wks | rabbit (NZW) | No toxicity; no deaths. | PS-45 |

# PARAFFINIC BASE STOCKS

## Sample 79-4 Viscosity (SUS/100°F) 485

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33066 | 2/81 | Acute Dermal Toxicity | rabbit (NZW) | >5.0 g/kg | PS-45 |
| 29-33066 | 2/81 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 30-32847 | 11/82 | Carcinogenesis: 50 mg, 2x/wk for 2 yrs via skin painting | mouse (Swiss) | No tumors observed. | PS-36 |
| 29-33066 | 2/81 | Dermal Sensitization: 1 ml dose | guinea pig | Nonsensitizing | PS-45 |
| 28-31866 | 6/81 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative (solubility limited evaluation) | PS-4 |
| 28-31866 | 6/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Equivocal (no dose-response relationship) | PS-4 |
| 28-31866 | 6/81 | Mutagenesis: in vivo Bone Marrow Cytogenetics (Oral doses of 500, 1000, 2000 mg/kg for 5 days) | rat | Negative | PS-4 |
| 36-33219 | 9/89 | Mutagenesis: Modified Ames Assay | Salmonella typhimurium | Negative (Mobil Studies) | |
| 29-33066 | 2/81 | Primary Dermal Irritation | rabbit (NZW) | Minimal<br>MIS=0.34<br>24-hr score: 0.33 | PS-45 |
| 29-33066 | 2/81 | Primary Eye Irritation | rabbit (NZW) | Practically nonirritating (Irritation Index)<br>Washed / Unwashed<br>24-hr score 0.67 / 0.33<br>48-hr score 0 / 0 | PS-45 |

## Sample 79-4 Viscosity (SUS/100°F) 485

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33066 | 2/81 | Subacute Dermal: 5 g/kg, 6 hr/day, 3 days/wk for 3 wks | rabbit (NZW) | Slight skin irritation in 1/8; no deaths. | PS-45 |

# PARAFFINIC BASE STOCKS

## Sample 79-5 Viscosity (SUS/100°F) 990

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33068 | 6/82 | Acute Dermal Toxicity | rabbit (NZW) | >5.0 g/kg | PS-45 |
| 29-33068 | 6/82 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 30-32847 | 11/82 | Carcinogenesis:<br>50 mg, 2x/wk for 2 yrs via skin painting | mouse (Swiss) | Histopathology: 1 hemangioma, 1 squamous cell carcinoma in 2 animals.<br>In summary, tumors not in excess of those seen in negative controls according to Kettering investigators, May 1987. This assessment is consistent with results of other highly refined base stocks. | PS-36 |
| 29-33068 | 6/82 | Dermal Sensitization:<br>2 ml dose | guinea pig | Nonsensitizing | PS-45 |
| 28-31867 | 6/81 | Mutagenesis:<br>Ames Assay | Salmonella typhimurium | Negative (solubility limited evaluation) | PS-4 |
| 28-31867 | 6/81 | Mutagenesis:<br>in vitro mouse Lymphoma Assay | mouse | Equivocal (no dose-response relationship) | PS-4 |
| 28-31867 | 6/81 | Mutagenesis:<br>in vivo Bone Marrow Cytogenetics<br>(Oral doses of 500, 1000, 2000 mg/kg for 5 days) | rat | Negative | PS-4 |
| 36-33219 | 9/89 | Mutagenesis:<br>Modified Ames Assay | Salmonella typhimurium | Negative (Mobil Studies) | |
| 29-33068 | 6/82 | Primary Dermal Irritation | rabbit (NZW) | Minimal<br>MIS=0.38<br>24-hr score: 0.00 | PS-45 |
| 29-33068 | 6/82 | Primary Eye Irritation | rabbit (NZW) | Nonirritating<br>Washed / Unwashed<br>24-hr score 0 / 0<br>48-hr score 0 / 0 | PS-45 |

# PARAFFINIC BASE STOCKS

## Sample 79-5 Viscosity (SUS/100°F) 990

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33068 | 6/82 | Subacute Dermal: 5 g/kg, 6 hr/day, 3 days/wk for 3 wks | rabbit (NZW) | Slight skin irritation in 1/8; no deaths. | PS-45 |

# NAPHTHENIC BASE STOCKS

## Sample 78-5 Viscosity (SUS/100°F) 80 (Solvent-Refined Light Naphthenic Distillate)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33106 | 3/81 | Acute Dermal Toxicity | rabbit (NZW) | >5.0 g/kg | PS-45 |
| 29-33106 | 3/81 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 30-32847 | 11/82 | Carcinogenesis:<br>50 mg, 2x/wk for 2 years, via skin painting | mouse (Swiss) | Gross tumors in 2 animals (latency 104.5 wks).<br>Histopathology: 2 fibromas, 3 squamous cell carcinomas in 5 animals.<br>In summary, no more than slightly carcinogenic. | PS-36 |
| 29-33106 | 3/81 | Dermal Sensitization | guinea pig | Nonsensitizing. (0.5-ml dose - sensitization and challenge.) | PS-45 |
| 29-32359 | 6/82 | Mutagenesis:<br>in vitro mouse Lymphoma Assay | mouse | Negative (solubility and moderate toxicity limited evaluation) | PS-4 |
| 29-32359 | 6/82 | Mutagenesis:<br>in vivo Bone Marrow Assay<br>0.5, 1.67, 5.0 g/kg/day oral dose for 5 days | rat | Negative | PS-4 |
| 33-30599 | 2/86 | Mutagenesis:<br>Methods Development Project<br>Standard Ames Assay | Salmonella typhimurium | Negative | PS-12 |
| 33-30599 | 2/86 | Mutagenesis:<br>Modified Ames Assay | Salmonella typhimurium | Negative | PS-12 |
| 29-33106 | 3/81 | Primary Dermal Irritation | rabbit (NZW) | Slightly irritating. MIS=0.65 | PS-45 |
| 29-33106 | 3/81 | Primary Eye Irritation | rabbit (NZW) | (Irritation Index) Nonirritating<br>Washed Unwashed<br>24 hr 0.00 0.00<br>48 hr 0.00 0.00 | PS-45 |
| 29-33106 | 3/81 | Subacute Dermal:<br>5 g/kg, 3x/wk, 3 wks | rabbit (NZW) | Skin irritation and inflammation. No mortality. | PS-45 |

# NAPHTHENIC BASE STOCKS

## Sample 79-1 Viscosity (SUS/100°F) 2000 (Solvent-Refined Heavy Naphthenic Distillate)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33065 | 3/81 | Acute Dermal Toxicity | rabbit (NZW) | >5.0 g/kg | PS-45 |
| 29-33065 | 3/81 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 30-32847 | 11/82 | Carcinogenesis:<br>50 mg, 2x/wk for 2 years via skin painting | mouse (Swiss) | One gross tumor at 68 wks.<br>Histopathology: 1 keratoacanthoma, 4 squamous cell carcinomas in 3 animals.<br>In summary, no more than slightly carcinogenic. | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay:<br>Short-Term<br>(Initiation/Promotion) | mouse (CD-1) | No initiation or promotion activity. | PS-62 |
| 29-33065 | 3/81 | Dermal Sensitization | guinea pig | Nonsensitizing. (2.0-ml dose - sensitization and challenge.) | PS-45 |
| 29-32360 | 6/82 | Mutagenesis:<br>in vitro mouse Lymphoma Assay | mouse | Negative (solubility limited evaluation) | PS-4 |
| 29-32360 | 6/82 | Mutagenesis:<br>in vivo Bone Marrow Assay<br>0.5, 1.67, 5.0 g/kg/day oral dose for 5 days | rat (SD) | Negative | PS-4 |
| 33-30599 | 2/86 | Mutagenesis:<br>Methods Development Project<br>Modified Ames Assay | Salmonella typhimurium | Negative | PS-12 |
| 33-30599 | 2/86 | Mutagenesis:<br>Methods Development Project<br>Standard Ames Assay | Salmonella typhimurium | Negative | PS-12 |
| 29-33065 | 3/81 | Primary Dermal Irritation | rabbit (NZW) | Slightly irritating. MIS=0.8 | PS-45 |
| 29-33065 | 3/81 | Primary Eye Irritation | rabbit (NZW) | Practically nonirritating (Irritation Index)<br>Washed / Unwashed<br>24 hr 0.00 / 0.33<br>48 hr 0.00 / 0.00 | PS-45 |

# NAPHTHENIC BASE STOCKS

## Sample 79-1 Viscosity (SUS/100°F) 2000 (Solvent-Refined Heavy Naphthenic Distillate)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-33065 | 3/81 | Subacute Dermal: 5 g/kg, 3x/wk, 3 wks | rabbit (NZW) | Very slight skin toxicity in 1/8 animals. No deaths. | PS-45 |

# MOTOR OIL COMPOSITE

## Sample 78-1 "New"

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32131 | 7/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg | PS-33 |
| 27-32131 | 7/80 | Acute Oral Toxicity | rat (SD) | >25 ml/kg | PS-33 |
| 30-32847 | 10/83 | Carcinogenesis: 50 mg/animal, 2x/wk for 2 yrs/lifetime via skin painting | mouse (Swiss) | 1 gross tumor after 75 wks. Histopathology: 1 papilloma, 2 squamous cell carcinomas, 1 fibrosarcoma each in 2 animals. In summary, tumors not in excess of those seen in negative controls. | PS-36 |
| 27-32131 | 7/80 | Dermal Sensitization 0.5 ml for 6 hr, 3x/wk for 3 wks; challenge 2 wks later | guinea pig | Nonsensitizing | PS-33 |
| 27-00325 | 8/79 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 27-00325 | 8/79 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-4 |
| 27-00325 | 8/79 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 125.0, 417.0, or 1250.0 mg/kg/d orally in corn oil for 5 consecutive days | rat | Negative | PS-4 |
| 27-32131 | 7/80 | Primary Dermal Irritation | rabbit (NZW) | Slightly irritating (Draize scale) PIS=1.09 | PS-33 |
| 27-32131 | 7/80 | Primary Eye Irritation | rabbit (NZW) | Practically nonirritating (Draize scale)<br>Washed Unwashed<br>24 hr 1.33 1.17<br>48 hr 0.00 0.00 | PS-33 |
| 27-32131 | 7/80 | Subacute Dermal LD50: 24 hr/d, 5 d/wk for 2 wks | rabbit (NZW) | >8 ml/kg | PS-33 |

# MOTOR OIL COMPOSITE

## Sample 79-7 "Used"

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32772 | 8/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg | PS-33 |
| 27-32772 | 8/80 | Acute Oral Toxicity | rat | >25 ml/kg<br>Signs-oily diarrhea and urine stains. | PS-33 |
| 30-32847 | 10/83 | Carcinogenesis:<br>50 mg/animal, 2x/wk for 2 yrs/lifetime via skin painting | mouse (Swiss) | Gross tumors in 19 mice (Latency 74.7 wks).<br>Histopathology: 4 papillomas, 8 keratocanthomas, 16 squamous cell carcinomas, 1 hemangiosarcoma in 19 animals. | PS-36 |
| 27-32772 | 8/80 | Dermal Sensitization:<br>0.5 ml for 6 hr, 3x/wk for 3 wks; challenge 2 wks later | guinea pig | Nonsensitizing | PS-33 |
| 27-32772 | 8/80 | Primary Dermal Irritation | rabbit (NZW) | Minimally irritating (Draize scale) PIS=0.46 | PS-33 |
| 27-32772 | 8/80 | Primary Eye Irritation | rabbit (NZW) | Nonirritating (Draize scale)<br>Washed / Unwashed<br>24 hr 1.33 / 0.00<br>48 hr 0.00 / 0.00 | PS-33 |
| 27-32772 | 8/80 | Subacute Dermal LD50:<br>24 hr/d, 5 d/wk for 2 wks | rabbit (NZW) | >8 ml/kg | PS-33 |

# HYDROTREATED LIGHT NAPHTHENIC DISTILLATE

## Sample 83-12

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-30499 | 1/86 | 28-Day Dermal Toxicity | rabbit (NZW) | 2000 mg/kg - moderate irritant<br>1000 mg/kg - slight to moderate irritant<br>200 mg/kg - minimal irritant<br>Significantly lower body weights (M&F) at high dose.<br>Testicular atrophy in 3/5 high-dose males. | PS-45 |
| 33-30592 | 1/86 | Acute Dermal LD50 | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 34-32775 | 8/87 | Acute Inhalation:<br>5.05 mg/l for 4 hr; lethal<br>repeated at 0-3.5 mg/l for 4 hr | rat (SD) | LC50 = 2.18 mg/l<br>(95% CI 1.8-2.55 mg/l, combined Male and Female) | PS-45 |
| 33-30592 | 1/86 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal<br>Carcinogenesis:<br>12-Month Toxicity Evaluation | mouse<br>(C3H/HeJ) | Locally dermatotoxic; no definitive chronic toxicity noted after 12 months of dosing. See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal<br>Carcinogenesis:<br>50 ul, 2x/wk for 2 years | mouse<br>(C3H/HeJ) | Histopathology: 6 mice with tumors; FEN = 40; Mean Latency = 94<br>Toluene Control: 0 mice with tumors<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 33-30592 | 1/86 | Dermal Sensitization | rabbit (NZW) | Not a sensitizer (closed patch technique) | PS-45 |
| 33-32802 | 9/86 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Positive with and without metabolic activation. | PS-4 |
| 33-30592 | 1/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 5.4 | PS-45 |
| 33-30592 | 1/86 | Primary Eye Irritation | rabbit (NZW) | Unwashed 0.3; Washed 0.0 (Irritation score at 24 hr) | PS-45 |

# LIGHT PARAFFINIC DISTILLATE

## Sample 84-01

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-31642 | 5/86 | 28-Day Dermal:<br>(dosed 3x/wk, for 4 wks) | rabbit (NZW) | 2000 mg/kg - moderate irritation & proliferative changes in treated skin<br>1000 mg/kg - slight irritation<br>200 mg/kg - minimal irritation.<br>Marginal body weight decreases at highest dose. | PS-45 |
| 33-30595 | 1/86 | Acute Dermal Toxicity | rabbit (NZW) | >2.0 g/kg | PS-4 |
| 33-30595 | 1/86 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-4 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis:<br>12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Liver toxicity; hyperplastic nodules and centrilobular hypertrophy. Locally dermatotoxic. See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis:<br>50 ul, 2x/week for 2 years | mouse (C3H/HeJ) | Histopathology: 36 mice developed tumors; FEN = 46; Mean Latency = 67<br>Toluene Control: 0 mice with tumors.<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay:<br>Short-Term<br>(Initiation/Promotion) | mouse (CD-1) | Promoter not initiator. | PS-62 |
| 33-30595 | 1/86 | Dermal Sensitization:<br>25% v/v in paraffin oil - sensitization<br>1% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-4 |
| 33-32801 | 9/86 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Positive with metabolic activation; negative without activation. | PS-4 |
| 33-30595 | 1/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 4.3 | PS-4 |
| 33-30595 | 1/86 | Primary Eye Irritation | rabbit (NZW) | 1 hr 24 hr<br>Unwashed 3.0 1.7<br>Washed 4.0 0.0 | PS-4 |

# LIGHT PARAFFINIC DISTILLATE SOLVENT EXTRACT

## Sample 83-16

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-31695 | 5/86 | 28-Day Dermal: (3x/wk for 4 wks) | rabbit (NZW) | 1000 mg/kg - moderately irritating; slight to moderately severe proliferative changes in treated skin.<br>500 mg/kg - moderately irritating<br>250 mg/kg - minimally irritating | PS-45 |
| 33-31226 | 4/86 | Acute Dermal Toxicity | rabbit (NZW) | >2.0 g/kg | PS-45 |
| 33-31226 | 4/86 | Acute Oral Toxicity | rat (SD) | >5.0 g/kg | PS-45 |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Reduced survivability (male—5/15 dead; female—7/15 dead). Liver toxicity - hyperplastic nodules (5/10 males, 1/10 female). Dermal neoplasms (male—2/10 papillomas; female—6/10 squamous cell carcinomas, 2/10 papillomas, 1/10 fibrosarcoma). See 36-33220 - 6/89 - PS-36 | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk for 2 years | mouse (C3H/HeJ) | Histopathology: 31 mice with tumors; FEN = 42; Mean Latency = 52<br>Toluene Control: 0 mice with tumors<br>12-Month Toxicity Evaluation see 34-32865 - 4/87 - PS-36 | PS-36 |
| 33-31226 | 4/86 | Dermal Sensitization: Undiluted - sensitization; 1% v/v in paraffinic oil - challenge | rabbit (NZW) | Not a sensitizer (closed patch technique) | PS-45 |
| 33-32803 | 9/86 | Mutagenesis: in vitro mouse Lymphoma | mouse | Positive with and without metabolic activation. | PS-4 |
| 33-31226 | 4/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 5.4 | PS-45 |
| 33-31226 | 4/86 | Primary Eye Irritation | rabbit (NZW) | Irritation Index:<br>Washed / Unwashed<br>1 hr 3.3 / 3.7<br>24 hrs 0.0 / 1.3 | PS-45 |

# HYDROTREATED HEAVY NAPHTHENIC DISTILLATE

## Sample 83-15

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 35-32430 | 3/87 | 28-Day Dermal | rabbit (NZW) | 2000 mg/kg - slight irritation, hyperplasia; elevated SGOT, SGPT. Decreased body weight and hepatocytomegaly/ subacute hepatitis at high dose. Increased relative liver weights in high dose females.<br>1000 mg/kg - slight irritation; elevated SGOT, SGPT.<br>200 mg/kg - minimal irritation. | PS-45 |
| 33-32639 | 8/86 | Acute Dermal Toxicity | rabbit (NZW) | >2g/kg | PS-45 |
| 33-32639 | 8/86 | Acute Oral Toxicity | rat (SD) | >5g/kg | PS-45 |
| 33-32009 | 7/86 | Chronic Dermal Carcinogenesis: 25 ul, 2x/wk - neat | mouse (C3H) | The decision was made to terminate this study after week 30 of treatment. | SYN-8 |
| 33-32639 | 8/86 | Dermal Sensitization: Undiluted - sensitization and challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 33-32800 | 9/86 | Mutagenesis: in vitro mouse Lymphoma | mouse | Negative | PS-4 |
| 33-32639 | 8/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation index 1.3 | PS-45 |
| 33-32639 | 8/86 | Primary Eye Irritation | rabbit (NZW) | Washed Unwashed<br>1 hr 4.7 4.5<br>24 hr 0.7 1.3 | PS-45 |

