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8EHQ-06-16590

MRH#299357

October 12, 2006

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Environmental Protection Agency
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Re: TSCA 8(e) Submission

Dear Sir/Madam:

On behalf of Shell Trading (US) Company, enclosed is our TSCA 8(e) submission. The signed original of this document is being sent by Certified U.S. Mail.

Please contact the undersigned if you have any questions.

Very truly yours,

John Kampman

JK:km
Enclosure

88070000008

Shell Trading

Shell Trading (US) Company
909 Fannin, Plaza Level 1
Houston TX 77010
(713)230 - 7854

US CERTIFIED MAIL, RRR

October 11, 2006

Document Processing Center (7407M)
(Attn: TSCA Section 8(e) Coordinator)
Office of Pollution Prevention and Toxics
Environmental Protection Agency
1200 Pennsylvania Ave., N.W.
Washington, DC 20460-0001

2006 OCT 12 PM 2: 12
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Re: TSCA 8(e) Submission

Dear Sir/Madam:

On September 12, 2006, Shell Trading (US) Company ("STUSCO") received information about the results of laboratory *in vitro* Modified Ames Assay screening tests for a component that is contained in a product that certain STUSCO – affiliated companies import into the United States from Canada. The imported product, Albian Heavy Synthetic Crude ("Albian Crude"), is a blend of petroleum-based substances that include petroleum extracted from tar sands. STUSCO is submitting this TSCA 8(e) notification because the laboratory testing includes observations for one component of the Albian Crude, which EPA may consider to be TSCA 8(e) reportable.

This component of the Albian Crude, referred to as heavy oil stripper bottoms ("HOS Bottoms") by the supplier, Shell Canada Limited, is a petroleum based substance that is the residual fraction resulting from the distillation of products from the LC-Fining hydrocracking process[1]. All process streams that feed this supplier's particular hydrocracking process, including petroleum extracted from tar sands, are petroleum hydrocarbons. Thus, the chemical substance that is called HOS Bottoms is identified by the CAS number 64741-75-9, and is listed on the TSCA Inventory as *hydrocracked residuum (petroleum)*. The supplier's current MSDS for the HOS Bottoms is enclosed as Attachment 1.[2]

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[1] The LC-Fining process was developed to hydrocrack heavy hydrocarbon streams, such as petroleum residuals, and heavy oils from tar sands. The LC-Fining process uses an ebullated (moving) catalyst bed and very high temperatures. An EPA sponsored document developed by SAIC entitled *Clarifying the Scope of Petroleum Hazardous waste Listings: Supplemental Information Regarding Petroleum Hydroprocessing Units*, June 2001 indicates that this type of process is not widely used in the refining industry.

[2] Attachment 1 was prepared before actual production of HOS Bottoms began, and is based on information from the results of simulated distillations. Analyses conducted after production was initiated demonstrate that the substance is composed of hydrocarbons having carbon numbers predominantly greater than C_{20} and boiling above approximately 350 degrees centigrade. It is our understanding that the HOS Bottoms MSDS is being modified consistent with the results of production information.

The supplier arranged for laboratory "Modified Ames Assay" *in vitro* testing to determine the mutagenicity index ("MI") of the HOS Bottoms component of Albian Crude. The Modified Ames Assay test protocol was developed as a screening test for application to certain petroleum substances and has subsequently been published as American Society for Testing and Materials (ASTM) Standard E 1687-95. The Modified Ames Assay results are enclosed as Attachment 2.

After receiving the results, we initiated an investigation to determine the reasons for the reported HOS Bottoms MI. Our findings determined that the supplier adds CAS number 64741-62-4 to the hydrocracker feed in the supplier's production process for the HOS Bottoms. CAS number 64741-62-4 is a petroleum substance listed on the TSCA Inventory as "*Clarified oils (petroleum), catalytic cracked*" (CCCO), and is sometimes referred to as "catalytically cracked clarified oil". CCCO has a very high MI and has previously been identified as presenting potential carcinogenic properties, which is information that is known to the EPA Administrator. In addition, during the supplier's production of the HOS Bottoms, the petroleum stream is processed through an ebullated (moving) catalyst bed. A substantial amount of the aromatic hydrocarbons from the CCCO that was added to the hydrocracker feed may remain essentially unchanged by the hydrocracking process and may be present in the resulting HOS Bottoms due to the supplier's production process.

