SCREENING LEVEL HAZARD CHARACTERIZATION

Petroleum Oxidates and Derivatives Category

SUBCATEGORY I: LIGHT OXIDIZED DISTILLATE

SPONSORED CHEMICAL

Distillates (petroleum), oxidized light	**CASRN 64742-98-9**

SUBCATEGORY II: PETROLEUM OXIDATES AND DERIVATIVES

SPONSORED CHEMICALS

Hydrocarbon waxes (petroleum), oxidized	**CASRN 64743-00-6**
Petrolatum (petroleum), oxidized	**CASRN 64743-01-7**
Petrolatum (petroleum), oxidized, Ca salt	**CASRN 68425-34-3**
Hydrocarbon waxes (petroleum), oxidized, Me esters	**CASRN 68602-85-7**
Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts	**CASRN 68603-10-1**
Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts	**CASRN 68603-11-2**
Hydrocarbon waxes (petroleum), oxidized, Me esters, Na salts	**CASRN 68603-12-3**

The High Production Volume (HPV) Challenge Program[1] was conceived as a voluntary initiative aimed at developing and making publicly available screening-level health and environmental effects information on chemicals manufactured in or imported into the United States in quantities greater than one million pounds per year. In the Challenge Program, producers and importers of HPV chemicals voluntarily sponsored chemicals; sponsorship entailed the identification and initial assessment of the adequacy of existing toxicity data/information, conducting new testing if adequate data did not exist, and making both new and existing data and information available to the public. Each complete data submission contains data on 18 internationally agreed to "SIDS" (Screening Information Data Set[1,2]) endpoints that are screening-level indicators of potential hazards (toxicity) for humans or the environment.

The Environmental Protection Agency's Office of Pollution Prevention and Toxics (OPPT) is evaluating the data submitted in the HPV Challenge Program on approximately 1400 sponsored chemicals by developing hazard characterizations (HCs). These HCs consist of an evaluation of the quality and completeness of the data set provided in the Challenge Program submissions. They are not intended to be definitive statements regarding the possibility of unreasonable risk of injury to health or the environment.

The evaluation is performed according to established EPA guidance[2,3] and is based primarily on hazard data provided by sponsors; however, in preparing the hazard characterization, EPA considered its own comments and public comments on the original submission as well as the sponsor's responses to comments and revisions made to the submission. In order to determine whether any new hazard information was developed since the time of the HPV submission, a

[1] U.S. EPA. High Production Volume (HPV) Challenge Program; http://www.epa.gov/chemrtk/index.htm.
[2] U.S. EPA. HPV Challenge Program – Information Sources; http://www.epa.gov/chemrtk/pubs/general/guidocs.htm.
[3] U.S. EPA. Risk Assessment Guidelines; http://cfpub.epa.gov/ncea/raf/rafguid.cfm.

search of the following databases was made from one year prior to the date of the HPV Challenge submission to the present: (ChemID to locate available data sources including Medline/PubMed, Toxline, HSDB, IRIS, NTP, ATSDR, IARC, EXTOXNET, EPA SRS, etc.), STN/CAS online databases (Registry file for locators, ChemAbs for toxicology data, RTECS, Merck, etc.) and Science Direct. OPPT's focus on these specific sources is based on their being of high quality, highly relevant to hazard characterization, and publicly available.

OPPT does not develop HCs for those HPV chemicals which have already been assessed internationally through the HPV program of the Organization for Economic Cooperation and Development (OECD) and for which Screening Initial Data Set (SIDS) Initial Assessment Reports (SIAR) and SIDS Initial Assessment Profiles (SIAP) are available. These documents are presented in an international forum that involves review and endorsement by governmental authorities around the world. OPPT is an active participant in these meetings and accepts these documents as reliable screening-level hazard assessments.

These hazard characterizations are technical documents intended to inform subsequent decisions and actions by OPPT. Accordingly, the documents are not written with the goal of informing the general public. However, they do provide a vehicle for public access to a concise assessment of the raw technical data on HPV chemicals and provide information previously not readily available to the public.