# NO. 6 FUEL OIL

## Sample 78-6 - Specific Gravity 0.99 - Sulfur 2.7%

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32814 | 9/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg | PS-33 |
| 27-32814 | 9/80 | Acute Oral LD50 | rat (SD) | >25 ml/kg | PS-33 |
| 27-32814 | 9/80 | Dermal Sensitization | guinea pig | Nonsensitizing | PS-33 |
| 27-32814 | 9/80 | Primary Dermal Irritation | rabbit (NZW) | Minimally irritating<br>MIS=0.35 | PS-33 |
| 27-32814 | 9/80 | Primary Eye Irritation | rabbit (NZW) | Minimally irritating<br>Washed / Unwashed<br>24 hr 4.67 / 4.0<br>48 hr 0.0 / 1.0 | PS-33 |
| 27-32814 | 9/80<br>7/81—Pathology Report | Subacute Dermal LD50: 24 hrs/day, 5 days/wk for 2 wks | rabbit (NZW) | At 8 ml/kg, dermal irritation, liver toxicity, 3/4 males died, 0/4 females died. | PS-33 |

# NO. 6 FUEL OIL

## Sample 78-7 - Specific Gravity 0.95 - Sulfur 0.8%

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32774 | 2/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg. | PS-33 |
| 27-32774 | 2/80 | Acute Oral LD50 | rat | >25 ml/kg | PS-33 |
| 27-32774 | 2/80 | Dermal Sensitization | guinea pig | Mildly sensitizing | PS-33 |
| 27-32774 | 2/80 | Primary Dermal Irritation | rabbit (NZW) | Slightly irritating<br>MIS=0.73 | PS-33 |
| 27-32774 | 2/80 | Primary Eye Irritation | rabbit (NZW) | Minimally irritating<br>Washed / Unwashed<br>24 hr 2.67 / 4.83<br>48 hr 1.33 / 0.67 | PS-33 |
| 27-32774 | 2/80 | Subacute Dermal LD50: 24 hrs/day, 5 days/wk for 2 wks | rabbit (NZW) | >8 ml/kg (weight loss; liver toxicity) | PS-33 |

# NO. 6 FUEL OIL

## Sample 78-8 - Specific Gravity 0.92 - Sulfur 0.2%

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32816 | 9/80 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 5 ml/kg. | PS-33 |
| 27-32816 | 9/80 | Acute Oral LD50 | rat (SD) | >25 ml/kg | PS-33 |
| 27-32816 | 9/80 | Dermal Sensitization | guinea pig | Nonsensitizing | PS-33 |
| 27-32816 | 9/80 | Primary Dermal Irritation | rabbit (NZW) | Minimally irritating<br>MIS=0.27 | PS-33 |
| 27-32816 | 9/80 | Primary Eye Irritation | rabbit (NZW) | Mildly irritating<br>Washed / Unwashed<br>24 hr 7.67 / 7.33<br>48 hr 5.0 / 4.67 | PS-33 |
| 27-32816 | 9/80 | Subacute Dermal LD50: 24 hrs/day, 5 days/wk for 2 wks | rabbit (NZW) | >8 ml/kg (weight loss, emaciated, hepatic toxicity) | PS-33 |

# NO. 6 FUEL OIL

## Sample 79-2 - Specific Gravity 1.04 - Sulfur 1.2%

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32813 | 9/80 | Acute Dermal Toxicity | rabbit (NZW) | 38% mortality at 5 ml/kg. | PS-33 |
| 27-32813 | 9/80 | Acute Oral LD50 | rat | 5.13 ml/kg (95% CI=4.1 to 6.5 ml/kg) | PS-33 |
| 27-32813 | 9/80 | Dermal Sensitization | guinea pig | Nonsensitizing | PS-33 |
| 27-32813 | 9/80 | Primary Dermal Irritation | rabbit (NZW) | Slightly irritating.<br>MIS=1.54 | PS-33 |
| 27-32813 | 9/80 | Primary Eye Irritation | rabbit (NZW) | Mildly irritating<br>Washed Unwashed<br>24 hr 6.67 7.33<br>48 hr 5.0 3.83<br>(score not 0 until day 14) | PS-33 |
| 27-32813 | 9/80 | Subacute Dermal LD50: 24 hrs/day, 5 days/wk for 2 wks | rabbit (NZW) | LD50=1.9 ml/kg (95% CI=0.39-9.24) | PS-33 |

# VACUUM RESIDUUM

## Sample 81-13

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31987 | 8/82 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 2 g/kg. | PS-45 |
| 30-31987 | 8/82 | Acute Oral LD50 | rat (SD) | >5.0g/kg (Hypoactivity, diarrhea, dark-stained anal region) | PS-45 |
| 33-31451 | 1/86 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Study | mouse (C3H/HeJ) | Locally dermatotoxic; no definitive chronic toxicity noted after 12 months of dosing. See 36-31364 - 1/89 - PS-36 | PS-36 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk in toluene | mouse (C3H/HeJ) | Histopathology: 5 mice with tumors; FEN = 49; Mean Latency 113 weeks<br>Toluene Controls: 4 mice with tumors; FEN=43; Mean Latency = 111 weeks<br>12-Month Toxicity Study see 33-31451 - 1/86 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay: Short-Term (Initiation/Promotion) (sample 50% w/v in toluene) | mouse (CD-1) | No initiation or promotion activity. | PS-62 |
| 31-31415 | 3/84 | Dermal Sensitization: (Undiluted, heated) 0.4 ml | guinea pig | Nonsensitizing | PS-45 |
| 31-30614 | 4/83 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative without activation. Weakly active with enzyme activation in low to moderate toxicities. | PS-4 |
| 31-30614 | 4/83 | Mutagenesis: in vivo Bone Marrow Cytogenetics (3, 1, 0.3 g/kg/d oral dose x 5 days) | rat (SD) | Negative | PS-4 |
| 30-31987 | 8/82 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 0.2 | PS-45 |
| 30-31987 | 8/82 | Primary Eye Irritation | rabbit (NZW) | Washed / Unwashed (Irritation Index)<br>1 hr 1.3 / 4.0<br>24 hr 5.3 / 4.0 | PS-45 |

# VACUUM RESIDUUM

## Sample 81-13

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32852 | 9/83 | Subchronic Dermal: 200, 1000, 2000 mg/kg; 3x/wk, 4 wks. | rabbit (NZW) | 2000 mg/kg—Thinness, decreased food intake, suppressed BW gain. Flaking skin, acanthotic dermatitis, hyperkeratosis, high-dose males. | PS-45 |

# VACUUM RESIDUUM

## Sample 81-14

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31989 | 8/82 | Acute Dermal Toxicity | rabbit (NZW) | 0% mortality at 2 g/kg. | PS-45 |
| 30-31989 | 8/82 | Acute Oral LD50 | rat (SD) | >5.0g/kg (Hypoactivity, diarrhea, dark-stained anal region) | PS-45 |
| 33-31451 | 1/86 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Study | mouse (C3H) | Locally dermatotoxic; no definitive chronic toxicity noted after 12 months of dosing. See 36-31364 - 1/89 - PS-36 | PS-36 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk in toluene | mouse (C3H/HeJ) | Histopathology: 2 mice with tumors; FEN = 49; Mean Latency = 120 weeks<br>Toluene Controls: 4 mice with tumors; FEN=43; Mean Latency = 111 weeks<br>12-Month Toxicity Study see 33-31451 - 1/86 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay: Short-Term (Initiation/Promotion) (sample 50% w/v in toluene) | mouse (CD-1) | No initiation or promotion activity. | PS-62 |
| 31-31416 | 3/84 | Dermal Sensitization: (Undiluted, heated) 0.4 ml | guinea pig | Nonsensitizing | PS-45 |
| 31-30615 | 4/83 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative without activation. Weakly active with enzyme activation in low to moderate toxicities. | PS-4 |
| 31-30615 | 4/83 | Mutagenesis: in vivo Bone Marrow Cytogenetics (4, 1.3, 0.4 g/kg/d oral dose x 5 days) | rat (SD) | Negative | PS-4 |
| 30-31989 | 8/82 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 0.4 | PS-45 |
| 30-31989 | 8/82 | Primary Eye Irritation | rabbit (NZW) | Irritation Index:<br>Washed / Unwashed<br>1 hr 1.3 / 1.0<br>24 hr 3.3 / 4.7 | PS-45 |

# VACUUM RESIDUUM

## Sample 81-14

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32853 | 9/83 | Subchronic Dermal: 200, 1000, 2000 mg/kg; 3x/wk, 4 wks | rabbit (NZW) | 2000 mg/kg—Thin, decreased food intake. Flaking skin, acanthotic dermatitis, hyperkeratosis, wart-like lesion, white discharge at treated site. | PS-45 |

# CATALYTICALLY CRACKED CLARIFIED OIL

## Sample 81-15

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32854 | 9/83 | 28-Day Dermal Toxicity: 200, 1000, & 2000 mg/kg/d, 3x/wk, 4 wks. | rabbit (NZW) | Mortality: 3/10 high-dose; 1/10 mid-dose. Symptoms: edema, skin ulceration, increased liver weight, liver damage, weight gain, depression in males and females. | PS-45 |
| 33-30442 | 1/86 | 28-Day Dermal Toxicity: 4000, 2000, 1000, 400 mg/kg/day, 5x/wk x 4 wks (Doses were inadvertently 2x higher than planned) | rat (F344) | In 4000 and 2000 mg/kg groups, study terminated on day 11 due to toxicity and early deaths. One death in males at 400, and 4 females dead at 1000 mg/kg. Decreased body weights and increased relative liver weights at 400 and 1000 mg/kg. Minimal to moderate diffuse hepatocytomegaly in all males and females at 400 mg/kg/day; slight skin hyperplasia and hyperkeratosis. | PS-45 |
| 30-31854 | 8/82 | Acute Dermal Toxicity | rabbit (NZW) | No deaths at 2.0 g/kg. | PS-45 |
| 30-31854 | 8/82 | Acute Oral LD50 | rat (SD) | Males: 5.27 g/kg; Females: 4.32 g/kg (Signs: hypoactivity, ataxia, prostration, piloerection, lacrimation, eye opacity, hair loss, diarrhea, etc.) | PS-45 |
| 33-31451 | 1/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H) | Decreased survivability (13/15 males and 13/15 females at 10% dose level died on test). Potent skin carcinogen (10% dose--males—9/10 squamous cell carcinomas, 2/10 fibrosarcomas, 2/10 papillomas; females—10/10 squamous cell carcinomas, 1/10 fibrosarcoma. 1% dose--males—3/10 squamous cell carcinomas; females—1/10 squamous cell carcinoma). Increased liver and liver-to-body weight ratios. See 36-31364 - 1/89 - PS-36 | PS-36 |

# CATALYTICALLY CRACKED CLARIFIED OIL

## Sample 81-15

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/wk (doses are % in toluene) | mouse (C3H/HeJ) | Histopathology:<br>10% FEN = 49 49 mice with tumors<br>1% FEN = 45 45 mice with tumors<br>0.1% FEN = 48 2 mice with tumors<br><br>Mean Latency:<br>22 weeks 72 weeks 113 weeks<br><br>Toluene Controls: 4 mice with tumors; FEN=43; Mean Latency = 111 weeks<br><br>12-Month Toxicity Evaluation see 33-31451 - 1/87 - PS-36 | PS-36 |
| 36-32643 | 7/89 | Dermal Bioassay: Short-Term (Initiation/Promotion) Sample 1% in toluene | mouse (CD-1) | Initiator and possibly promoter activity. | PS-62 |
| 31-31417 | 3/84 | Dermal Sensitization: Undiluted - sensitization and challenge | guinea pig | Nonsensitizing | PS-45 |
| 35-32480 | 4/88 | in vitro Teratology Assays: Mouse Ovarian Tumor Cell Attachment Inhibition | mouse | Suspect teratogen (rating 3) | PS-63 |
| 36-31909 | 5/89 | in vitro Teratology: Human Embryonic Palatal Mesenchymal (HEPM) Cell Growth Inhibition Assay (Nonactivated) | HEPM | Suspect teratogen (rating 3) with and without activation. | PS-63 |

# CATALYTICALLY CRACKED CLARIFIED OIL

## Sample 81-15

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 36-31910 | 5/89 | in vitro Teratology: Human Embryonic Palatal Mesenchymal (HEPM) Cell Growth Inhibition Assay (S-9 mediated) | HEPM | Suspect teratogen (rating 3) with and without activation. | PS-63 |
| 33-30599 | 2/86 | Mutagenesis: Ames Salmonella Assay Methods Development Project Standard Assay | Salmonella typhimurium | Positive | PS-12 |
| 33-30599 | 2/86 | Mutagenesis: Ames Salmonella Assay Methods Development Project Modified Assay | Salmonella typhimurium | Positive | PS-12 |
| 33-32638 | 8/86 | Mutagenesis: Cell Transformation Assay (BALB/3T3 Cells) | BALB/3T3 Cells | "Weakly" positive with activation; negative without activation. | PS-12 |
| 32-32118 | 6/85 | Mutagenesis: Genetic/Toxicity in vitro Chinese Hamster Ovary (CHO) Cell Assay HGPRT Locus | hamster | Negative with and without metabolic activation. | PS-12 |
| 32-30534 | 2/85 | Mutagenesis: in vitro mouse Lymphoma | mouse | Positive with (moderate to extreme toxicity) and without (moderate toxicity) metabolic activation. | PS-4 |
| 32-32750 | 10/85 | Mutagenesis: in vitro Sister Chromatid Exchange Assay (CHO Cells) | hamster | Positive with metabolic activation, negative without activation. | PS-12 |
| 32-32407 | 4/85 | Mutagenesis: in vitro Unscheduled DNA Synthesis in rat hepatocytes | rat | Positive | PS-12 |

# CATALYTICALLY CRACKED CLARIFIED OIL

## Sample 81-15

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-30534 | 2/85 | Mutagenesis: in vivo Bone Marrow Cytogenetics (1.0, 0.3 & 0.1 g/kg/d, dose levels x 5 days) oral dose | rat (SD) | Negative | PS-4 |
| 32-32406 | 4/85 | Mutagenesis: in vivo:in vitro Unscheduled DNA Synthesis (hepatocytes) (50, 200 and 1000 mg/k gavage) | rat | Positive | PS-12 |
| 32-32754 | 11/85 | Mutagenesis: in vivo Sister Chromatid Exchange Assay in Mice (0.4, 2.0, and 4.0 g/kg i.p. inj.) | mouse (B6C3F1) | Positive with dose response. | PS-12 |
| 35-31938 | 2/88 | Mutagenesis: Mouse Embryo Limb Bud Culture Assay | mouse | Inactive | PS-63 |
| 30-31854 | 8/82 | Primary Dermal Irritation | rabbit (NZW) | Irritation Index = 0.2 | PS-45 |
| 30-31854 | 8/82 | Primary Eye Irritation | rabbit (NZW) | Unwashed Washed (Irritation Index)<br>1 hr 2.3 2.0<br>24 hr 2.0 2.0 | PS-45 |
| 32-32743 | 10/85 | Subchronic Toxicity: 40, 200, and 400 mg/kg 12 wk (58 applications) | rat (F344) | Mortality:<br>20/20 at 400 mg/kg<br>7/20 at 200 mg/kg<br>1/20 at 40 mg/kg<br>Generalized systemic toxicity observed; termination at 12 weeks. | PS-45 |

# n-HEXANE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-32291 | 4/81 | Biochemistry of Hexane Metabolites and Neurotoxicity of Low-Level, Subchronic Exposure of n-Hexane (5, 25, 125 ppm, 6 hr/d, 5d/wk, or 21 hr/d, 7 d/wk for 2, 4, 6 mo.) | N/A | Negative - no nervous system degeneration. | PS-29 |
| 27-32179 | 1/80 | Mutagenesis: Dominant Lethal Assay 100 & 400 ppm via inhalation 6 hr/d, 5 d/wk, 8 wks | mouse | Negative (28-31343, same report) | PS-39 |
| 28-31628 | 5/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | |
| 28-31628 | 5/81 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 150, 300, 600 ppm, 6 hr/d, 5 d/wk, 1 wk via inhalation | rat | Original study was "Positive" ("a significant increase in chromosomal aberrations at all treatment levels"), but findings from this study are considered suspect on the basis of technical errors. | |
| 32-30966 | 2/85 | Nephropathy Screen | rat (F344) | See Unleaded Gasoline (Subchronic Studies) | PS-53 |
| 30-32836 | 6/83 | Neurobehavioral Toxicity: 10 and 1.0 mg/kg administered as a single oral dose (gavage) | mouse (C57B16) | Markedly less locomotor activity during first hour postadministration. No effects at 48 and 72 hours. No residual effects observable at 26 days postadministration. Locomotor activity suppression more apparent in females than in males. Movement throughout the enclosure but in a "z" pattern with new directional movements following a "stagger" and recovery. | PS-40 |
| 28-30077 | 12/78 | Neurotoxicity: 5, 25 & 125 ppm; either 6 hr/d, 5 d/wk or 21 hr/d, 7 d/wk, 6 months | rat (SD) | No evidence of CNS or PNS neuropathy. | PS-29 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32177 | 1/79 | Teratogenesis: 100 and 400 ppm via inhalation, days 6-15 of gestation | rat (SD) | Negative | |