Thus, based on available information we believe that the HOS Bottoms MI reported in Attachment 2 results from the addition of the CCCO and the characteristics of the supplier's production process.

Our investigation has also determined that the Albian Crude, which contains the HOS Bottoms, is used as a petroleum refinery feed stock that is further subjected to extensive petroleum refining processes. The petroleum refining process is typically a closed process, so potential exposure is not expected under normal operating conditions. Thus, an MI associated with either of these two substances is unlikely to represent a risk to human health or the environment.

Please contact me at the above-listed telephone number if you have any questions.

Sincerely,

Robert Conn,
Manager
Health, Safety & Environment

Enclosures:

(1) PetroLabs Inc., Final Report Modified Ames Test, PLI Study No. 05072, for Shell Canada Limited -

(2) Shell Canada Limited Material Safety Data Sheet dated April 12, 2005, for Heavy Oil Stripper Bottoms (MSDS No. 9200-642)

Shell Canada Limited

Material Safety Data Sheet

Effective Date: 2005-04-12
Supersedes: 2003-08-12

Class D2A Other Toxic Effects - Carcinogen

Class D2B Other Toxic Effects - Skin Irritant

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT:	**HEAVY OIL STRIPPER BOTTOMS**
PRODUCT USE:	Upgrader intermediate stream
MSDS Number:	9200-642

MANUFACTURER	**TELEPHONE NUMBERS**	
Shell Canada Limited	**Shell Emergency Number**	1-800-661-7378
P.O. Box 100, Station M	**CANUTEC 24 HOUR EMERGENCY NUMBER**	613-996-6666
400-4th Ave. S.W.		
Calgary, AB Canada	For general information:	1-800-661-1600
T2P 2H5	For MSDS information:	403-691-3982
	(From 7:30 to 4:30 Mountain Time)	403-691-2220

This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark(s) of Shell Canada Limited, used under license by Shell Canada Products.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled
Hydrocracked Residues	64741-75-9	45 - 65	Yes
Distillates (petroleum), heavy hydrocracked	64741-76-0	35 - 55	Yes

See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description: Viscous Liquid Black colour Hydrocarbon Odour

Routes of Exposure: Exposure will most likely occur through skin or eye contact. Inhalation is only possible if the product is heated or mists are generated.

Hazards:

Irritating to skin.
May cause cancer.
Vapours are moderately irritating to the eyes.
Vapours are moderately irritating to the respiratory passages.

Handling:

Avoid prolonged exposure to vapours.
Minimize skin contact.
Wear suitable gloves and eye protection.

For further information on health effects, see Section 11.

4. FIRST AID

Eyes: Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.

Skin: Wipe excess from skin. Wash contaminated skin with mild soap and water for 15 minutes. If irritation occurs and persists, obtain medical attention.

Ingestion: Do not induce vomiting. Obtain medical attention.

Inhalation: Remove victim from further exposure and restore breathing, if required. Obtain medical attention.

Notes to Physician: Treatment of exposure should be directed at the control of symptoms and the clinical condition.

5. FIRE FIGHTING MEASURES

Extinguishing Media:

Dry Chemical
Carbon Dioxide
Foam
Water Fog

Firefighting Instructions: Material will not burn unless preheated. Clear area of unprotected personnel. Do not use a direct stream of water as it may spread fire. Use water to cool fire exposed containers. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus.

Hazardous Combustion Products: Carbon monoxide and carbon dioxide are produced on combustion.

6. ACCIDENTAL RELEASE MEASURES

Eliminate all ignition sources. Isolate hazard area and restrict access. Avoid direct contact with material. Wear appropriate breathing apparatus (if applicable) and protective clothing. Stop leak only if safe to do so. Dike and contain land spills; contain water spills by booming. For large spills remove by mechanical means and place in containers. Absorb residue or small spills with absorbent material and remove to non-leaking containers for disposal. Flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations. Notify appropriate environmental agency(ies).