Chemical Abstract Service Registry Number (CASRN)	**Subcategory I** **<u>Sponsored Chemical</u>** **64742-98-9** **Subcategory II** **<u>Sponsored Chemicals</u>** **64743-00-6** **64743-01-7** **68425-34-3** **68602-85-7** **68603-10-1** **68603-11-2** **68603-12-3**
Chemical Abstract Index Name	**Subcategory I** **<u>Sponsored Chemical</u>** **Distillates (petroleum), oxidized light** **Subcategory II** **<u>Sponsored Chemicals</u>** **Hydrocarbon waxes (petroleum), oxidized** **Petrolatum (petroleum), oxidized** **Petrolatum (petroleum), oxidized, calcium salt** **Hydrocarbon waxes (petroleum), oxidized, Me esters** **Hydrocarbon waxes (petroleum), oxidized, Me esters, barium salts** **Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts** **Hydrocarbon waxes (petroleum), oxidized, Me esters, sodium salts**
Structural Formula	**See Appendix**

Summary

The Petroleum Oxidates and Derivatives Category consists of 8 complex mixtures separated into two subcategories. Subcategory I consists of a single substance, CASRN 64742-98-9, which is a mixture of oxidized light distillates (petroleum) derived from aliphatic hydrocarbons with carbon numbers ranging from C9 to C16. It is a liquid with moderate vapor pressure and moderate water solubility. Subcategory II consists of seven mixtures containing higher molecular weight components (carbon chain length ranging from C33 to C43) that are derived from the oxidation of slack wax or petrolatum streams. These seven members are waxy, solid substances which have negligible to moderate vapor pressure and low to moderate water solubility. All of the substances in Subcategory II are expected to possess low mobility in soil; however, Subcategory I member, CASRN 64742-98-9 (distillates (petroleum), oxidized light) may contain substances that possess high mobility. Volatilization ranges from low to high based upon the estimated Henry's Law constants for representative structures for these mixtures. The components of this category are not subject to hydrolysis because they lack functional groups that hydrolyze. The rate of atmospheric oxidation ranges from moderate to rapid for the substances in this category. The substances in this category are not readily biodegradable. The data suggests that the substances in this category are expected to possess low (P1) to moderate (P2) persistence. Subcategory I member, CASRN 64742-98-9, is expected to contain substances with low (B1) to high (B3) bioaccumulation potential. All Subcategory II members are expected to possess substances with low bioaccumulation potential (B1).

Human Health Hazard

Subcategory I: Light Oxidized Distillate

Acute mammalian toxicity data were not submitted for CASRN 64742-98-9: however, there were no mortalities in the combined repeated-dose/reproductive/developmental toxicity screening test on CASRN 64742-98-9. In a combined repeated-dose/reproductive/developmental toxicity screening test of CASRN 64742-98-9 via gavage, male rats exhibited follicular cell hypertrophy of the thyroid at 300 mg/kg-day; the NOAEL is 100 mg/kg-day. In the same study, there were no treatment-related effects on mating, fertility, pregnancy rates, litter size, viability, growth or development; the NOAEL for reproductive and developmental toxicity is 1000 mg/kg-day. CASRN 64742-98-9 was not mutagenic in bacteria *in vitro* and did not induce chromosomal aberrations in human lymphocyte cells *in vitro*.

There are no data gaps for Subcategory I under the HPV Challenge Program.

Subcategory II: Petroleum Oxidates and Derivatives

The acute toxicity of the petroleum oxidates and derivatives is low via the oral route. There are no repeated-dose, reproductive or developmental toxicity studies available for members of this subcategory. CASRN 64743-00-6 was not mutagenic in bacteria *in vitro* and did not induce chromosomal aberrations in human lymphocyte cells *in vitro*.

Repeated-dose, reproductive and developmental toxicity are identified as data gaps for Subcategory II under the HPV Challenge Program.

Hazard to the Environment

Subcategory I: Light Oxidized Distillate

The sponsor's submitted acute ecotoxicity data are considered not adequate for assessing hazard for CASRN 64742-98-9 (Subcategory I) because the use of water accommodated fraction (WAF) testing without sufficient analytical monitoring. Furthermore, based on the physical-chemical properties of CASRN 64742-98-9 (log Kow = 3.4 to 8.0), there is also a chronic concern for aquatic invertebrate toxicity.

The acute toxicity to aquatic organisms (fish, aquatic invertebrates and aquatic plants), and chronic toxicity to aquatic invertebrates are identified as data gaps for Subcategory I under the HVP Challenge Program.

Subcategory II: Petroleum Oxidates and Derivatives

Based on the physical-chemical properties (log K_{ow} = 13.3 to 21.0) for the CASRNs within Subcategory II (CASRNs 64743-00-6, 64743-01-7, 68425-34-3, 68602-85-7, 68603-10-1, 68603-11-2, 68603-12-3), the acute toxicity to aquatic organisms (fish, aquatic invertebrates and aquatic plants), and chronic toxicity to aquatic invertebrates are expected to result in no effects at saturation.