## COMPONENTS OF COMMERCIAL HEXANE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32846 | 10/83 | Neurotoxicity: n- Hexane & hexane isomers - 0 + 0, 0 + 500, 500 + 500, 500 + 0 ppm, 22 h/d, 7 d/wk for 6 mos | rat (SD) | N-hexane-induced neuropathy seen in positive controls (500 + 0) after 2 and 6 months, and the 500 + 500 group after 6 months. No potentiation of neurotoxicity by hexane isomers. Increased incidence of degenerative and dystrophic axons in gracile tracts of the cervical region.<br>- Study Report (IRDC)<br>- Einstein Neuropathology Report - 30-30226 - 10/82 - PS-29<br>- Pathology Changes - Cervical Spinal Chord - 30-30223 - 10/82 - PS-29 | PS-29 |
| 30-32858 | 10/83 | Neurotoxicity: n-Hexane + hexane isomers: - 0 + 0, 125 + 0, 125 + 125, 125 + 375, 125 + 1375, 500 + 0 ppm, 22 h/d, 7 d/wk for up to 6 mos | rat (SD) | N-hexane-induced neuropathy seen only in positive controls (500 + 0); some axonal swelling in medulla oblongata of 125 + 1375 group but no peripheral changes. (Few axonal swellings 125 + 375 group.)<br>- Study Report (IRDC)<br>- Einstein Neuropathology Report - 30-30226 - 10/82 - PS-29<br>- Pathology Changes - Cervical Spinal Chord - 30-30223 - 10/82 - PS-29 | PS-29 |

# COMMERCIAL HEXANE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 37-31153 | 2/90 | Acute Operant Behavior Study: (900, 3000, 9000 ppm for 6 hrs) | rat (SD) | The response data revealed no significant differences between the control and treated groups. | PS-71 |
| Data on File | 6/1/93 | Chronic (lifetime) Inhalation (Nominal doses 900, 3000, 9000 ppm) 6 hr/day, 5 days/wk | $B_6C_3F_1$ | No significant difference in survivorship between control and treated groups. Body weight gain reduced in high dose females. Treatment-related increase in hepatocellular adenomas, carcinomas in high dose females; also increased incidence of proliferative changes in the pituitaries of CH-exposed females. Slightly decreased incidence and decreased severity of cystic endometrial hyperplasia in high dose females. No neoplastic changes in CH-exposed males. | PS-71 |
| Data on File | 4/14/93 | Chronic (lifetime) Inhalation (Nominal doses 900, 3000, and 9000 ppm) 6 hr/day, 5 days/wk | Fischer 344 Rat | No significant difference in survivorship between control and treated groups. Body weight gain reduced in males, females from high and mid dose groups. Histologic evidence of mucosal irritation in nasal turbinates and larynx of CH-exposed males, females - greatest in high dose animals. No stat. sig. difference in overall or individual tumor incidences between control and exposed animals. | PS-71 |
| 36-33319 | 11/89 | Developmental Toxicity: Inhalation at 900, 3000, and 9000 ppm. Gestation days 6-15. | rat (SD) | Maternal toxicity at 3000 and 9000 ppm with no apparent developmental toxicity at any level. | PS-71 |
| 36-33318 | 11/89 | Developmental Toxicity: Inhalation at 900, 3000, and 9000 ppm. Gestation days 6-15. | mouse (CD-1) | Slight maternal toxicity at 3000 and 9000 ppm and developmental toxicity at 9000 ppm. | PS-71 |
| 36-32641 | 7/89 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-71 |
| 37-31487 | 4/90 | Mutagenesis: CHO/HGPRT Mutation Assay (0.132, 0.098, 0.063, 0.0362, 0.0122 ul/ml) | hamster | Negative | PS-71 |

# COMMERCIAL HEXANE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 37-31152 | 4/90 | Mutagenesis: Chromosomal Aberrations in CHO Cells (activated dose levels of 0.015, 0.034, 0.074, 0.123, 0.416; nonactivated levels of 0.014, 0.022, 0.056, 0.118) | hamster | Negative | PS-71 |
| 39-33107 | 8/92 | Pharmacokinetic Study of n-Hexane | rat (F344) | For n-hexane, exhalation was the predominant means of elimination after administration by iv bolus, dermal absorption, and inhalation with 47-80% of the dose being exhaled within 72 hours, except after the low (900ppm) dose on n-hexane, when CO2 predominated, the majority (40-65%) of the exhaled radiolabel was unchanged; the balance was CO2. Urinary excretion increased from 12-17% of the dose (after either iv bolus or 900ppm inhalation) to 25-39%(after either single or repeated exposure at 900ppm). Following dermal exposure application, 1-3% of the applied dose was excreted in the urine. After either iv bolus or inhalation, from 2.7 to 8.1% of the dose was recovered from the carcass, whereas after the dermal exposure, residual carcasses retained <0.5% of the dose. For all routes of administration, no sex-related differences were noted. Terminal elimination of radioactivity from the blood was described by a one-compartment pharmacokinetic model. No dose-related differences were noted in the half-life of radioactivity in the blood. The average estimated half-life across all studies was 9.6 hours. For all routes of n-hexane administration, reversed-phase radiochromatographic profiles showed multiple metabolites. There were no qualitative differences in the urinary metabolites of males vs. females. | PS-71 |

# COMMERCIAL HEXANE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-32864 | 9/86 | Reproductive/Developmental Effects: 1-generation inhalation study at 100, 500, and 1500 ppm for 100 days premating, during mating, days 1-20 gestation, days 5-21 lactation for rats of F0 generation and at high dose for males and females bred to untreated counterparts. | rat (SD) | Exposure to females only or both sexes resulted in small but (at certain intervals) statistically significant reductions in pup weights at all dose levels through lactation. The weights of pups from all groups were comparable to controls by the end of the 7-week postnatal recovery period. The reduced pup weights were reflective of litter size and not dose related, and therefore, were not considered to be test-article-related effects. No test-article-related effects were apparent for developmental or fertility indices. The NOEL for this study was 1500 ppm. | PS-39 |
| 37-31830 | 6/90 | Subchronic in vivo Cytogenetics Study: (876, 3249, 8715 ppm, 6 hrs/day for 5 days) | rat (SD) | Negative | PS-71 |
| 37-31148 | 2/90 | Subchronic Inhalation — Special Pathology Evaluation: Kidneys from study 37-31151 were shipped to EPL, stained with Mallory Heidenhain stain, and evaluated. | rat (F344) mouse (B6C3F1) | Nephrotoxicity scores of control, low, and mid-dose male rat kidneys were 27, 30, and 34, respectively. Statistical analysis identified only the high-dose group (score=82) to be unequivocally different from control. | PS-71 |
| 37-31151 | 2/90 | Subchronic Inhalation Study: (900, 3000, 9000 ppm, 6 hr/day, 5 days/wk, for 13 weeks) | rat (F344) mouse (B6C3F1) | High-dose male rat: increased blood platelets, creatinine, total protein, albumin; decreased chloride. Histopathological liver and kidney findings in male rats. No observed adverse effect level is 2984 ppm. | PS-71 |
| 37-31154 | 2/90 | Subchronic Inhalation Study of Potential Effects on Behavior and Neuromorphology: (900, 3000, 9000 ppm, 6 hrs/day, 5 days/wk, for 13 weeks ) | rat (SD) | The functional observational battery and motor activity tests failed to identify any treatment-related changes in behavior. Neuromorphological evaluations revealed no adverse effects of treatment. | PS-71 |

# COMMERCIAL HEXANE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 38-31216 | 4/91 | Two-Generation Reproduction Study: (900, 3000, 9000 ppm, 6 hrs/day, for 10 weeks prior to mating, during mating, gestation, and lactation) | rat (SD) | Parental toxicity at 9000 ppm; perinatal toxicity was concomitant with parental toxicity, being well-defined at 9000 ppm. No treatment-related reproductive effects observed. No observable effect level (NOEL) for general toxicity in adults and offspring was 3000 ppm. The NOEL for reproductive effects was at least 9000 ppm. | PS-71 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| Data on File | 8/92 | Pharmacokinetic Study of MCP | rat (F344) | For MCP, exhalation was the predominant means of elimination after administration by iv bolus, dermal absorption, and inhalation of 9000 ppm of commercial hexane;51% to 79% of the radiolabeled dose was exhaled within 96 hours. Following inhalation of the low concentration (900ppm) of MCP, either once for six hours, or daily for eight consecutive days, the rats exhaled 21 to 35% of the dose. Exhalation was almost exclusively as unchanged MCP; rats exhaled 3% or less of the dose as CO2, regardless of the route or dose. Following administration by iv bolus, rats eliminated 13-19% of the dose in the urine; this rose to 34% after inhalation of 9000 ppm MCP. In contrast, after either single or multiple exposures to 900 ppm MCP, urinary excretion was the main pathway of elimination, with a total of 56% (single) and 65% (multiple) excreted in the urine, respectively. Following dermal application (1.1 or 11 mg/cm2 ) of CH, rats excreted averages of 3.0 and 4.8% of the applied dose in the urine, respectively; none of the organs examined retained appreciable amounts of radiolabel. Following inhalation, approximately 1-3% of the dose remained in the residual carcass. HPLC radiochromatographic profiles of urinary metabolites revealed multiple radiolabeled metabolites. Repeated inhalation of 900 ppm caused quantitative (but not qualitative) changes in the urinary profile, and there were no qualitative sexual differences in MCP metabolism. | PS-71 |

# CYCLOHEXANE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-32357 | 4/82 | Mutagenesis:<br>in vitro mouse Lymphoma<br>Assay | mouse | Negative | PS-4 |
| 29-32357 | 4/82 | Mutagenesis:<br>in vivo rat Bone Marrow<br>Cytogenetics<br>1041.6, 307.2 & 96.6 ppm/d<br>x 5 d via inhalation, 6 hr/d | rat | Negative (some increased aberrations at low and medium doses but no dose-related effect). | PS-4 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 28-31209 | 5/80 | Neurotoxicity: 400 and 3000 ppm via inhalation 6 hr/d, 5 d/wk, up to 26 wks | rat (SD) | No toxin-related neuropathological changes. | PS-29 |

# ASTM D-3734 TYPE I C9 HYDROCARBONS

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 35-32077 | 3/87 | Generation and Analysis Methodology | N/A | | PS-64 |
| 35-30932 | 9/87 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-64 |
| 35-30936 | 1/88 | Mutagenesis: Bone Marrow Cytogenetics | rat | Negative | PS-64 |
| 35-30935 | 9/87 | Mutagenesis: CHO/HGPRT | hamster | Negative | PS-64 |
| 35-30934 | 10/87 | Mutagenesis: Chromosomal Aberration Frequencies | hamster | Negative | PS-64 |
| 35-30933 | 9/87 | Mutagenesis: SCE Frequencies | hamster | Negative | PS-64 |
| 35-32084 | 5/88 | Neurotoxicity: 101, 452, 1320 ppm, 6 hr/d 5 d/wk x 13 wks | rat (SD) | Negative | PS-64 |
| 35-31367 | 4/88 | Range-Finding Inhalation Reproduction Toxicity: (Estimated levels for multigeneration) | rat (SD) | 1000 ppm = NOAEL | PS-64 |
| 35-30937 | 3/88 | Range-Finding Toxicity: (Estimated levels for developmental in mice) | mouse (CD-1) | 500 ppm = LOAEL | PS-64 |

# ASTM D-3734 TYPE I C9 HYDROCARBONS

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 36-32642 | 7/89 | Reproduction/Fertility: Inhalation 100, 500, 1500 ppm | rat | Parental animals: reduced weight gain and survival; F0 and F1 at 500 and 1500 ppm. F2 exposed at lactation day 22; reduced body weights at all treatment levels. Male fertility reduced in F1 parents. Day 0 lactation survival reduced in 1500 ppm. Offspring: reduced body weight gain in F1 and F2 pups at 1500 ppm when maternal animals resumed exposure. F3 pups: reduced birth weight at 1500 ppm. | PS-64 |
| 35-31368 | 4/88 | Teratogenesis/Development: 100, 500, 1500 6 hr/d via inhalation days 6-15 gestation | mouse (CD-1) | Fetal toxicity at 500, 1500 ppm; maternal toxicity at 1500 ppm. | PS-64 |

# MIXED XYLENES

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60083 | 4/75 | Acute Inhalation Toxicity | rat (HW) | 4 hr LC50 = 29 mg/l (6700 ppm) (95% CI=22-37) | |
| 26-60083 | 4/75 | Acute Inhalation Toxicity:<br>2.3 mg/1 (530 ppm) for 4 hrs.<br>5.4 mg/1 (1200 ppm) for 4 hrs. | dog | No ill effects observable at 2.3 mg/l.<br>Lacrimation at 5.4 mg/l. | |
| 26-60083 | 4/75 | Acute Inhalation Toxicity:<br>2.5 mg/1 (580 ppm) for 4 hrs. | rat (HW) | No ill effects observable. | |
| 26-60083 | 4/75 | Acute Inhalation Toxicity:<br>41 mg/1 (9500 ppm) | cat | All subjects dead w/in 2 hrs; CNS depression. | |
| 26-60083 | 4/75 | Acute Inhalation Toxicity:<br>Massive Concentration (46 mg/l) | rat (HW) | LT50=92 min.; 15 min. - extreme irritability; 60 min. - prostate; 120 min. - 4/5 dead. | |
| 26-60083 | 4/75 | Subchronic Inhalation Toxicity:<br>0.77 mg/l (180 ppm)<br>2.0 mg/1 (460 ppm)<br>3.5 mg/1 (810 ppm)<br>6 hr/d, 5 d/wk for 13 wks (65 days) | rat (HW)/dog | No significant differences from controls. | |

# XYLENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60083 | 4/75 | Human Sensory Response: 2.0 mg/l (460 ppm) via inhalation for 15 min. | human | Eye irritation reported by 4/6 subjects. | |
| 26-60083 | 4/75 | Human Sensory Response: Odor Threshold | human | Approximately 0.0006-0.006 mg/l | |
| 26-60083 | 4/75 | Human Sensory Response: Sensory Threshold | human | 0.46 mg/l | |
| 26-60018 | 2/78 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 26-60103 | 1978 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 ml/kg, i.p. | rat | Negative | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 ml/kg of a 10% dilution in corn oil, subQ | mouse | Negative | |
| 26-60018 | 2/78 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-4 |
| 26-60018 | 2/78 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 0.044 ml/kg, 0.147 ml/kg & 0.441 ml/kg i.p.; acute = 1 exposure; subchronic = 5 exposures 24 hrs apart | rat | Negative | PS-4 |
| 33-31034 | 3/80 | Percutaneous Absorption: 0.5 ml | minipig | m-Xylene - urinary recovery 0.51% of dose. | PS-32 |

# XYLENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-31034 | 3/80 | Percutaneous Absorption: In vitro, doses not stated. | monkey | Rapid absorption; peak o-xylene: approximately 0.38% dose/hour; m-xylene: 0.28% dose/hour. | PS-32 |
| 33-31034 | 3/80 | Percutaneous Absorption: m-Xylene 0.5 ml over approx. 100 $cm^2$; 0.15 - 0.075 ml subQ inj. | monkey | Rapidly absorbed. Urinary recovery as % of dose; after skin application 0.72 ± 0.2; after subQ administration 68.8 ± 14.7. | PS-32 |
| 33-31034 | 3/80 | Percutaneous Absorption: o-Xylene 0.5 ml over approx. 100 $cm^2$; 0.15 - o.075 ml subQ inj. | monkey | Rapidly absorbed. Urinary recovery as % of dose; after skin application 0.46 ± 0.29; after subQ administration 40.6 ± 25.6. | PS-32 |
| 26-60013 | 4/78 | Teratogenesis: 100 & 400 ppm via inhalation, days 6-15 of gestation, 6 hr/day | rat (SD) | Negative | PS-15 |

# STODDARD SOLVENT

## Sample 85-01

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 36-32640 | 6/89 | 28-Day Dermal Toxicity | rabbit (NZW) | 2000 mg/kg severe irritation<br>1000 mg/kg moderate to severe irritation<br>200 mg/kg moderate irritation<br>Decreased weight gain at mid and high doses. | PS-45 |
| 33-32723 | 8/86 | Acute Dermal Toxicity LD50 | rabbit (NZW) | >3.0 g/kg | PS-45 |
| 34-32779 | 7/87 | Acute Inhalation LC50 | rat (SD) | No deaths at 5.5 mg/L for 4 hours; signs - languid behavior, squinted eyes; 3/5 females exhibited no weight gain during 8-day observation period. | PS-45 |
| 33-32723 | 8/86 | Acute Oral LD50 | rat (SD) | >5.0 g/kg | PS-45 |
| 33-32009 | 7/86 | Chronic Dermal Carcinogenesis:<br>25 ul, 2x/wk, neat | mouse (C3H) | This study was terminated after week 30 of treatment. | SYN-8 |
| 33-32723 | 8/86 | Dermal Sensitization:<br>75% v/v in paraffin oil - sensitization<br>25% v/v in paraffin oil - challenge | guinea pig | Not a sensitizer (closed patch technique) | PS-45 |
| 34-30329 | 12/86 | Mutagenesis:<br>in vitro mouse Lymphoma | mouse | Positive with and without metabolic activation at high toxicities. | PS-4 |
| 33-32723 | 8/86 | Primary Dermal Irritation | rabbit (NZW) | Irritation index - 4.5 | PS-45 |
| 33-32723 | 8/86 | Primary Eye Irritation | rabbit (NZW) | Washed / Unwashed (Irritation Index)<br>1 hr 4.7 / 1.0<br>24 hr 0.0 / 0.0 | PS-45 |