7. HANDLING AND STORAGE

Handling: Avoid excessive heat, sparks, open flames and all other sources of ignition. Avoid all direct contact with this material. Avoid prolonged or repeated inhalation of vapours. Launder contaminated clothing prior to reuse. Use good personal hygiene.

Storage: Store in a cool, dry, well ventilated area, away from heat and ignition sources.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

THE FOLLOWING INFORMATION, WHILE APPROPRIATE FOR THIS PRODUCT, IS GENERAL IN NATURE. THE SELECTION OF PERSONAL PROTECTIVE EQUIPMENT WILL VARY DEPENDING ON THE CONDITIONS OF USE.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

Asphalt (Petroleum; Bitumen) fume as benzene-soluble aerosol: 0.5 mg/m3
Polycyclic Aromatic Hydrocarbons (PAH): Shell recommends 0.02 mg/m3 as an OEL (8-hour TWA).

Mechanical Ventilation: Concentrations in air should be maintained below the recommended threshold limit value if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). Local ventilation recommended where mechanical ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes.

Skin Protection: Impervious gloves should be worn at all times when handling this product. Best protection is provided by: Viton Nitrile Rubber. In confined spaces or where the risk of skin exposure is much higher, impervious clothing should be worn.

Respiratory Protection: If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Use a NIOSH-approved chemical cartridge respirator with organic vapour cartridges or use a NIOSH-approved supplied-air respirator. For high airborne concentrations, use a NIOSH-approved supplied-air respirator, either self-contained or airline breathing apparatus, operated in positive pressure mode.

9. PHYSICAL DATA

Physical State:	Viscous Liquid
Appearance:	Black colour
Odour:	Hydrocarbon Odour
Odour Threshold:	Not available
Freezing/Pour Point:	Not available
Boiling Point:	290 - 750 °C
Density:	1005 kg/m3 @ 15 °C
Vapour Density (Air = 1):	Not available
Vapour Pressure (absolute):	Not available
Specific Gravity (Water = 1):	1.01
pH:	Not available
Flash Point:	>100 °C
Lower Explosion Limit:	Not available

Upper Explosion Limit:	Not available
Autoignition Temperature:	Not available
Evaporation Rate (n-BuAc = 1):	Not available
Partition Coefficient (K_{ow}):	Not available
Water Solubility:	Insoluble
Other Solvents:	Organic Solvents

10. STABILITY AND REACTIVITY

Chemically Stable:	Yes
Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No
Sensitive to Static Discharge:	No
Incompatible Materials:	Avoid contact with strong oxidizing agents and acids.
Conditions of Reactivity:	Avoid excessive heat, open flames and all ignition sources.

11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified)	**Toxicological Data**
Hydrocracked Residues	
Distillates (petroleum), heavy hydrocracked	

Routes of Exposure:	Exposure will most likely occur through skin or eye contact. Inhalation is only possible if the product is heated or mists are generated.
Irritancy:	Based on the ingredients, this product is expected to be irritating to skin.
Chronic Effects:	Prolonged or repeated contact of polycyclic aromatic hydrocarbons with skin may cause skin cancer where poor personal hygiene may be a contributing factor. Prolonged exposure to high vapour concentration can cause headache, dizziness, nausea, blurred vision and central nervous system depression.
Carcinogenicity and Mutagenicity:	Carcinogenic hazard. This product may contain a variety of polycyclic aromatic hydrocarbons (PAH), some of which are associated with the potential of inducing skin cancer. Increasing amounts of PAH may be released if this product is heated above 200 C.

12. ECOLOGICAL INFORMATION

Environmental Effects:	Do not allow product or runoff from fire control to enter storm or sanitary sewers, lakes, rivers, streams, or public waterways. Block off drains and ditches. Provincial regulations require and federal regulations may require that environmental and/or other agencies be notified of a spill incident. Spill area must be cleaned and restored to original condition or to the satisfaction of authorities. May be harmful to aquatic life.
Biodegradability:	Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery (cement kilns, thermal power generation), 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority.

14. TRANSPORTATION INFORMATION

Canadian Road and Rail Shipping Classification:
This product is not regulated under the Canadian Transportation of Dangerous Goods Regulations for transport by road and rail.
This product is not regulated in the United States under 49CFR.

15. REGULATORY INFORMATION

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Class:	Class D2A Other Toxic Effects - Carcinogen Class D2B Other Toxic Effects - Skin Irritant
DSL/NDSL Status:	This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act. This product and/or all components are listed on the U.S. EPA TSCA Inventory.
Other Regulatory Status:	No Canadian federal standards.

16. ADDITIONAL INFORMATION

LABEL STATEMENTS

Hazard Statement :	Irritating to skin. May cause cancer.
Handling Statement:	Avoid prolonged exposure to vapours. Minimize skin contact. Wear suitable gloves and eye protection.
First Aid Statement :	Wash contaminated skin with soap and water. Flush eyes with water. If overcome by vapours remove to fresh air. Do not induce vomiting. Obtain medical attention.
Revisions:	This MSDS has been reviewed and updated. Changes have been made to: Section 3 Section 9 Section 12

PetroLabs Inc.

Final Report
Modified Ames Test
PLI Study No. 05072
August 26, 2005

Sponsor:
Shell Canada Ltd.

PetroLabs Inc.
133 Industrial Drive
Ivyland, PA 18974
Telephone: (215) 355-6340
Fax: (215) 355-6341

INTRODUCTION

The purpose of this study was to determine the Mutagenicity Index of two samples from Shell Canada Ltd. The Mutagenicity Index, or MI, determined by the Modified Ames Test has been shown to be an accurate predictor of carcinogenicity in the mouse skin-painting bioassay, the standard method for assessing the dermal carcinogenic potential of oils. The Modified Ames Test's utility is based on the well-established correlation between mutagenicity and carcinogenicity for a wide variety of chemical compounds. Its particular applicability to petroleum- and other fossil fuel-derived materials is a consequence of modifications to the standard Ames assay, which was developed by B.N. Ames of the University of California, Berkeley. These modifications were designed to maximize the sensitivity of the test to mutations induced by polycyclic aromatic compounds (PAC), the principal mutagens/carcinogens in fossil fuel-derived materials

Modified Ames Testing of petroleum streams has shown that oils with MIs greater than 1.0 are likely to be carcinogenic in the mouse skin-painting bioassay, while oils with MIs under 1.0 are not. Over the range of MIs from 1.0 to about 50, MI has been shown to be proportional to dermal carcinogenic potency. Oils with MIs greater than 50, which are generally catalytically or thermally cracked streams, induce tumors in virtually all the mice in a skin-painting assay.

The Modified Ames Test is a standard ASTM method, number E 1687. Copies of the method are available from ASTM offices in Conshohocken, Pennsylvania.

MATERIALS AND METHODS

The test organism used in the Modified Ames Test is the *Salmonella typhimurium* strain designated TA98 developed by B.N. Ames. This strain is used because it has been shown to have the highest sensitivity to PAC mutagens.

Bacterial Cultures

Tester strain derived from an initial inoculum of frozen stock was incubated for approximately 16 hours in nutrient broth at 37°C. The resulting culture was then rediluted and incubated an additional three hours to ensure that the bacteria were in log-phase growth, and therefore most susceptible to mutation.

DMSO Extraction and Dosing of Test and Reference Materials

One of the modifications to the standard Ames test procedure used in the modified assay is the testing of a dimethyl sulfoxide (DMSO) extract of an oil, rather than the neat oil dissolved in a suitable solvent. This circumvents the poor solubility of oils in aqueous systems, and optimizes the interaction between PACs and the bacteria and metabolizing enzymes .

Three extracts of the test articles and one of the reference oil used as a positive control for the test were prepared according to the following procedure: 200 mg of sample was added to 5 volumes of DMSO in a glass tube at 100°C and the resulting mixture vortexed for 30 seconds every five minutes for 30 minutes (*). The phases were separated by centrifugation and the extract (lower phase) removed with a pipet and stored in an amber vial until tested. The test article extracts and testing were performed in triplicate. The reference oil was extracted and tested only once.
(*) The standard procedure is to extract samples at room temperature, however due to the consistency and/or viscosity of these samples the extracts were performed at 100°C.