# STODDARD SOLVENT

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60124 | 5/75 | Acute Inhalation Toxicity | rat | LC50 unobtainable; no deaths at the saturation concentration. | |
| 26-60124 | 5/75 | Acute Inhalation Toxicity: 10 mg/l (1700 ppm) | cat | 4/4 deaths within 7.5 hours; tremors, CNS depression. | |
| 26-60124 | 5/75 | Acute Inhalation Toxicity: 2.4 mg/l (420 ppm) for 8 hrs | rat | No observable response; no BW effects. | |
| 26-60124 | 5/75 | Acute Inhalation Toxicity: 4.0 mg/l for 8 hrs | dog | No observable effects. | |
| 26-60124 | 5/75 | Acute Inhalation Toxicity: 8 mg/l for 8 hrs | dog | Eye irritation, salivation, tremors and clonic spasms. | |
| 26-60124 | 5/75 | Acute Inhalation Toxicity: 8.2 mg/l (1400 ppm) for 8 hrs | rat | 1/15 deaths (eye irritation, blood exudate around nostril, slight loss of coordination); similar effects at 4.6 mg/l, but no loss of coordination. | |
| 30-32081 | 5/82 | Human Sensory Response | human | Published paper (see 26-60025 and 26-60124) | |
| 26-60025 | 2/76 | Human Sensory Response: 0.60 mg/l, 30 min. | human | Mild eye and nose irritation (see also 26-60124 and 30-32081) | |
| 26-60124 | 5/75 | Human Sensory Response: 0.85 mg/l (150 ppm) for 15 min via inhalation | human | Slight eye irritation reported by 1 of 6 subjects (see also 26-60025 and 30-32081) | |
| 26-60124 | 5/75 | Human Sensory Response: 2.40 mg/l (maximum concentration) for 30 min via inhalation | human | Increase eye blink rate. Increased incidence of "mild" eye irritation reported by subjects. No significant decrements on psychomotor performance. (see also 26-60025 and 30-32081) | |
| 26-60124 | 5/75 | Human Sensory Response: 2.7 mg/l | human | 6/6 with eye irritation, 3 with tearing (see also 26-60025 and 30-32081) | |
| 26-60124 | 5/75 | Human Sensory Response: Odor Threshold | human | 0.005 mg/l readily perceived. (see also 26-60025 and 30-32081) | |

# STODDARD SOLVENT

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60025 | 2/76 | Human Sensory Response: Odor Threshold | human | 0.002 mg/l (see also 26-60124 and 30-32081) | |
| 26-60010 | 5/78 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative, both with and without metabolic activation. | |
| 26-60103 | 1978 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative, both with and without metabolic activation. | PS-4 |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 ml/kg, i.p. | rat | Negative | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 ml/kg of a 10% dilution in corn oil, subQ | mouse | Negative | |
| 26-60010 | 5/78 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | |
| 26-60010 | 5/78 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 0.087 ml/kg, 0.289 ml/kg, 0.868 ml/kg i.p.; acute = 1 exposure, subchronic = 5 exposures 24 hrs apart | rat | Negative | |
| 26-60124 | 5/75 | Subchronic Inhalation Toxicity: 1.9 mg/l (330 ppm) 1.1 mg/l (190 ppm, 0.48 mg/l (84 ppm) 6 hr/d, 5 d/wk, 13 wks (65 days) | rat (HW) | Kidney pathology among 1.9 mg/l dosage group attributed to inherent murine nephropathy of Harlan-Wistar rats. | |

# STODDARD SOLVENT

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60124 | 5/75 | Subchronic Inhalation Toxicity:<br>1.9 mg/l (330 ppm)<br>1.1 mg/l (190 ppm,<br>0.48 mg/l (84 ppm)<br>6 hr/d, 5 d/wk, 13 wks (65 days) | dog | No effect at 1.9 mg/l. | |
| 26-60026 | 10/77 | Teratogenesis:<br>100 & 400 ppm via inhalation<br>days 6-15 of gestation | rat (SD) | Negative (no maternal or fetal effects) | |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60085 | 1975 | Acute Inhalation Toxicity: 1.8 and 1.2 mg/l, 8 hr. 2.4 mg/l (440 ppm) for 8 hr. 5.0, 4.2, 3.7 mg/l, 4 hr. | dog | No ill effects observable (1.8 and 1.2 mg/l). Some lachrymation and reddening of the sclera (2.4 mg/l). Tears, blinking, redness of eyes, salivation, tremors, head shaking, tonic clonic convulsions, labored breathing, prostrate, anesthesia. One beagle at 5.0 mg/l had convulsions and died 1.5 hours postexposure; 1 at 4.2 mg/l died 18 hours postexposure (5.0, 4.2, 3.7 mg/l). | |
| 26-60085 | 1975 | Acute Inhalation Toxicity: 2.0 mg/l (370 ppm) for 6 hr. | cat | 3/4 -- signs of CNS depression; 1/4 -- asymptomatic. One death 6 days postexposure, presumably caused by panleukopenia and pneumonia. | |
| 26-60085 | 1975 | Acute Inhalation Toxicity: 2.7, 1.0, and 0.54 mg/l (8 hrs) 4.4 mg/l (8 hrs) | rat | No signs of toxic stress; no deaths (2.7, 1.0, and 0.54 mg/). No deaths; lachrymation, fine tremors, poor coordination (4.4 mg/l). | |
| 30-32081 | 5/82 | Human Sensory Response | human | Published paper (see 26-60025 and 26-60085) | |
| 26-60085 | 1975 | Human Sensory Response: 0.32 mg/l (59 ppm) via inhalation for 15 min. | human | "Minimal responses" in 6 subjects (see also 26-60025 and 30-32081) | |
| 26-60025 | 2/76 | Human Sensory Response: 0.35 mg/l for 30 min. | human | Mild eye and nose irritation (see also 26-60085 and 30-32081) | |
| 26-60085 | 1975 | Human Sensory Response: 0.95 mg/l (180 ppm) via inhalation for 15 min. | human | Ocular irritation reported by 5/6 subjects. Nasal irritation reported by 3/6 subjects. (see also 26-60025 and 30-32081) | |
| 26-60025 | 2/76 | Human Sensory Response: Odor Threshold | human | Approximately 0.003 mg/l (see also 26-60085 and 30-32081) | |
| 26-60085 | 1975 | Human Sensory Response: Odor Threshold | human | 0.005 mg/l (see also 26-60025 and 30-32081) | |
| 26-60103 | 1978 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative, both with and without metabolic activation. | PS-4 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 mg/l, i.p. | rat | Negative | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 mg/l of a 10% solution in corn oil, subQ | mouse | Negative | |
| 26-60085 | 1975 | Subchronic Inhalation Toxicity: 0.46 mg/l (85 ppm), 1.1 mg/l (200 ppm), 2.2 mg/l (410 ppm); 6 hr/d, 5 d/wk, 13 wks (65 days) | rat/dog | Body weight gain reduced in 2.2 mg/l dosage group (rats and dogs). Liver weight increase in 2.2 mg/l dogs. | |

# RUBBER SOLVENT

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60125 | 1/75 | Acute Inhalation Studies: 49 mg/l, 4 hr | cat | CNS depression, no deaths. | |
| 26-60125 | 1/75 | Acute Inhalation Studies: LC50, 4 hr | rat | 61 mg/l (CI=54-70) | |
| 26-60125 | 1/75 | Acute Inhalation Studies: LT50, 180 mg/l | rat | 2 min = poor coordination<br>4 min = 2/5 dead<br>8 min = 5/5 dead | |
| 26-60125 | 1/75 | Acute Inhalation Studies: No effect level, 4 hr | rat | 11 mg/l | |
| 26-60125 | 1/75 | Acute Inhalation Studies: No effect level, 4 hr | dog | 5.9 mg/l | |
| 26-60125 | 1/75 | Human Sensory Response: Odor Threshold | human | 0.04 mg/l | |
| 26-60125 | 1/75 | Human Sensory Response: Sensory Threshold | human | 1.7 mg/l caused only slight or transitory responses (nose, eye and throat irritation). | |
| 26-60011 | 10/75 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | |
| 26-60011 | 10/75 | Mutagenesis: Dominant Lethal Assay | rat | Equivocal, undetermined effect. | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 ml/kg in 10% corn oil, subcutaneous-mice; undiluted in rats | rat/mouse | Both negative | |
| 26-60011 | 10/75 | Mutagenesis: in vivo Bone Marrow Cytogenetics Assay | rat | Negative | |

# RUBBER SOLVENT

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60011 | 10/75 | Mutagenicity: Mouse Lymphoma | mouse | Negative | |
| 26-60100 | 12/78 | Mutagenicity of Hydrocarbon Fractions Using Somatic Mutations: (ip injection with corn oil, 1.5 ml/kg dose) | rat | Positive mutagenic activity. | |
| 26-60125 | 1/75 | Subchronic Toxicity | rat | No ill effects at 1.9, 3.7, 7.9 mg/l. | |
| 26-60125 | 1/75 | Subchronic Toxicity | dog | Increase in urine specific gravity at 7.9 mg/l. | |
| 26-60015 | 6/78 | Teratogenesis: (800, 1600 ppm for 6 hrs/day during days 6-15 of gestation) | rat (SD) | Negative - no maternal or fetal effects. | |

# FILTERED RUBBER SOLVENT

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60016 | 10/75 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | |
| 26-60016 | 10/75 | Mutagenesis: Dominant Lethal Assay | rat | Negative | |
| 26-60016 | 10/75 | Mutagenesis: in vivo Bone Marrow Cytogenetics Assay (ip) | rat | Negative | |
| 26-60016 | 10/75 | Mutagenesis: mouse Lymphoma Assay | mouse | Negative | |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60084 | 2/75 | Acute Inhalation Studies: 4 hour, 20 mg/l | cat | CNS depression; all dead in exposure. | |
| 26-60084 | 2/75 | Acute Inhalation Studies: LC50, 4 hr | rat (SD) | 24 mg/l | |
| 26-60084 | 2/75 | Acute Inhalation Studies: Mass Concentration | rat (HW) | 42 mg/l - LT=150 min. (30 min = prostrate, 120 min = 1/5 dead; 207 min = 5/5 dead.) | |
| 26-60084 | 2/75 | Acute Inhalation Studies: No Ill Effect Level, 4 hr | rat (SD) | 12 mg/l (lacrimation and loss of coordination); 3.4 mg/l - no effect. | |
| 26-60084 | 2/75 | Acute Inhalation Studies: No Ill Effect Level, 4 hr | dog | 4.0 mg/l - no noticeable effects. | |
| 26-60084 | 2/75 | Human Sensory Response: Odor Threshold | human | 0.01 mg/l | |
| 26-60084 | 2/75 | Human Sensory Response: Sensory Threshold | human | 1.3 mg/l | |
| 26-60003 | 10/75 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 26-60103 | 1978 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative, both with and without metabolic activation. | PS-4 |
| 26-60003 | 10/75 | Mutagenesis: Dominant Lethal Assay | rat | Negative | PS-4 |
| 29-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1 ml/kg in 10% corn oil Undiluted, 1 ml/kg (Subcutaneous) | rat | Decreased mutagenic activity. | |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-60098 | 1973 | Mutagenesis:<br>Dominant Lethal Assay<br>1 ml/kg in 10% corn oil<br>Undiluted, 1 ml/kg<br>(Subcutaneous) | mouse | Increased mutagenic activity. | |
| 26-60003 | 10/75 | Mutagenesis:<br>in vivo Cytogenetics Assay | rat | Negative | PS-4 |
| 26-60003 | 10/75 | Mutagenesis:<br>Mouse Lymphoma Assay | mouse | Negative | PS-4 |
| 26-60100 | 12/78 | Mutagenicity Using Somatic Mutations:<br>(1.5 ml/kg in 10% corn oil) | rat | Shows mutagenic activity. | |
| 26-60084 | 2/75 | Subchronic Inhalation Toxicity:<br>65 day, 6 hr/day | rat/dog | Dog—Questionable relative liver weight increase in dogs at 5.7 and 2.8 mg/l; relative and absolute kidney weight in dog increased at 5.7 and 2.8 mg/l.<br><br>Rat—At 13 weeks, hematocrit decreased at 5.7 mg/l; SGOT, SGPT increased in 5.7, 2.8 mg/l rats. Dilated kidney tubules at 5.7, 2.8, 1.4 and tubular regeneration at 5.7 and 0.85 mg/l. | |

## 40 THINNER

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60090 | 12/75 | Acute Toxicity: (4-hr exposure) | cat | 7.0 mg/l aerosol; no death or CNS depression. | |
| 26-60090 | 12/75 | Acute Toxicity: (7-hr exposure) | rat | 0.2 mg/l (33 ppm) = no ill effect level. | |
| 26-60090 | 12/75 | Acute Toxicity: (8-hr exposure) | dog | 0.25 mg/l (41 ppm) = no ill effect level. | |
| 26-60090 | 12/75 | Acute Toxicity LC50 | rat | Not attainable - saturated vapor did not cause death. | |
| 26-60090 | 12/75 | Human Sensory Response: Odor Threshold | human | 0.0002-0.002 ml/l [most probably 0.001 (0.17 ppm)] | |
| 26-60090 | 12/75 | Human Sensory Response: Sensory Threshold | human | 0.21 ml/l (35 ppm) did not cause adverse effects; 2/6 considered it disagreeable. | |
| 26-60090 | 12/75 | Repeated Inhalation: (10 day) | rat/dog | 0.19 mg/l (31 ppm) = no ill effects. | |
| 26-60090 | 12/75 | Short-Term Massive Concentration | cat | 8.3 mg/l aerosol - mild coordination loss - no deaths. | |
| 26-60090 | 12/75 | Subchronic Toxicity | rat/dog | 0.22 mg/l - no adverse effects. | |

## 50 THINNER

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60088 | 1975 | Acute Toxicity: (4-hr exposure) | rat | 5.2 mg/l (1300 ppm) - no ill effect level. | |
| 26-60088 | 1975 | Acute Toxicity: (6-hr exposure) | dog | 2.4 mg/l (600 ppm) - no ill effect level. | |
| 26-60088 | 1975 | Acute Toxicity: (6-hr exposure) | cat | 30 mg/l (7600 ppm) - signs suggestive of CNS depression. | |
| 26-60088 | 1975 | Acute Toxicity LC50 | rat | 33 mg/l or 83 ppm | |
| 26-60088 | 1975 | Human Sensory Response: Odor Threshold | human | 0.005 and 0.05 mg/l [probably 0.01 (2.5 ppm)] | |
| 26-60088 | 1975 | Human Sensory Response: Sensory Threshold | human | 1.7 mg/l (430 ppm) | |
| 26-60088 | 1975 | Short-Term/Massive Concentration | rat | 95 mg/l (24,000 ppm) LT50=16 minutes | |
| 26-60088 | 1975 | Subchronic Toxicity: 65 days | rat/dog | Unexplained BW increase at 2.4 and 1.2 mg/l in rats and 2.4 mg/l in dogs. | |

## 80 THINNER

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60087 | 1975 | Acute Toxicity: (4-hr exposure) | rat | 3.5 mg/l (810 ppm) - no ill effect level. | |
| 26-60087 | 1975 | Acute Toxicity: (4-hr exposure) | dog | 2.1 mg/l - no ill effect level. | |
| 26-60087 | 1975 | Acute Toxicity: (4-hr exposure) | cat | 2.4 mg/l - signs suggestive of CNS depression - no deaths. | |
| 26-60087 | 1975 | Acute Toxicity LC50: (4 hr) | rat | 27 mg/l or 6200 ppm | |
| 26-60087 | 1975 | Human Sensory Response: Odor Threshold | human | 0.004 mg/l (0.9 ppm) | |
| 26-60087 | 1975 | Human Sensory Response: Sensory Threshold | human | 0.45 mg/l (100 ppm) | |
| 26-60087 | 1975 | Short-Term/Massive Concentration | rat | Lethal - 10/10 in 4 hrs at 34 mg/l. | |
| 26-60087 | 1975 | Subchronic Toxicity: 14 weeks | rat/dog | No adverse effects at 0.4 or 1.7 mg/l. | |

# BENZENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-31034 | 3/80 | Absorption of Benzene Across Skin:<br>0.5 ml over approx. 200 $cm^2$;<br>(subQ dose, .15-.075 ml) | monkey (Macaca mullata) | Urinary recovery as % of dose after skin application - 0.076 ± 0.51 vs 37.6 ± 17.2 after subQ administration. | PS-32 |
| 33-31034 | 3/80 | Absorption of Benzene Across Skin:<br>0.5-ml skin application | minipig | Urinary recovery - 0.042% of dose | PS-32 |
| 32-32749 | 1984 | Absorption of Benzene Across Skin:<br>100 uci 14C Benzene<br>Finite dose - 5 ul/cm2 on palm or forearm in vivo | human | Finite dose:<br>Palm - 0.024 ± 0.013 % of dose<br>Forearm - 0.018 ± 0.016 % of dose<br>Infinite dose:<br>1 min. - 0.0349 ± 0.0157 ul/cm2<br>3 min. - 0.0627 ± 0.0097 ul/cm2 | PS-32 |
| 32-32749 | 1984 | Absorption of Benzene Across Skin:<br>100 uci 14C Benzene<br>Finite dose - 5 ul/cm2 on palm or forearm in vitro | human | 10 min. - 0.06 ul/cm2<br>30 min. - not done<br>1 hr. - 0.29 ul/cm2<br>2 hr. - 0.55 ul/cm2<br>3 hr. - 1.04 ul/cm2 | PS-32 |
| 32-32749 | 1984 | Absorption of Benzene Across Skin:<br>Benzene vapor on skin - 30-min. exposure (in vivo) | monkey | Vapor - 0.15 ul/cm2<br>Liquid - 5.4 ul/cm2 | PS-32 |
| 32-32749 | 1984 | Absorption of Benzene Across Skin:<br>Palm Immersion<br>10- and 15-min. exposures (in vivo) | monkey | 10- and 15-minute contact times resulted in total benzene absorption that is approximately 300-fold greater than following a brief exposure. | PS-32 |
| 31-30448 | 1/83 | Acute Inhalation Toxicity:<br>2000 ppm, 6 hrs/d, 5 d | rat (SD)<br>mouse (CD-1) | Leukopenia, weight loss | PS-7 |

# BENZENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-32727 | 1986 | Benzene Levels in Expired Breath:<br>(smokers and nonsmokers)<br>in vivo | human | Levels of benzene in expired breath were greater than those in the ambient environment (pristine and urban). Levels in smokers were greater than nonsmokers, and levels in urban areas were higher than pristine areas. | |
| 33-31225 | 1/85 | Benzene Penetration Through Skin:<br>5% in vehicles as indicated (in vitro) | human | Permeability constants from hexadecane, iso-octane, hexane and gasoline: 0.94 - 3.73 x 10-3 cm/hour.<br>Stratum corneum/vehicle (as above)<br>Partition coefficients:<br>0.11 - 0.19<br>Diffusion constants:<br>hexadecane - 2.1x10-9<br>iso-octane - 5.3x10-9<br>gasoline - 6.8x10-9<br>hexane - 9.1x10-9<br>Absorption (flux) from 4 vehicles = 0.05 - 0.19 ul/cm2/hour (evaporation not controlled) | |
| 36-31431 | 12/88 | Benzene Pharmacokinetics | N/A | Model development | |
| 29-32358 | 8/78 | Chronic Toxicity:<br>Inhalation Exposure -<br>6 hr/day, 5 days/wk, lifetime<br>Parameters Evaluated -<br>Hematological<br>100 ppm & 300 ppm | rat (SD) | At 300 ppm, mean survival was 59 weeks compared to 73 for controls. No blood taken during second year due to mortality. Reduced BW, leukopenia (one myelogenous leukemia has been noted). | PS-7 |
| 29-32358 | 8/78 | Chronic Toxicity:<br>Inhalation Exposure -<br>6 hr/day, 5 days/wk, lifetime<br>Parameters Evaluated -<br>Hematological<br>100 ppm & 300 ppm | mouse (AKR) | At 300 ppm, all mice dead at 28 weeks. Severe weight loss. Blood monitoring suspended after 92 days due to mortality. Severe lymphocytopenia, anemia, and bone marrow hypoplasia. At 100 ppm, no difference from controls in survival or weight gain. Lymphocytopenia and bone marrow hypoplasia, but not as severe as at 300 ppm. | PS-7 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-32358 | 8/78 | Chronic Toxicity:<br>Inhalation Exposure -<br>6 hr/day, 5 days/wk, lifetime<br>Parameters Evaluated -<br>Hematological<br>300 ppm | mouse (CD-1) | At 300 ppm, mean survival was 31 weeks compared to 50 in the controls. Reduced BW gain. Lymphocytopenia and anemia after 1 exposure week. 2/40 mice developed myelogenous leukemia. | PS-7 |
| 29-32358 | 8/78 | Chronic Toxicity:<br>Inhalation Exposure -<br>6 hr/day, 5 days/wk, lifetime<br>Parameters Evaluated -<br>Hematological<br>300 ppm exposure | mouse (C-57B1) | Treated survival of 49 weeks, control - 83 weeks. Lymphocytopenia and anemia. Some hypoplastic bone marrow. | PS-7 |
| 30-32848 | 1/83 | Immunology:<br>Inhalation Exposure -<br>1, 10, 30, 300 ppm; sacrificed at 7, 14, 28, 56, 91 days of exposure | mouse (CD-1) | Trend to early suppression (as early as 7 days) of basal serum immunoglobulins, followed by elevations in IgG. | PS-7 |
| 30-32848 | 1/83 | Immunology:<br>Inhalation Exposure -<br>1, 10, 30, 300 ppm; sacrificed at 7, 14, 28, 56, 91 days of exposure | rat (SD) | No consistent effects. | PS-7 |
| 26-60092 | 7/77 | Mutagenesis:<br>Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 28-31211 | 12/80 | Mutagenesis:<br>Dominant Lethal Inhalation Assay<br>1, 10, 30 & 300 ppm, 6 hr/d, 5 d/wk, 10 wks | rat | Negative (testicular lesions in 2/20 high-dose animals). | |

# BENZENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 28-31211 | 12/80 | Mutagenesis: Dominant Lethal Inhalation Assay 1, 10, 30, 300 ppm, 6 hr/day, 5 day/week for 10 weeks | rat | Did not affect male reproductive performance or have a demonstrated dominant/lethal mutagenic effect. | |
| 26-60092 | 7/77 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-4 |
| 26-60092 | 7/77 | Mutagenesis: in vivo rat Bone Marrow Cytogenetic Assay acute and subchronic i.p. exposures | rat | Positive: clastogenic at 0.02 ml/rat and 0.06 ml/rat. | PS-4 |
| 30-31996 | 6/83 | Mutagenesis: Subchronic Inhalation Cytogenetics Assay 0, 1, 10, 30 & 300 ppm, 6 hrs/d, 5 d/wk, 90 days | rat (SD) mouse (CD-1) | Statistically significant increase in chromosomal aberrations in M and F mice, and smaller, nonsignificant increase in rats at 300 ppm; 1, 10, 30 ppm produced no effect in frequency of chromosomal aberrations. | PS-7 |
| 37-32485 | 7/90 | Palatability and Stability Study in Drinking Water: Doses of 101, 305, 700 mg/l for 15 days | rat (F344) | Problems occurred in the administration of benzene in drinking water to rats due to leaking water bottles, making consumption difficult to estimate. It appears that, with proper technique, benzene in drinking water can be delivered to rats and that 500 mg/l is a maximum tolerated dose. | |
| 37-32486 | 7/90 | Palatability and Stability Study in Drinking Water: Doses of 101, 305, 700 mg/l for 15 days | mouse (B6C3F1) | Problems occurred in the administration of benzene in drinking water to mice due to leaking water bottles, making consumption difficult to estimate. It appears that, with proper technique, benzene in drinking water can be delivered to mice and that 500 mg/l is a maximum tolerated dose. | |
| 30-31994 | no date | Percutaneous Absorption of Benzene: 0.4 ml over 80 cm2 (in vivo) | human | Urinary excretion of 0.023% ± 0.022 of dose from forearm dose. | |

# BENZENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31994 | no date | Percutaneous Absorption of Benzene: 0.5-ml dose over 50-100 cm2 | monkey | Urinary recovery - 0.065 ± 0.042 % of dose. | |
| 30-31994 | no date | Percutaneous Absorption of Benzene: 0.5-ml dose over 50-100 cm2 | minipig | Urinary recovery - 0.042 ± 0.017 % of dose. | |
| 30-31994 | no date | Percutaneous Absorption of Benzene: 5-520 ul/cm2 doses (in vitro) | human | Absorption of 0.010 - 0.903 ul/cm2. | |
| 28-31212 | 11/80 | Reproduction: 1, 10, 30, & 300 ppm, 6 hr/d, 5 d/wk to females from 10 wks prior to mating to day 20 of gestation, then days 5-21 of lactation | rat | Negative | |
| 32-32855 | 9/85 | Subchronic Inhalation Exposure: Micronuclei Evaluation 0, 1, 10, 30, and 300 ppm, 6 hr/d, 5d/wk, 13 wks; sacrifices at 0, 15, 30, 60, and 90 days | mouse (CD-1) | Exposure to 300 ppm caused a significant increase in micronucleated erythrocytes in M&F mice at all sample times. Exposure to 30 ppm caused a significant increase in damaged cells in F mice at some sample times. (Reports results of slide analysis, not any other portion of study.) | PS-7 |
| 30-31532 | 6/83 | Subchronic Inhalation Toxicity: 1, 10, 30, 300 ppm, 6 hr/d, 5d/wk for 13 weeks | rat (SD) mouse (CD-1) | Anemia and leukopenia in high-dose mice and rats. Thymic atrophy, bone marrow hypoplasia, lymphoid depletion of LN, increased extramedullary hematopoeisis of spleen, periarteriolar lymphoid sheath depletion in spleen, testicular atrophy and reduced spermatogenesis, ovarian cyst in high-dose mice. | PS-7 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-30765 | 11/79 | Subchronic Inhalation Toxicity: 361-388 ppm, 6 hr/d, 5 d/wk, 12 wks (1/2 given a 4-wk recess period) | mouse (Bl. NZ) | Reversible fall in platelets, eye irritation. | PS-13 |
| 27-30765 | 11/79 | Subchronic Inhalation Toxicity: 361-388 ppm, 6 hr/d, 5 d/wk, 12 wks (extra 5 exposures at 813 ppm at wk 37; held for 104 wks) | guinea pig | Body weight loss following week 37 - reversible. | PS-13 |
| 27-30765 | 11/79 | Subchronic Inhalation Toxicity: 361-388 ppm, 6 hr/d, 5 d/wk, 12 wks | rat (SD & Hartley) | No toxicity. | PS-13 |
| 27-30765 | 11/79 | Subchronic Inhalation Toxicity: 361-388 ppm, 6 hr/d, 5 d/wk, 12 wks | rabbit (NZW) | No toxicity. | PS-13 |
| 27-30765 | 11/79 | Subchronic Inhalation Toxicity: 361-388 ppm, 6 hr/d, 5 d/wk, 12 wks | dog | No toxicity. | PS-13 |
| 27-30765 | 11/79 | Subchronic Inhalation Toxicity: 361-388 ppm, 6 hr/d, 5 d/wk, 12 wks | monkey | No toxicity. | PS-13 |
| 30-30224 | 3/82 | Teratogenesis: 1, 10, 40, 100 ppm via inhalation days 6-15 of gestation, 6 hr/day | rat (SD) | Fetal BW reduced at 100 ppm; slight fetal toxicity. No other treatment-related effects in remainder of study. See 30-32012 - Paper of this final report | PS-39 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32012 | 12/82 | Teratogenesis:<br>10, 40 ppm, 6 hr/d, days 6-15 of gestation | rat | Increased resorption rate at 40 ppm. Repeated at same levels and increased at 40 ppm when compared to controls; however, controls appeared to have abnormally low resorption incidence. Resorption incidence of repeat 40-ppm dose did not exceed controls from first study. Firm conclusion regarding benzene not reached. - Publication (No lab report) | PS-39 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-31451 | 1/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H) | Locally dermatotoxic; no definitive chronic toxicity noted after 12 months of dosing. See 36-31364 | |
| 34-32865 | 4/87 | Chronic Dermal Carcinogenesis: 12-Month Toxicity Evaluation | mouse (C3H/HeJ) | Locally dermatotoxic; no definitive chronic toxicity noted after 12 months of dosing. See 36-33220 | |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenesis: 50 ul, 2x/week | mouse (C3H/HeJ) | Histopathology: 4/50 mice with tumors. Latency - 111 weeks FEN - 43 (see also 33-31451) | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenesis: 50ul, 2x/week | mouse (C3H/HeJ) | Histopathology: 0/50 mice with tumors. (see also 34-32865) | PS-36 |
| 37-31150 | 3/90 | in vitro Teratology Assay: Mouse Ovarian Tumor (MOT) Cell Attachment Inhibition Assay | mouse | Not likely to be a teratogen - rating of 1. | PS-63 |
| 37-30620 | 1/90 | in vitro Teratology Assays: Human Embryonic Palatal Mesenchymal (HEPM) Cell Growth Inhibition Assay | human | (S9 mediated) Negative. | PS-63 |
| 37-30618 | 1/90 | in vitro Teratology Assays: Human Embryonic Palatal Mesenchymal (HEPM) Cell Growth Inhibition Assay | human | (Nonmediated) Negative. | PS-63 |
| 35-31939 | 2/88 | in vitro Teratology Assays: Mouse Embryo Limb Bud Culture Assay | mouse | Inactive | PS-63 |

# TOLUENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| Data on File | N/A | Irritation and Epidermal Hyperplasia in human skin grafted to athymic nude mice. | athymic mouse /human | Data on File | Middle Distillates |
| Data on File | N/A | Irritation and Epidermal Hyperplasia in mouse skin | mouse (CD-1) | Data on File | Middle Distillates |
| 26-60020 | 1/78 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 28-31347 | 1/81 | Mutagenesis: Dominant Lethal Assay 100/400 ppm (inhalation) 6 hr/d, 5 d/wk, 8 wks | mouse | Negative | PS-39 |
| 26-60020 | 1/78 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-4 |
| 26-60020 | 1/78 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 0.025 ml/kg, 0.082 ml/kg, 0.247 ml/kg; acute = 1 exposure, i.p.; subchronic = 5 exposures 24-hr apart, i.p. | rat | Negative | PS-4 |
| 32-30966 | 2/85 | Nephropathy Screen | rat (F344) | See Unleaded Gasoline (Subchronic Studies) | PS-53 |
| 30-32836 | 6/83 | Neurobehavioral Toxicity: 0.7 and 5 ml/kg administered as a single oral dose (gavage) | mouse (C57B16) | Markedly less locomotor activity during first hour postadministration (even in maize oil controls); most pronounced 20-50 minutes postadministration. Effects not discernible at 24 or 48 hours. No residual effects observed 26 days postadministration. Locomotor activity suppression more apparent in females than in males. | PS-40 |

# TOLUENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 28-31210 | 2/81 | Neurotoxicity: 100 & 1500 ppm via inhalation 6 hr/d, 5d/wk, for 26 weeks | rat (SD) | At week 2, CNS depression in high dose; increased incidence of dry rales and urogenital staining in high dose. (Report of 26-week study only.) | PS-29 |
| 31-32169 | 7/84 | Neurotoxicity: Effects of Toluene Exposure to Auditory Pathways Animals from 28-31210; Selected areas of central and peripheral nervous system examined. | rat | No toxin-related pathological changes noted. (Additional animals needed to clarify lesion found in a 100- and a 1500-ppm male animal). | PS-29 |
| 33-31034 | 3/80 | Percutaneous Absorption: 0.5 ml | minipig | Urinary recovery 0.15% of dose. | PS-32 |
| 33-31034 | 3/80 | Percutaneous Absorption: 0.5 ml over approx. 100 cm2 | monkey | Rapidly absorbed; urinary recovery 0.28 ± 0.04% of dose vs 64.7 ± 19.9% of a subQ dose. | PS-32 |
| 33-31034 | 3/80 | Percutaneous Absorption: 40 ul/cm2; 100 ul/cm2 with occlusion (in vitro) | monkey | At 40 ul/cm2 - 0.5% of dose absorbed after 15 minutes. (Not calculated for higher dose.) | PS-32 |
| 26-60019 | 1/78 | Teratogenesis: 100 & 400 ppm via inhalation days 6-15 of gestation | rat (SD) | Negative | |
| TR 401 40-32426 | 9/92 | Teratogenesis: 250,750, 1500, &3000 ppm via inhalation 6hr/d, days 6-15 of gestation | rat (SD) | Maternal toxicity observed at 1500 and 3000 ppm. Fetal toxicity observed at 1500 and 3000 ppm. Fetal toxicity included exposure-related, but minimal reduction in litter and mean fetal weights and increase in fetuses with reduced or ossified sternebrae. (Preliminary Study Publication #40-32425) | PS-73 |

# TOLUENE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32854 | 5/85 | Two-Generation Reproductive Effects: 100, 500, & 2000 ppm, 6 hr/day, 7 days/week for 80 days prior to mating, during mating, and gestation and lactation (2 generation). Additional high dose also mated to untreated counterparts. | rat (SD) | Exposure to females at 2000 ppm resulted in significant inhibition of growth of offspring over both generations. Exposure to males only at 2000 and to both sexes at lower doses did not elicit similar findings. All dose levels were negative for gross teratology. F1 male and female BW reduced during exposure. (NOEL = 500 ppm) | PS-39 |

# TOLUENE CONCENTRATE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60091 | 1975 | Acute Inhalation Toxicity: 3.0 mg/l (760 ppm) for 6 hr | dog | No ill effects observable. | |
| 26-60091 | 1975 | Acute Inhalation Toxicity: 31 mg/l (7800 ppm) for 6 hr | cat | CNS depression in 4/4 subjects - 1/4 died within 14 days postexposure of a pneumonic infection. | |
| 26-60091 | 1975 | Acute Inhalation Toxicity: 6.8 mg/l (1700 ppm) for 6 hr | rat | No ill effects observable. | |
| 26-60091 | 1975 | Acute Inhalation Toxicity LC50 | rat | 4-hr LC50 = 35 mg/l (8000 ppm) | |
| 26-60091 | 12/75 | Acute Toxicity: Short-Term Massive Concentration | rat | 180 mg/l was lethal to 5/5 in 20 minutes. | |
| 26-60091 | 1975 | Human Sensory Response: Odor Threshold | human | Approximately 0.01 mg/l (2.5 ppm) | |
| 26-60091 | 12/75 | Human Sensory Response: Sensory Threshold | human | 1.9 mg/l tolerable for 8 hours; transitory drying sensation in eyes in 1/6. | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 mg/kg, i.p. | rat | Negative | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 mg/kg of a 10% dilution in corn oil, subQ | mouse | Negative | |

# TOLUENE CONCENTRATE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60091 | 1975 | Subchronic Inhalation Toxicity: 0.95 mg/l (240 ppm), 1.9 mg/l (480 ppm), 3.9 mg/l (980 ppm); 6 hr/d, 5 d/wk, 13 wks (65 days) | rat/dog | No significant differences from controls. | |