Three dosing solutions were prepared for the test article and reference oil by diluting the extracts with DMSO to the appropriate concentrations in 60 µl dosing aliquots. Due to the results of a preliminary range finding assay, the asphaltene pellet extracts were diluted 1-2 with DMSO and tested at equivalent doses of 0 µl, 6 µl, 12 µl, 18 µl, 24

µl and 30 µl per plate in a 60 µl dosing aliquot. The HOSB extracts were diluted 1:50 with DMSO and tested at equivalent doses of 0 µl, 0.24 µl, 0.48 µl, 0.72 µl, 0.96 µl and 1.2 µl per plate in a 60 µl dosing aliquot. The reference oil was diluted 1:4 with DMSO before preparing the dosing solutions. The doses tested were 0 µl, 3 µl, 6 µl, 9 µl, 12 µl and 15 µl per plate in a 60 µl dosing aliquot.

Metabolic Activation System

Polycyclic aromatic compounds must be metabolized in order to express mutagenic or carcinogenic activity. Since the Ames Test bacteria lack the enzymes necessary for this metabolism, the test system was supplemented by addition of an enzyme-rich extract (termed S-9) derived from Syrian Golden Hamster liver, prepared by, and purchased from Molecular Toxicology Inc., Boone, North Carolina. The S-9 was mixed with salts and cofactors in the following proportions to produce the final metabolic activation mixture: 0.8 ml S9 fraction, 0.075 ml of 0.104M NADP, 0.005 ml of 1.0M G-6-P, 0.02 ml of 1.65M KCl / 0.4M $MgCl_2$ and 0.1 ml of 1M phosphate buffer (pH 7.4). The quantity of S-9 used in this mixture is eight-fold higher than in the standard Ames Test -- a modification again designed to maximize the sensitivity of the assay to PAC mutagens.

Test Procedure

Testing was performed essentially as described in the ASTM Standard Method E 1687. All raw data and the original final report will be maintained at PetroLabs Inc. To the extent possible, Good Laboratory Practice guidelines were adhered to in the performance of this study. However, strict compliance with certain documentation regulations was not necessarily observed, and phase- and report-audit by Quality Assurance personnel were not performed. Therefore, this study is not intended for regulatory submission.

RESULTS AND DISCUSSION

Asphaltene Pastilles	MI = 8.7
Heavy Oil Stripper Bottoms	MI = 106

DMSO extracts of the test articles were tested in the Modified Ames Assay. The test articles were extracted and tested in triplicate assays on duplicate plates. The plate counts from each of the three individual assays, the mean revertant values and the standard deviations for the test articles and the reference oil are presented in Tables 1 - 3. The mean revertants per plate were plotted against the volume of DMSO extract (in µl/plate) for the test articles and reference oil, and are presented in Figures 1 - 3. Fold Increase (FI) and Mutagenic Potency Index (MPI) are also shown in Figures 1 and 2.

The data for the test articles were analyzed using a suitable graphics-statistics program, and determining by linear regression analysis the slope of the dose-response curve. This value is the Mutagenicity Index (MI) of the test article.

REFERENCES

Maron, D.M., & Ames, B.N., (1983). Revised methods for the *Salmonella* mutagenicity test. *Mutation Research* **113**, 173-215.

Blackburn, G.R. et al. (1986). Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* **2**, 63-84.

Roy, T.A. et al. (1988). Correlation of mutagenic and dermal carcinogenic activities of mineral oils with polycyclic aromatic compound content. *Fundamental and Applied Toxicology* **10**, 466-476.

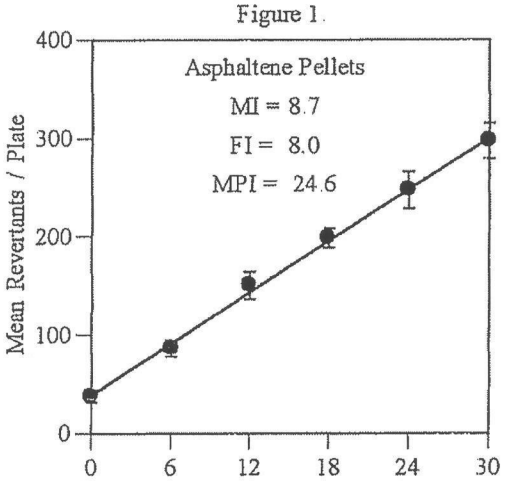
ASTM Standard Method Number E 1687-98, ASTM, Conshohocken, PA.

Table 1.

Asphaltene Pellets

Dose ul/plate	Revertants / Plate				
	Test A	Test B	Test C	Mean	S.D.
0 ul	30	31	46	37	6
	41	36	37		
6 ul	84	99	87	86	8
	77	91	77		
12 ul	132	149	176	150	14
	137	158	149		
18 ul	207	214	196	198	10
	186	192	190		
24 ul	237	220	237	247	19
	245	262	279		
30 ul	289	327	309	297	18
	269	293	295		

Figure 1.



DMSO Extract (ul/plate)

Table 2.

Dose ul/plate	Revertants / Plate Test A	Test B	Test C	Mean	S.D.
0 ul	30	31	46	37	6
	41	36	37		
0.24 ul	56	56	66	59	3
	57	58	60		
0.48 ul	84	95	93	86	7
	82	87	74		
0.72 ul	109	120	123	115	6
	107	113	119		
0.96 ul	127	119	151	132	10
	127	135	140		
1.2 ul	173	159	165	166	6
	161	161	175		

Figure 2.

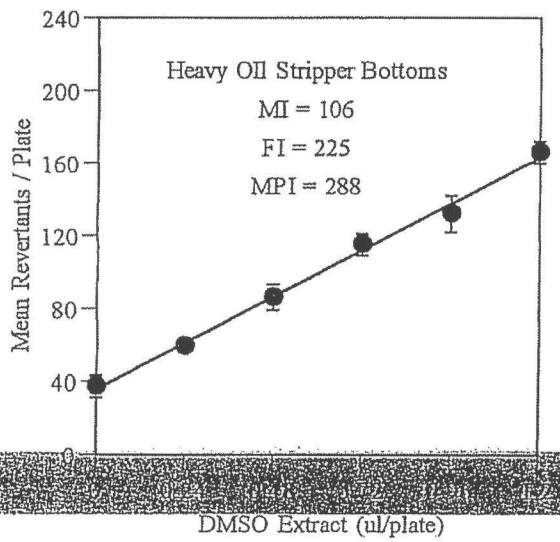
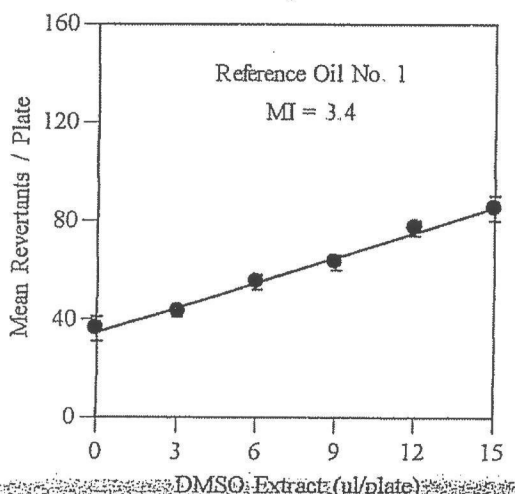


Table 3.

Reference Oil No. 1

Dose ul/plate	Revertants / Plate Test A	Mean	S.D.
0 ul	31 41	36	5
3 ul	41 44	43	2
6 ul	58 52	55	3
9 ul	65 60	63	3
12 ul	74 79	77	3
15 ul	80 89	85	5

Figure 3.



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CALGARY, ALBERTA

PetroLabs Inc.

Study No. 05072

Modified Ames Testing of Two Samples from Shell Canada Limited

MATERIAL DESCRIPTION:	Asphaltene Pastilles Heavy Oil Stripper Bottoms
REQUESTOR:	Shell Canada Ltd. 400 4th Ave. S.W. Calgary, Alberta T2P 2H5 CANADA
STUDY PERFORMED BY:	PetroLabs Inc. 133 Industrial Drive Ivyland, PA. 18974
EXPERIMENTAL START DATE:	August 24, 2005
EXPERIMENTAL TERMINATION:	August 26, 2005

Signatures

W T Bleicher 9-1-05
Study Director Date

GR Blackburn 9.1.05
President Date