# VM&P NAPHTHA

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60123 | 6/74 | Acute Inhalation Toxicity | rat | 4-hr LC50 = 16 mg/l | |
| 26-60123 | 6/74 | Acute Inhalation Toxicity: 19 mg/1 (4100 ppm) for 4 hr. | cat | 4/4 survival; CNS depression exhibited. | |
| 26-60123 | 6/74 | Acute Inhalation Toxicity: 4.4 mg/l (940 ppm) for 4 hr. | rat | No ill effects observable. | |
| 26-60123 | 6/74 | Acute Inhalation Toxicity: 8 mg/l (1700 ppm) for 4 hr. | dog | No ill effects observable. | |
| 26-60123 | 6/74 | Acute Inhalation Toxicity: Massive Concentration 71 mg/l | rat | 7.5 min - no ill effects<br>15 min - poor condition<br>30 min - 1/5 dead<br>57 min - 5/5 dead | |
| 26-60123 | 6/74 | Human Sensory Response: 4.1 mg/1 (880 ppm) via inhalation for 15 min. | human | Upper respiratory tract irritation reported by 4/7 subjects. Eye irritation reported by 3/7 subjects. | |
| 26-60123 | 6/74 | Human Sensory Response: Odor Threshold | human | 0.007-0.0007 mg/l | |
| 26-60103 | 1978 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 ml/kg, i.p. (undiluted) | rat | Negative | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1.0 ml/kg of a 10% dilution in corn oil, subQ | mouse | Negative | |

# VM&P NAPHTHA

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60123 | 6/74 | Subchronic Inhalation Toxicity: 1.3 mg/l (280 ppm), 2.8 mg/l (600 ppm), 5.8 mg/l (1200 ppm); 6 hr/day, 5 days/wk for 13 wks (65 days) | rat/dog | No significant differences among controls and 1.3 mg/l and 2.8 mg/l dosage groups. No major differences between controls and 5.8 mg/l dosage groups. High-dose dogs showed an increased alkaline phosphatase at 13 weeks. | |
| 27-30484 | 9/79 | Teratogenesis: 100 & 400 ppm via inhalation days 6-15 of gestation, 6 hr/day | rat (SD) | Negative | |

# HIGH AROMATIC SOLVENT

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-31349 | 1977 | Acute Inhalation Toxicity: 8.2 mg/l aerosol for 6 hrs. | cat | CNS depression. | |
| 27-31349 | 1977 | Acute Inhalation Toxicity: 8.7 mg/l aerosol for 8 hrs. | rat | Death (2/10) | |
| 27-31349 | 1977 | Acute Toxicity LC50 | rat | Not attainable since saturated vapor did not cause death. | |
| 27-31349 | 1977 | Human Sensory Response: Odor Threshold | human | 0.07 ppm | |
| 27-31349 | 1977 | Human Sensory Response: Sensory Threshold | human | 0.15 mg/l | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay 1 ml/kg in 10% corn oil | mouse | Reduced mutation index. | |
| 26-60098 | 1973 | Mutagenesis: Dominant Lethal Assay Undiluted, 1 ml/kg | rat | Increased mutation index. | |
| 26-60100 | 12/78 | Mutagenicity in HC Fraction Using Somative Mutations in Rats: 1.5 ml/kg, ip dose (in corn oil) | rat | Some mutagenic activity. | |
| 27-31349 | 1977 | Subchronic Inhalation Toxicity: 0.38 mg/l for 13 wks, 6 hr/day 5 day/wk | rat/dog | No adverse effects. | |
| 27-32176 | 2/79 | Teratogenesis: 100 & 400 ppm, 6 hr/d on days 6-15 of gestation | rat (SD) | 400 ppm caused significant reduction in food consumption and body weight; increase in mucous membrane irritation; 12 deaths. Mean fetal weight reduced - may be maternal effect; too few fetuses for conclusion about teratogenicity.<br><br>100 ppm caused adult mucous membrane irritation; no other maternal or fetal effects. | |

# HIGH NAPHTHENIC SOLVENT

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-31350 | 3/77 | Acute Toxicity LC50: 4 hour, inhaled | rat | 5.3 (4.4-6.7) mg/l<br>Rats tolerated a concentration of more than 4.6 mg/l and dogs more than 3.8 mg/l for 6 hours without visible discomfort. | |
| 26-60123 | 1975 | Human Sensory Response: Odor Threshold | human | Approximately 0.004 mg/l (0.86 ppm) | |
| 26-60103 | 1978 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-4 |
| 27-31350 | 3/77 | Subchronic Toxicity: Up to 5.5 mg/l, 6 hr/day, 5 days/wk, for 13 wks | rat | 75% incidence of kidney tubule dilatation. | |

# NAPHTHENIC AROMATIC SOLVENT

## Blend of 70 Solvent and High Naphthenic Solvent

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-31351 | 3/77 | Acute Inhalation Toxicity: 3.7-5.8 mg/l (inaccurate due to problem in measuring vapor/aerosol) for 1 day | rat | Salivation, progressive loss of coordination, mild tremors. | |
| 27-31351 | 3/77 | Acute Inhalation Toxicity LC50 | rat | No deaths at highest attainable vapor concentration. | |
| 27-31351 | 3/77 | Subchronic Toxicity: 1.1 and 2.2 mg/l vapor; 4.5 mg/l measured; 6 hr/day, 5 day/wk, for 62 days | rat | 1.1/2.2 mg/l - No effects.<br>4.5 mg/l - Significant reduction in BW gain. | |

# PETROLEUM COKE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31598 | 3/82 | Carcinogenesis: 100 ul/animal, 3x/wk for life via skin painting; delayed process and fluid process cokes, solid condensed emission, quench water (aqueous condensed emission) | mouse (C3H/HeJ) | Survivability similar to negative controls. No significant increase in tumor incidence or time to tumor. Quench-water-induced hyperkeratosis. | PS-22 |
| 28-30724 | 6/80 | Comprehensive Analysis of Petroleum Coke Products | N/A | | PS-22 |

# PETROLEUM COKE

## Delayed Process Coke

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-30234 | 12/84 | Chronic Inhalation: approximately 10 mg/m3, 30 mg/m3, 6 hr/d, 5 d/wk, 24 mos. | rat (SD) | Significant macro and micro changes in lungs; black foci in lungs and lymph nodes; keratin cysts; statistically significant increase in lung weights; phagocytized coke in tissues. Both macro and micro changes in lung reticuloendothelial system. Low-level inflammatory response in low dose and nonneoplastic changes in the high dose (sclerosis). | PS-22 |
| 32-30234 | 12/84 | Chronic Inhalation: approximately 10 mg/m3, 30 mg/m3, 6 hr/d, 5 d/wk, 24 mos. | monkey (Cynomolgus) | Slight skin thickening observed; statistically significant increase in relative and absolute lung and trachea weights; gray lungs with black foci; phagocytized coke in tissues. | PS-22 |
| 28-30728 | 1/81 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-22 |
| 28-30728 | 1/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-22 |
| 28-30728 | 1/81 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 10 ug/l, 6 hr/d, 20 days; 40 ug/l, 6 hr/d, 5 days | rat (SD) | Positive at 40 ug/l, 6 hr/day for 5 days. Findings from this study have been considered suspect on the basis of technical errors. | PS-22 |

# PETROLEUM COKE

## Fluid Process Coke

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 28-30726 | 1/81 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-22 |
| 28-30726 | 1/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-22 |
| 28-30726 | 1/81 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 10 ug/l, 6 hr/d, 20 days; 40 ug/l, 6 hr/d, 5 days | rat | Negative Findings from this study have been considered suspect on the basis of technical errors. | PS-22 |

# PETROLEUM COKE

## Solid Condensable Delayed Coke

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 28-30727 | 1/81 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-22 |
| 28-30727 | 1/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-22 |
| 28-30727 | 1/81 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 10 ug/l, 6 hr/d, 20 days; 40 ug/l, 6 hr/d, 5 days | rat | Positive at 40 ug/l, 6 hr/day for 5 days. Findings from this study have been considered suspect on the basis of technical errors. | PS-22 |

# PETROLEUM COKE

## Liquid Condensable Delayed Process Quench H2O

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 28-30725 | 1/81 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative | PS-22 |
| 28-30725 | 1/81 | Mutagenesis: in vitro mouse Lymphoma Assay | mouse | Negative | PS-22 |
| 28-30725 | 1/81 | Mutagenesis: in vivo rat Bone Marrow Cytogenetics Assay 3.55 mg/l, 6 hr/day, 20 days; 5.89 mg/l, 6 hr/day, 5 days | rat | Negative Findings from this study have been considered suspect on the basis of technical errors. | PS-22 |

# CRUDE OIL AND CRUDE OIL FRACTIONS

## Crude C

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | | | Project Number |
|---|---|---|---|---|---|---|---|
| 30-32851 | 2/83 | Chronic Dermal Carcinogenesis: 1977 Study | mouse (C3H/HeJ) | Duration (in weeks) | — # with Tumors/Effective # | — Average Latency (in weeks) | PS-8 |
| | | Fraction (°F) | | | | | |
| | | 50 mg/application, 2x/week | | | | | |
| | | (1) 0.05% BaP | | (1) 73 | 45/46 | 42.5 | |
| | | (2) 0.05% BaP | | (2) 71 | 40/46 | 45.6 | |
| | | (3) 0.15% BaP | | (3) 46 | 29/30 | 26.9 | |
| | | (4) 0.15% BaP | | (4) 70 | 25/30 | 29.4 | |
| | | (5) Crude | | (5) 110 | 13/33 | 69.0 | |
| | | (6) Crude | | (6) 103 | 4/9 | 82.3 | |
| | | (7) 120–350° | | (7) 116 | 14/38 | 85.7 | |
| | | (8) 350–550° | | (8) 102 | 14/30 | 70.4 | |
| | | (9) 350–550° | | (9) 83 | 5/13 | 75.3 | |
| | | (10) 550–700° | | (10) 78 | 7/18 | 59.2 | |
| | | (11) 700–1070° | | (11) 106 | 30/38 | 50.1 | |
| | | (12) 1070° + 50% Toluene | | (12) 108 | 0/39 | — | |
| | | (13) 350–550° Aromatics | | (13) 129 | 16/38 | 65.2 | |
| | | (14) 350–550° Saturates | | (14) 101 | 33/41 | 74.2 | |
| | | (15) 550–700° Aromatics | | (15) 81 | 12/20 | 59.0 | |
| | | (16) 550–700° Saturates | | (16) 120 | 18/41 | 98.1 | |
| | | (17) 700–1070° Aromatics | | (17) 83 | 40/42 | 44.2 | |
| | | (18) 700–1070° Saturates | | (18) 120 | 2/43 | — | |
| | | (19) No Treatment | | (19) 125 | 0/46 | — | |
| | | (20) No Treatment | | (20) 110 | 0/43 | — | |
| | | (21) Toluene | | (21) 119 | 6/49 | 97.0 | |
| | | (22) Toluene | | (22) 120 | 2/49 | — | |
| | | 25 mg/application, 2x/wk | | | | | |
| | | (23) 350–700° | | (23) 122 | 18/38 | 85.1 | |
| | | (24) 550–700° Aromatics | | (24) 122 | 22/44 | 80.3 | |
| | | (25) 550–700° | | (25) 122 | 18/38 | 85.1 | |
| | | (26) 700–1070° Aromatics | | (26) 123 | 20/48 | 60.1 | |
| | | (27) Toluene | | (27) 119 | 3/50 | 108.0 | |

See also 27-32132 - 10/79 - PS-8

# CRUDE OIL AND CRUDE OIL FRACTIONS

## Crude C

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | | | Project Number |
|---|---|---|---|---|---|---|---|
| 32-30964 | 6/84 | Chronic Dermal Carcinogenesis: 1980 Study | mouse (C3H/HeJ) | Duration — # with Tumors/Effective # — Average Latency (in weeks) | | | PS-8 |
| | | Fraction (°F) | | | | | |
| | | 50 mg/application, 2x/week | | | | | |
| | | (1) 120–350° | | (1) 105 | 1/48 | — | |
| | | (2) 120–350° 10% Bottoms | | (2) 105 | 8/43 | 78.6 | |
| | | (3) 350–550° Saturates | | (3) 105 | 20/48 | 80.0 | |
| | | (4) 550–700° Saturates | | (4) 105 | 10/47 | 74.6 | |
| | | (5) 700–1070° Saturates | | (5) 105 | 0/45 | — | |
| | | (6) No Treatment | | (6) 105 | 0/42 | — | |
| | | (7) Toluene | | (7) 105 | 0/39 | — | |
| | | (8) 0.05% BaP | | (8) 72 | 44/46 | 44.6 | |
| | | 25 mg/application, 2x/wk | | | | | |
| | | (9) 700–1070° | | (9) 102 | 33/44 | 58.1 | |
| | | (10) 0.05% BaP | | (10) 92 | 44/47 | 49.4 | |
| 27-32132 | 10/79 | Dermal Carcinogenesis — Separation and Characterization of Fractions for Bioassay | | | | | PS-8 |
| 30-31588<br>32-32856<br>33-30599 | 8/82<br>9/85<br>2/86 | Mutagenesis: Methods Development Project — Adapting the Ames Salmonella Assay to Complex Hydrocarbon Mixtures | Salmonella typhimurium | 30-31588 - 8/82 - PS-22 | | | PS-12<br>PS-22 |
| | | | | Fraction (°F) — Standard Ames — Modified Ames | | | |
| | | | | 120°–350° | | Negative | |
| | | | | 350°–550° | | Negative | |
| | | | | 700°–1070° | | Positive | |
| | | | | 32-32856 - 9/85 - PS-12 | | | |
| | | | | Fraction (°F) — Standard Ames — Modified Ames | | | |
| | | | | 350°–550° | | Positive (with >30% S9) | |
| | | | | 700°–1070° | | Positive (+S9) | |
| | | | | 33-30599 - 2/86 - PS-12 | | | |
| | | | | Fraction (°F) — Standard Ames — Modified Ames | | | |
| | | | | 550°–700° | Negative | Negative | |
| | | | | 700°–1070° Aromatics | Equivocal | Positive (+S9) | |

# CRUDE OIL AND CRUDE OIL FRACTIONS

## Crude D

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | | | Project Number |
|---|---|---|---|---|---|---|---|
| 30-32851 | 2/83 | Chronic Dermal Carcinogenesis: 1977 Study | mouse (C3H/HeJ) | Duration — # with Tumors/Effective # — Average Latency (in weeks) | | | PS-8 |
| | | Fraction (°F) | | (in weeks) | | | |
| | | 50 mg/application, 2x/week | | | | | |
| | | (1) 0.05% BaP | | (1) | 71 | 40/46 | 45.6 |
| | | (2) 0.05% BaP | | (2) | 73 | 45/46 | 42.5 |
| | | (3) 0.15% BaP | | (3) | 70 | 25/30 | 29.4 |
| | | (4) 0.15% BaP | | (4) | 46 | 29/30 | 26.9 |
| | | (5) Crude | | (5) | 108 | 21/34 | 63.8 |
| | | (6) IBP–120° | | (6) | 110 | 3/36 | — |
| | | (7) 120–350° | | (7) | 109 | 17/44 | 85.0 |
| | | (8) 350–550° | | (8) | 82 | 13/27 | 62.3 |
| | | (9) 550–700 ° | | (9) | 71 | 6/37 | 40.0 |
| | | (10) 700–1070° | | (10) | 73 | 31/34 | 34.4 |
| | | (11) 700–1070° | | (11) | 55 | 8/11 | 32.8 |
| | | (12) 1070° + 50% Toluene | | (12) | 113 | 3/43 | 70.0 |
| | | (13) 350–550° Aromatics | | (13) | 123 | 15/44 | 93.5 |
| | | (14) 350–550° Saturates | | (14) | 102 | 33/44 | 77.8 |
| | | (15) 550–700° Aromatics | | (15) | 78 | 36/43 | 44.6 |
| | | (16) 550–700° Saturates | | (16) | 122 | 13/41 | 90.8 |
| | | (17) 700–1070° Aromatics | | (17) | 81 | 14/40 | 32.3 |
| | | (18) 700–1070° Saturates | | (18) | 122 | 2/47 | — |
| | | 25 mg/application, 2x/wk | | | | | |
| | | (19) 550–700° Aromatics | | (19) | 87 | 43/49 | 45.6 |
| | | (20) 700–1070° Aromatics | | (20) | 116 | 35/46 | 74.6 |
| | | (21) 0.05% BaP | | (21) | 71 | 46/49 | 42.8 |
| | | (22) Toluene | | (22) | 119 | 3/50 | 108.0 |
| | | | | See also 27-32132 - 10/79 - PS-8 | | | |

# CRUDE OIL AND CRUDE OIL FRACTIONS

## Crude D

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | | | Project Number |
|---|---|---|---|---|---|---|---|
| 32-30964 | 6/84 | Chronic Dermal Carcinogenesis: 1980 Study<br>Fraction (°F)<br>50 mg/application, 2x/week | mouse (C3H/HeJ) | Duration — # with Tumors/Effective # — Average Latency (in weeks) | | | PS-8 |
| | | (1) 120–350° | | (1) 105 | 17/48 | 82.1 | |
| | | (2) 120–350° 10% Bottoms | | (2) 105 | 26/47 | 74.8 | |
| | | (3) No Treatment | | (3) 105 | 0/42 | — | |
| | | (4) Toluene | | (4) 105 | 0/39 | — | |
| | | (5) 0.05% BaP | | (5) 72 | 44/46 | 44.6 | |
| | | 25 mg/application, 2x/wk | | | | | |
| | | (6) 550°–700° | | (6) 105 | 16/41 | 92.0 | |
| | | (7) 700–1070° | | (7) 86 | 37/49 | 46.5 | |
| | | (8) 0.05% BaP | | (8) 92 | 44/47 | 49.4 | |
| 27-32132 | 10/79 | Dermal Carcinogenesis — Separation and Characterization of Fractions for Bioassay | | | | | PS-8 |
| 30-31588<br>32-32856<br>33-30599 | 8/82<br>9/85<br>2/86 | Mutagenesis: Methods Development Project — Adapting the Ames Salmonella Assay to Complex Hydrocarbon Mixtures | Salmonella typhimurium | 30-31588 - 8/82 - PS-22 | | | PS-12<br>PS-22 |
| | | | | Fraction (°F) — Standard Ames — Modified Ames | | | |
| | | | | 0°–120° | | Negative (as Gas) | |
| | | | | 550°–700° | | Positive | |
| | | | | 700°–1070° | | Negative | |
| | | | | 32-32856 - 9/85 - PS-12 | | | |
| | | | | Fraction (°F) — Standard Ames — Modified Ames | | | |
| | | | | 550°–700° | | Positive | |
| | | | | 700°–1070° | | Positive | |
| | | | | 33-30599 - 2/86 - PS-12 | | | |
| | | | | Fraction (°F) — Standard Ames — Modified Ames | | | |
| | | | | 120°–350° | Negative | Negative | |
| | | | | 550°–700° Aromatics | Negative | Positive (+S9) | |
| | | | | 550°–700° Saturates | Negative | Negative | |
| | | | | 700°–1070° Aromatics | Negative | Positive (+S9) | |

# CRUDE OIL FRACTIONS

## Crude C 120°–350° Fraction (PS-8-76-C2)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-32725 | 12/85 | Carcinogenesis:<br>Initiation/Promotion Study<br>C2, 10 or 50 mg, 2x/wk for life<br><br>C2, 2.5 and 12.5 mg, 2x/wk for 2 wk plus 2.5 ug TPA 2x/wk for life<br><br>2.5 ug DMBA 2x/wk, 2 wk plus 10 mg C2, 2x/wk for life<br><br>0.25 ug DMBA plus 10 mg C2, 2x/wk for life<br><br>positive and negative controls | mouse (C3H/HeJ) | C2 (10 and 50 mg) was weakly carcinogenic. C2 did not promote tumors after DMBA. No evidence of C2 as an initiator with TPA. | PS-8 |
| 34-30859 | 2/87 | Mutagenesis:<br>Cell Transformation Assay | BALB/3T3 Cells | Negative with and without activation (toxic level not reached). | PS-12 |

# CRUDE OIL FRACTIONS

## Crude D 120°–350° Fraction (PS-8-76-D2)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 33-32725 | 12/85 | Carcinogenesis: Initiation/Promotion Study<br>D2, 10 or 50 mg, 2x/wk for life<br><br>D2, 2.5 and 12.5 mg, 2x/wk for 2 wks plus 2.5-ug TPA, 2x/wk for life<br><br>2.5-ug DMBA, 2x/wk for 2 wks plus 10-mg D2, 2x/wk for life<br><br>0.25-ug DMBA plus 10-mg D2, 2x/wk for life<br><br>positive and negative controls | mouse (C3H/HeJ) | D2 (50 mg) was weakly carcinogenic. D2 did not promote tumors after DMBA; no evidence of D2 as an initiator with TPA. | |

# CRUDE OIL FRACTIONS

## Crude D 700°–1070° Fraction (PS-8-76-D5) Aromatics

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 34-30858 | 2/87 | Mutagenesis: Cell Transformation Assay | BALB/3T3 cells | Negative with and without activation (insoluble, not considered definitive). | PS-12 |
| 33-30931 | 2/86 | Mutagenesis: in vitro Sister Chromatid Exchange Assay (CHO) | hamster | Positive with and without activation. | PS-12 |
| 35-32013 | 9/87 | Mutagenesis: in vivo Sister Chromatid Exchange Assay | mouse | Negative | PS-12 |
| 33-31826 | 5/86 | Mutagenesis: in vivo Unscheduled DNA Synthesis in rats | rat | Negative (up to 1 g/kg gavage) | PS-12 |
| 33-31751 | 4/85 | Mutagenesis: Unscheduled DNA Synthesis in primary rat hepatocyte cultures | rat | Positive | PS-12 |

# CRUDE OIL FRACTIONS

## Crude D 700°–1070° Fraction (PS-8-76-D5) Saturates

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32731 | 9/85 | Mutagenesis: in vitro Sister Chromatid Exchange Assay (CHO Cells) | hamster | Positive with and without activation. | PS-12 |
| 33-30932 | 3/86 | Mutagenesis: in vivo Sister Chromatid Exchange Assay | mouse | Canceled due to uncertainty of ID of test article. | PS-12 |
| 32-32406 | 4/85 | Mutagenesis: in vivo Unscheduled DNA Synthesis in rats | rat | Negative (up to 1 g/kg gavage) | PS-12 |
| 32-32407 | 4/85 | Mutagenesis: Unscheduled DNA Synthesis in primary rat hepatocyte cultures | rat | Negative | PS-12 |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-31512 | 4/85 | Subchronic Exposure: (Effect on Host Resistance) 5, 20, and 40 mg/kg/d of BaP and 40 mg/kg/d BeP for 14 days then challenged with Listeria monocytogenes, Streptococcus pneumoniae, Herpes Simplex Type 2 (HSV-2), Influenza A2, or B16F10 melanoma | mouse (B6C3F1) | BaP increased resistance to L. monocytogenes; decreased resistance to B16F10 melanoma, Herpes Simplex and S. pneumoniae. BeP caused no change in resistance to any of the pathogenic or tumor cells. | PS-23 |
| 30-32850 | 8/83 | Subchronic Exposure: (Effect on Specific Immune Parameters) 5, 20, and 40 mg/kg/d of BaP and 40 mg/kg/d BeP for 14 days | mouse (B6C3F1) | Alteration in immune parameters by BaP but not BeP. Specifically, BaP inhibited the humoral immunity response. | PS-23 |
| 33-31750 | 4/86 | Subchronic Exposure: (Effects on Specific Immune Parameters) 2.5, 10, and 20 mg/kg/d of BaP for 14 days; 20 mg/kg/d of BeP, single treatment (subQ injection) | rat (F344) | Data indicated that the rat was affected similarly to the mouse by exposure to benzopyrenes. (High Dose of BaP depressed humoral immunity and low dose enhanced response; BeP had no effect on the immune system.) | PS-23 |

# BENZO(a)PYRENE AND BENZO(e)PYRENE

## Benzo(a)pyrene

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-31646 | 5/83 | Chronic Dermal Carcinogenesis: 3x/wk for 2 years | mouse (Swiss) | Highly carcinogenic squamous cell carcinoma tumor incidence:<br>0.05% dose - 92%<br>0.15% dose - 96% | PS-36 |
| 36-31364 | 1/89 | Chronic Dermal Carcinogenicity: 50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology:<br>0.01% in toluene - 32 mice with tumors. Latency = 86 wks, FEN=49<br>0.05% in toluene - 49 mice with tumors. Latency = 49 wks, FEN=49<br>(see also 33-31451) | PS-36 |
| 36-33220 | 6/89 | Chronic Dermal Carcinogenicity: 50 ul, 2x/wk | mouse (C3H/HeJ) | Histopathology:<br>0.01% in toluene - 24 mice with tumors. Latency = 87 wks, FEN=47<br>0.05% in toluene - 46 mice with tumors. Latency = 47 wks, FEN=47<br>(see also 34-32865) | PS-36 |
| 36-31913 | 4/89 | in vitro Teratology Assay: Human Embryonic Palatal Mesenchymal (HEPM) Cell Growth Inhibition Assay | human | Inactive without activation. Considered a potential teratogen with activation. | PS-63 |
| 37-30619 | 1/90 | in vitro Teratology Assay: Human Embryonic Palatal Mesenchymal (HEPM) Cell Growth Inhibition Assay | human | Inactive without activation. Considered a potential teratogen with activation. | PS-63 |
| 35-31937 | 2/88 | in vitro Teratology Assay: Mouse Embryo Limb Bud Culture Assay | mouse | Active | PS-63 |
| 37-31149 | 3/90 | in vitro Teratology Assay: Mouse Ovarian Tumor (MOT) Cell Attachment Inhibition Assay | mouse | Positive (potential teratogen) | PS-63 |

# RAW SHALE

## Sample RS

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60044 | 12/77 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative under both activation and nonactivation conditions. | |
| 26-60044 | 12/77 | Mutagenesis: mouse Lymphoma Assay 5 dose levels up to 5 mg/ml | mouse | Negative | |
| 26-60044 | 12/77 | Mutagenesis: rat Bone Marrow Cytogenetics Assay 0.5, 1.7, 5 g/kg orally in corn oil; acute = 1 administration; subchronic = 5 consecutive daily administrations | rat | Subchronic dose group at 5.0 g/kg showed a significant increase in chromosomal abnormalities. At intermediate dose (1670 mg/kg) abnormalities were high but not significant. Negative at all other levels. | |

# RAW SHALE

## Samples RS101, RS102, RS103

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60027 | 3/78 | Acute Dermal Toxicity: 20g/kg as an aqueous paste | rabbit (NZW) | No systemic toxicity; no dermal irritation. (RS101, 102, 103) | |
| 26-60027 | 3/78 | Acute Oral Toxicity: 20% solution of micronized raw shale in corn oil | rat (SD) | LD50 >10g/kg for all samples (RS101, 102, 103): CNS depression, decreased locomotor activity, ptosis, piloerection. | |
| 29-32356 | 7/82 | Chronic Dermal Carcinogenesis: 50 mg of a 33% solution (1:2 ratio by weight) of micronized raw shale in mineral oil 2 x/wk, 18 months; test animals were followed for life | mouse (C3H/HeJ) | RS-101: Noncarcinogenic (no tumor incidence)<br>RS-102: Noncarcinogenic (no tumor incidence)<br>RS-103: Noncarcinogenic (no tumor incidence)<br>Slight acanthosis. | SPS-3 |
| 27-32466 | 3/80 | Chronic Inhalation Toxicity: 10 mg/m3 or 30 mg/m3, 6 hr/d, 5 d/wk, 2 yrs inhalation (raw shale dusts) | rat/monkey | No evidence of progressive, fibrogenic, or carcinogenic effects (at 30 mg/m3) in either species despite clear indication of a lung burden which caused inflammatory reactions in both species. 30-31535 - publication | |
| 26-60027 | 3/78 | Dermal Sensitization | guinea pig | Nonsensitizing<br>(2/10 dead - RS101)<br>(2/10 dead - RS103) | |
| 26-60021 | 12/77 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative under both activation and nonactivation conditions (RS101). | |
| 26-60021 | 12/77 | Mutagenesis: Mouse Lymphoma Assay 5 dose levels up to 5 mg/ml | mouse | Slight but no significant increase in mutations observed at the higher dose levels under both nonactivation and activation conditions (RS101). | |
| 26-60021 | 12/77 | Mutagenesis: Rat Bone Marrow Cytogenetics Assay 0.5, 1.7, 5 g/kg orally in corn oil; acute = 1 administration; subchronic = 5 consecutive daily administrations | rat | Subchronic dose group at 5.0 g/kg showed a significant increase in chromosomal abnormalities. At intermediate dose (1670 mg/kg) abnormalities were high but not significant. Negative at all other levels. Single high value seen in high dose at 24 hours - no dose response (RS101). | |

# RAW SHALE

## Samples RS101, RS102, RS103

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60027 | 3/78 | Primary Dermal Irritation: 0.5 g as an aqueous paste | rabbit (NZW) | Nonirritating (RS101, 102, 103) | |
| 26-60027 | 3/78 | Primary Eye Irritation: 0.5 g | rabbit (NZW) | Nonirritating<br>RS101 RS102 RS103<br>24 hr 0 0 4.0<br>48 hr - - 0 | |
| 26-60007 | 10/78 | Teratogenesis: (Raw Shale Dust) 18 mg/m3 and 102 mg/m3, 6 hrs/d, days 6-15 of gestation via inhalation | rat (SD) | Negative (RS101, 102, 103) | |

# SPENT SHALE

## Samples SS201, SS202, SS203, SS204

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60027 | 3/78 | Acute Dermal Toxicity:<br>20 g/kg as an aqueous paste | rabbit (NZW) | No systemic toxicity; some erythema at painting site in 3/5 rabbits - abraded skin for SS201 was the only dermal irritation/toxicity. | |
| 26-60027 | 3/78 | Acute Oral Toxicity:<br>20% solution of micronized raw shale in corn oil | rat (SD) | LD50 >10g/kg; for all samples: CNS depression, decreased locomotor activity, ptosis, piloerection. | |
| 29-32356 | 7/82 | Chronic Dermal Carcinogenesis:<br>50 mg of a 33% solution (1:2 ratio by weight) of micronized spent shale in mineral oil 2x/wk for 18 months; test animals were followed for life | mouse (C3H/HeJ) | SS201: Noncarcinogenic (no tumor incidence)<br>SS202: Noncarcinogenic (no tumor incidence)<br>SS203: Noncarcinogenic (no tumor incidence)<br>SS204: Noncarcinogenic (no tumor incidence)<br>Slight acanthosis. | SPS-3 |
| 27-32466 | 3/80 | Chronic Inhalation Toxicity:<br>10 mg/m or 30 mg/m, 6 hr/d, 5 d/wk, 2 yrs via inhalation<br>(Shale Dust) | rat/monkey | No evidence of either progressive fibrogenic or carcinogenic effects (at 30 mg/m3) in either species despite clear indication of a lung burden which caused inflammatory reaction in both species .<br>30-31535 publication | |
| 26-60027 | 3/78 | Dermal Sensitization | guinea pig | Nonsensitizing<br>(1/10 dead - SS203)<br>(2/10 dead - SS204) | |
| 26-60027 | 3/78 | Primary Dermal Irritation:<br>0.5 g as an aqueous paste | rabbit (NZW) | Nonirritating | |
| 26-60027 | 3/78 | Primary Eye Irritation:<br>0.5 g dose | rabbit (NZW) | SS201 and SS204 "significantly" irritating, but reversible.<br>SS202 and SS203 nonirritating<br>.<br>SS201 SS202 SS203 SS204<br>24 hr 7.3 2.7 1.3 12<br>48 hr 6.3 0 0 8.7 | |
| 26-60008 | 10/78 | Teratogenesis:<br>62 mg/m3 and 146 mg/m3, 6 hr/d, days 6-15 of gestation<br>(Retorted Shale Dust) | rat (SD) | Negative | |

# RETORTED SHALE OIL

## Samples RO-1, RO-2, RO-3, RO-4

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60027 | 3/78 | Acute Dermal Toxicity: 0-5 ml @ 100°F | rabbit (NZW) | LD50 >20 ml/kg for all samples; erythema and edema locally; target organ appears to be the liver systemically (fatty changes, necrosis). (RO-1, RO-2, RO-3, RO-4) | |
| 26-60027 | 3/78 | Acute Oral Toxicity: (at 100°F when dosed in corn oil) | rat (SD) | RO-1: LD50 = 10.05±0.62 g/kg<br>RO-2: LD50 = 10.25±0.96 g/kg<br>RO-3: LD50 = 9.63±0.62 g/kg<br>RO-4: LD50 = 8.00±0.49 g/kg<br>Dose-related CNS depression clinically observed - decreased locomotor activity, ptosis, respiratory depression, death. Piloerection was observed. | |

# RETORTED SHALE OIL

## Samples RO-1, RO-2, RO-3, RO-4

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 29-32356 | 7/82 | Chronic Dermal Carcinogenesis: 50 mg neat 2x/wk for 18 mos; test animals were followed for life | mouse (C3H/HeJ) | (RO-1)<br>Gross tumor incidence = 34/42 = 81%<br>Average latency period = 31.9 wks<br>- Early epilation of the skin continuing throughout the experiment.<br>- The retorted shale oils were markedly irritating to the skin causing dermal ulceration, fibrosis, and acanthosis.<br><br>(RO-2)<br>Gross tumor incidence = 35/43 = 81%<br>Average latency period = 21.6 weeks<br>- Early epilation of the skin continuing throughout the experiment.<br>- The retorted shale oils were markedly irritating to the skin causing dermal ulceration, fibrosis, and acanthosis.<br><br>(RO-3)<br>Gross tumor incidence = 40/46 = 87%<br>Average latency period = 28.5 weeks<br>- Early epilation of the skin continuing throughout the experiment.<br>- The retorted shale oils were markedly irritating to the skin causing dermal ulceration, fibrosis, and acanthosis.<br><br>(RO-4)<br>Gross tumor incidence = 39/48 = 87%<br>Average latency period = 25.7 weeks<br>- Early epilation of the skin continuing throughout the experiment.<br>- The retorted shale oils were markedly irritating to the skin causing dermal ulceration, fibrosis, and acanthosis. | SPS-3 |
| 26-60027 | 3/78 | Dermal Sensitization | guinea pig | Nonsensitizing (RO-1, RO-2, RO-3, RO-4) | |
| 26-60006 | 7/78 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative under both activation and nonactivation conditions. (Retorted Shale Sample) | PS-4 |

# RETORTED SHALE OIL

## Samples RO-1, RO-2, RO-3, RO-4

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60004 | 12/77 | Mutagenesis: Ames Assay | Salmonella typhimurium | (RO-1) Positive with microsomal activation; weak positive without activation. (Also positive in assay reported with activation in 32-32856 - 9/85 - PS-12) | |
| 26-60005 | 5/78 | Mutagenesis: Ames Assay | Salmonella typhimurium | (RO-3) Plate assay: positive under activation conditions; negative under nonactivation conditions. Suspension assay: positive with activation in TA 98. | |
| 26-60009 | 1/78 | Mutagenesis: Ames Assay | Salmonella typhimurium | (RO-4) Positive with activation. | |
| 26-60006 | 7/78 | Mutagenesis: Ames Assay | Salmonella typhimurium | Negative (Retorted Shale Sample) | PS-4 |
| 32-32744 | 9/85 | Mutagenesis: in vitro Chinese Hamster Ovary (CHO) Cell Assay (HGPRT locus) | hamster | (RO-1) Equivocal with and without activation. | PS-12 |
| 30-31037 | 5/82 | Mutagenesis: in vitro; in vivo Urine Assay Oral administration, 5 ml/kg | rat | (RO-1) Positive only with TA-98 with and without enzyme activation. | PS-50 |
| 33-30445 | 1/86 | Mutagenesis: in vitro Sister Chromatid Exchange Assay (CHO Cells) | hamster | (RO-1) Positive with and without activation. | PS-12 |
| 26-60009 | 1/78 | Mutagenesis: in vivo Cytogenetics Assay in Bone Marrow (0.5, 1.7, and 5.0 ml/kg orally, pure form; acute = 1 administration; subchronic = 5 daily administrations) | rat | (RO-4) Negative | |

# RETORTED SHALE OIL

## Samples RO-1, RO-2, RO-3, RO-4

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60006 | 7/78 | Mutagenesis: in vivo Cytogenetics Assay in Bone Marrow (500, 1670, and 5000 mg/kg in 5% gum tragacanth, orally; acute = 1 administration; subchronic = 5 daily administrations) | rat | Negative (Retorted Shale Sample) | PS-4 |
| 26-60004 | 12/77 | Mutagenesis: in vivo Cytogenetics Assay in Rat Bone Marrow 0.5 ml/kg, 1.7 ml/kg & 5.0 ml/kg in corn oil; acute = 1 administration; subchronic = 5 consecutive daily administrations | rat | (RO-1) Negative | |
| 26-60005 | 5/78 | Mutagenesis: in vivo Cytogenetics Assay in Rat Bone Marrow 0.5 ml/kg, 1.7 ml/kg & 5.0 ml/kg in corn oil; acute = 1 administration; subchronic = 5 consecutive daily administrations | rat | (RO-3) Negative | |
| 32-32406 | 4/85 | Mutagenesis: in vivo; in vitro Unscheduled DNA Synthesis Assay in Rats (liver) (up to 1 g/kg gavage) | rat | (RO-1) Negative | PS-12 |
| 37-32484 | 11/85 | Mutagenesis: in vivo Sister Chromatid Exchange Assay in Mice (0.2, 0.75, and 2.0 g/kg ip) | mouse | (RO-1) Positive | PS-12 |

# RETORTED SHALE OIL

## Samples RO-1, RO-2, RO-3, RO-4

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 26-60005 | 5/78 | Mutagenesis: Mouse Lymphoma Assay | mouse | (RO-3) Negative | |
| 26-60009 | 1/78 | Mutagenesis: Mouse Lymphoma Assay | mouse | (RO-4) Weakly positive; no clear dose response but significant increase in mutations at high end of dose range, both with and without activation. | |
| 26-60004 | 12/77 | Mutagenesis Mouse Lymphoma Assay 5 dose levels up to 5 mg/ml | mouse | (RO-1) Weakly positive. Significant increase in mutations under nonactivation conditions. No significant increase when activated. | |
| 26-60006 | 7/78 | Mutagenesis: Mouse Lymphoma Assay levels up to 5 mg/ml | mouse | Negative under both activation and nonactivation conditions. (Retorted Shale Sample) | PS-4 |
| 26-60006 | 7/78 | Mutagenesis: Plate Assay | Salmonella typhimurium | Negative (Retorted Shale Sample) | PS-4 |
| 32-32407 | 4/85 | Mutagenesis: Unscheduled DNA Synthesis Assay (rat hepatocytes) | rat | (RO-1) Positive | PS-12 |
| 27-33264 | 10/80 | PNA Analysis of Shale Oils and Downstream Products | | | SPS-5 |
| 26-60027 | 3/78 | Primary Dermal Irritation: 0.5 ml | rabbit (NZW) | Moderate irritation<br>PIS RO-1 = 2.5<br>PIS RO-2 = 2.7<br>PIS RO-3 = 3.4<br>PIS RO-4 = 2.6 | |
| 26-60027 | 3/78 | Primary Eye Irritation: 0.1 ml heated to 100°F | rabbit (NZW) | Moderate irritation<br>RO-1 RO-2 RO-3 RO-4<br>24 hr 4.0 4.0 4.0 4.0<br>48 hr 2.7 4.0 1.7 3.3 | |
| 27-32129 | 2/79 | Teratogenesis: 5 mg/m3 and 100 mg/m, 6 hrs/d, days 6-15 of gestation via inhalation | rat (SD) | (RO-1) Dam body weight and food consumption significantly decreased on days 7-15 (100 mg/m3). Lung discoloration at 100 mg/m3. | SPS-6 |

## RETORTED SHALE OIL

### Samples RO-1, RO-2, RO-3, RO-4

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 27-32127 | 11/78 | Teratogenesis: 5 mg/m3 and 100 mg/m, 6 hrs/d, days 6-15 of gestation via inhalation | rat (SD) | (RO-3) Decrease in body weight of dams at 100 mg/m3 after exposure days 6-15. | SPS-6 |
| 27-32128 | 2/79 | Teratogenesis: 5 mg/m3 and 100 mg/m, 6 hrs/d, days 6-15 of gestation via inhalation | rat (SD) | (RO-4) Mottled lungs at 100 mg/m3; increase in resorptions, embryotoxic at 100 mg/m3. | SPS-6 |

# CRUDE SHALE OIL

## Samples SFR-1, SFR-2

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32652 | 7/85 | 28-Day Dermal Toxicity Study: 0.25, 2.5 g/kg; 5x/wk for 4 wks | rat (SD) | (SFR-1) Slight erythema, edema desquamation, fissuring; male reduced BW gain. | |
| 32-32652 | 7/85 | 28-Day Dermal Toxicity Study: 0.25, 2.5 g/kg; 5x/wk for 4 wks | rat (SD) | (SFR-2) Slight to moderate dermal irritation, erythema, edema, desquamation, fissuring, male reduced BW gain, increase in female absolute and relative liver weight. | |
| 32-30626 | 9/84 | 30-Day Skin Painting (Pilot) to Chronic: Two exposure regiments: 25 ul, 2x/wk & 3x/wk for 4 wks | mouse (C3H/HeNCR1) | Samples SFR-1-F3, SFR-1-F4, SFR-2-F3, and SFR-2-F4 were assayed. Treatment-related effects were confined to the skin. F3 less severe than F4; 2x/wk less severe than 3x; F4, 3x/wk - somewhat reduced BW. (Note: F3 is a 350-550°F cut and F4 is a 550-700°F cut of the corresponding oils.) | SYN-8 |
| 33-32009 | 7/86 | Chronic Dermal Carcinogenesis: 25 ul, 2x/wk; all materials were dosed neat | mouse (C3H) | The decision was made to terminate this study after week 30 of treatment. | |
| 30-32849 | 10/83 | Chronic Dermal Carcinogenesis: 50 mg (neat) 2x/week for 69 wks | mouse (C3H/HeJ) | 47/50 mice developed microscopic tumors (Average latency = 20.9 weeks) FEN=50. | SPS-3 |

# HYDROTREATED SHALE OIL

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32849 | 10/83 | Chronic Dermal Carcinogenesis: 50 mg (neat) 2x/week for 67 wks (no survivors after that time) | mouse (C3H/HeJ) | 29 mice with microscopic tumors. Average latency period = 43.1 weeks; FEN=37 | SPS-3 |
| 28-70300 | 1/81 | Comprehensive Analysis of Shale Oil Products | | | SPS-5 |

# HYDROTREATED SHALE OIL

## Samples SFP-105, SFP-119, SFP-206

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32652 | 7/85 | 28-Day Dermal Toxicity Study: 0.25, 2.5 g/kg/day for 5 day/wk for 4 weeks | rat (SD) | (SFP-105) Male - reduced weight gain, both groups. | PS-SYN-7 |
| 32-32652 | 7/85 | 28-Day Dermal Toxicity Study: 0.25, 2.5 g/kg/day for 5 day/wk for 4 weeks | rat (SD) | (SFP-119) Male - increased cholinesterase and dose-related female liver enzyme GGPT. | PS-SYN-7 |
| 32-32652 | 7/85 | 28-Day Dermal Toxicity Study: 0.25, 2.5 g/kg/day for 5 day/wk for 4 weeks | rat (SD) | (SFP-206) Slight dermal irritation and reduced weight gain. | PS-SYN-7 |
| 32-30626 | 9/84 | 30-Day Skin Painting: (Pilot) 2 exposure regimens: 25 ul 2 or 3x/wk for 4 wks | mouse (C3H/HeNCR1) | Samples SFP-119-F3, SFP-119-F4, SFP-206-F3, and SFP-206-F4 were assayed. Treatment-related effects were confined to the skin. Lesions of F3 were less severe than for F4; 2x/wk treatment less severe than 3x treatment regimen. (Note: F3 is 350-550°F cut and F4 is a 550-700°F cut of the corresponding oils.) | SYN-8 |
| 33-32009 | 7/86 | Chronic Dermal Carcinogenesis: 25 ul, 2x/wk - all materials are dosed neat | mouse (C3H) | The decision was made to terminate this study after week 30 of treatment. | |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32849 | 10/83 | Chronic Dermal Carcinogenesis: 50 mg (neat) 2 x/week for 54 weeks (no survivors after that time) | mouse (C3H/HeJ) | 48 mice had microscopic tumors<br>Average latency = 14.6 wks<br>FEN=49 | SPS-3 |
| 28-70300 | 1/81 | Comprehensive Analysis of Shale Oil Products | | Also see 26-60063 | SPS-5 |
| 27-33264 | 10/80 | PNA Analysis of Shale Oils and Downstream Products | | | SPS-5 |

# HIGH NITROGEN CRUDE OIL

## Sample HNC-1

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-32652 | 7/85 | 28-Day Dermal Toxicity Study: 0.25, 2.5 g/kg/day; 5 day/wk for 4 weeks (warmed to 40°C for dosing) | rat (SD) | Very slight skin irritation, depression of weight gain in high-dose males; females not remarkable except increase in relative and absolute liver weights. | |
| 32-30626 | 9/84 | 30-Day Skin Painting: (Pilot) 2 exposure regimens: 25 ul 2 or 3x/wk, for 4 weeks, neat | mouse (C3H/HeNCR1) | Samples HNC-1-F3 and HNC-1-F4 were assayed. Treatment-related effects were confined to the skin. F3 treatment effects not as severe as F4. Treatment 2x/wk not as severe as 3x/wk. (Note: F3 is 350-550°F and F4 is a 550-700°F cut of the corresponding oil.) | SYN-8 |
| 33-32009 | 7/86 | Chronic Dermal Carcinogenesis: 25 ul, 2x/wk; all materials are dosed neat | mouse (C3H) | The decision was made to terminate this study after week 30 of treatment. | |

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32849 | 10/83 | Chronic Dermal Carcinogenesis: 50 mg (neat) 2x/week for 63 weeks (no survivors after that time) | mouse (C3H/HeJ) | DFM Precursor -- 2 mice with microscopic tumors Average latency period = 59.0 weeks; FEN=22 | SPS-3 |
| 30-32849 | 10/83 | Chronic Dermal Carcinogenesis: 50 mg (neat) 2x/week for 69 weeks (no survivors after that time) | mouse (C3H/HeJ) | DFM Product -- 6 mice with microscopic tumors. Average latency period = 50.5 weeks; FEN=36 | SPS-3 |

## SHALE-OIL-DERIVED HEAVY FUEL OIL EQUIVALENT HYDROTREATED RESIDUE

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 30-32849 | 10/83 | Chronic Dermal Carcinogenesis: 50 mg (neat) 2x/week for 64 weeks (all dead at that time) | mouse (C3H/HeJ) | 35 mice with microscopic tumors. Average latency period = 35.2 weeks; FEN=46 | SPS-3 |
| 28-70300 | 1/81 | Comprehensive Analysis of Shale Oil Products | | | SPS-5 |

# SOLVENT-REFINED COAL DISTILLATE

## Sample 86-02

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 36-31911 | 4/89 | in vitro Teratology Assay: Human Embryonic Palatal Mesenchymal (HEPM) Cell Growth Inhibition Assay | human | Potential teratogen (rating 4) without metabolic activation. | PS-63 |
| 36-31912 | 4/89 | in vitro Teratology Assay: Human Embryonic Palatal Mesenchymal (HEPM) Cell Growth Inhibition Assay | human | Potential teratogen (rating 4) with metabolic activation. | PS-63 |
| 35-31936 | 1/88 | in vitro Teratology Assay: Mouse Embryo Limb Bud Culture Assay | mouse | Inactive | PS-63 |
| 35-32481 | 4/88 | in vitro Teratology Assay: Mouse Ovarian Tumor (MOT) Cell Attachment Inhibition Assay | mouse | Potential teratogen (rating 4) | PS-63 |

# METHYL-T-BUTYL ETHER (MTBE)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| 32-30235 | 3/84 | Acute Toxicity: 100, 300, 1000, & 3000 ppm, 6 hr/d for 9 days | rat (SD) | 3000 ppm - increased relative liver weights and inflammation of trachea and nasal mucosa. | N/A |
| 32-30238 | 3/84 | Metabolism: Approximately. 60 uCi (x conc. = 232-mg MTBE/kg) 14C-MtBE inj.; animals sacrificed at 5, 15, 30, & 45 min. & 1, 2, 3, 6, 24, & 48 hrs. posttreatment | rat | Material balance - 104% of dose obtained 48 hrs posttreatment; 91.75% 14C identified as expired MtBE. | N/A |
| 32-30239 | 3/84 | Reproduction: Males at 290, 1180, and 2860; females at 300, 1240, and 2980 ppm via inhalation, 6 hr/d, 5 d/wk for premating & postmating periods, during mating, gestation & lactation periods (2 mating intervals) | rat (SD) | No effects on mating, fertility indices, or reproduction measures; pup survival indices comparable to controls; pups from mid- and high-dose female had slightly lower mean weights at lactation days 14 and 21. | N/A |
| 32-30236 | 3/84 | Teratogenesis: 250, 1000, and 2500 ppm, 6 hr/d via inhalation | rat (SD) | No toxic effects. | N/A |
| 32-30237 | 3/84 | Teratogenesis: 280, 1110, and 2710 ppm, 6 hr/d via inhalation, days 6-15 gestation | mouse (CD-1) | No toxic effect. | N/A |
| Publ 4592 | 1/94 | Odor and Taste Threshold studies on commercial grade MTBE | human | Odor detection and recognition thresholds of MTBE in air were 0.053 ppm and 0.125 ppm, respectively. Odor detection and recognition thresholds of MTBE in water were 0.045 ppm and 0.055 ppm, respectively. The taste threshold of MTBE in water was 0.039 ppm. | |

# TERTIARY AMYL METYL ETHER (TAME)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| Publ 4591 | 07/93 | Odor and Taste Thresholds | human | Odor threshold In Air - Odor Detection = 0.027 ppm<br>Odor Recognition = 0.047 ppm<br><br>In Water - Odor Detection = 0.194 ppm<br>Odor Recognition = 0.443 ppm<br>Taste Detection Threshold<br>In Water - Taste Detection Threshold = 0.128 ppm | N/A |
| TR 402 | 8/12/94 | Acute toxicity ($EC_{50}$) 0.04, 0.08, 0.16,0.31, 0.63, 1.3, 2.5, 5.0 mg A.I./L for 96 hours (nominal) in a closed system w/added bicarbonate. | Selenastrum Capricornutum (green algae) | 96-hr $EC_{50}$ (calculated) = 0.11 mg A.I./L<br>96-hr NOEC = 0.017 mg A.I./L<br><br>Supplemental exposure conducted at test termination showed that 3.7 mg A.I./L has an algistatic, i.e., reversible effect on growth of S. capricornutum once it is diluted to a non-inhibitory concentration (0.04 mg A.I./L, nominal). | N/A |
| TR 406 | 2/19/94 | Acute Toxicity ($EC_{50}$) (15, 28, 55, 83, 120 mg Active Ingredient (A.I.)/L for 48 hours) | Daphnia magna | 90% immobilization at 120 mg A.I./L; sublethal effects (lethargy) in all mobile daphnids. No immobilization or sublethal effects at lower concentrations. NOEC established to be 83 mg A.I./L (measured concentration) through 48 hours. | N/A |
| TR 407 | 12/29/94 | Acute toxicity ($LC_{50}$) 1.6, 4.0, 7.3, 15, 30, 60 mg A.I./L (for 96 hrs) nominal in a static renewal system w/renewal at 24, 48, 72 hrs of exposure. | Mysidopsis bahia (mysid shrimp) | 96-hr $LC_{50}$ (calculated) = 14 mg A.I./L<br>96-hr NOEC < 5.0 mg A.I./L<br>Results for lowest concentration not presented due to analytical "complications." | N/A |
| TR 408 | 12/19/94 | Acute Toxicity ($LC_{50}$) (78, 150, 310, 560, 640 mg A.I./L, for 96 hours) | Oncorhynchus mykiss (rainbow trout) | 100% mortality at 640 mg A.I./L (72 hr); 30% mortality at 560 mg/L (96 hr); sublethal effects (loss of equilib, dk pigmentation) in survivors. No mortality or sublethal effects at other exposure levels. NOEC established at 310 mg A.I./L | N/A |

A.I./L = active ingredient per liter of solution

# TERTIARY AMYL METHYL ETHER (TAME)

| Report Abstract Number | Date of Report | Test Performed | Species Tested | Test Results | Project Number |
|---|---|---|---|---|---|
| TR 403 | 9/94 | Dermal Sensitization (Closed-patch, repeated insult) (Buehler method) Animals dosed 0.3 ml for 6 hrs, 1X/week, for 3 weeks (induction), challenge was one dose at naive sites, 14 days after induction; 100% TAME Dosed. | Guinea Pig | All animals challenged w/100% TAME were free of dermal responses; Incidence Index of sensitization to TAME was 0%; Severity Indices at 24, 48 hr were 0 for TAME-treated animals and irritation control animals. All animals survived throughout study. | N/A |