There are no data gaps for Subcategory II under the HPV Challenge Program.

The sponsor, Lubrizol, submitted a Test Plan and Robust Summaries to EPA for the petroleum oxidates and derivatives category on November 11, 2002. EPA posted the submission on the ChemRTK HPV Challenge website on November 27, 2002 (http://www.epa.gov/chemrtk/pubs/summaries/petroxid/c14068tc.htm). EPA comments on the original submission were posted to the website on April 1, 2003. Public comments were also received and posted to the website. The sponsor submitted updated/revised documents on June 23, 2003 and November 6, 2006, which were posted to the ChemRTK website on July 23, 2003 and December 21, 2006, respectively.

Category Justification

The members of the petroleum oxidates and derivatives category are petroleum oxidates, oxidized methyl esters, and their salts. The sponsor has proposed that category members be divided into two subcategories based on the molecular weight range of the starting materials. Subcategory I consists of a single substance, CASRN 64742-98-9, which is a mixture of oxidized light distillates (petroleum) derived from aliphatic hydrocarbons with carbon numbers ranging from C9 to C16. Subcategory II consists of seven mixtures (CASRNs 64743-00-6, 64743-01-7, 68425-34-3, 68602-85-7, 68603-10-1, 68603-11-2 and 68603-12-3) containing higher molecular weight components (carbon chain length ranging from C33 to C43) that are derived from the oxidation of slack wax or petrolatum streams.

EPA agrees that these subcategories are appropriate for screening hazard purposes, based on the molecular weight ranges for the starting materials and the different physical-chemical properties between the two groups. The sponsor proposed that the data from Subcategory I be used in a read-across manner to apply to the members of Subcategory II, but EPA disagrees with this approach based on the differences stated above. Therefore, for the purposes of human health and ecotoxicity, read-across will be applied between members of the same subcategory, but not across subcategories.

1. Chemical Identity

1.1 Identification and Purity

The following description is taken from the 2006 Test Plan and Robust Summary.
The members of this test plan are petroleum oxidates, oxidized methyl esters, and their salts which are derived from aliphatic hydrocarbons. The petroleum oxidates vary in molecular weight, which is determined by the starting raw material and the extent of oxidation. The petroleum oxidates described in this test plan are derived from petroleum distillate, slack wax, or petrolatum. The petroleum distillate starting material ranges in chain length from C9-C16 (Subcategory I) and the slack wax and petrolatum starting material ranges in chain length from C33 to C43 (Subcategory II). The typical composition of the petroleum oxidate in subcategory I (CASRN 64742-98-9) is 50% unreacted petroleum starting material, 10% carboxylic acid (mono- and di-), 25% ketone, and the remainder (15%) consists of oxyacids, aldehydes, and methyl ester. The typical composition of the petroleum oxidates in subcategory II (64743-01-7 and 64743-00-6) is 40-50% unreacted petroleum starting material, 30-35% monocarboxylic acid,

and the remainder (15%) consists of dicarboxylic acids, oxyacids, aldehydes, and ketones. The oxidized methyl ester, CASRN 68602-85-7, is created by an esterification reaction of the petroleum oxidate using methanol and sulfuric acid. The product of this reaction is a mixture of methyl esters, unreacted starting material, mono and di-carboxylic acids, oxyacids, aldehydes, and ketones. The oxidized petroleum or oxidized methyl ester intermediates are treated with Ba, Ca, or Na base to convert carboxylic acids present to the corresponding salts. The test plan is ambiguous as to whether the methyl esters survive this treatment or are hydrolyzed to the metal carboxylates.

1.2 Physical-Chemical Properties

The physical-chemical properties of the Petroleum Oxidates and Derivatives Category are summarized in Table 1. The Petroleum Oxidates and Derivatives Category consists of 8 complex mixtures divided into two subcategories. Subcategory I consists of one substance, CASRN 64742-98-9 (oxidized light distillates, petroleum), which is derived from aliphatic hydrocarbons with carbon numbers ranging from C9 to C16. It is a liquid with moderate vapor pressure and moderate water solubility. Subcategory II consists of seven mixtures containing higher molecular weight components (carbon chain length ranging from C33 to C43) that are derived from the oxidation of slack wax or petrolatum streams. These seven members are waxy, solid substances which have negligible to moderate vapor pressure and low to moderate water solubility.

Table 1. Physical-Chemical Properties of the Petroleum Oxidates and Derivatives Category[1]								
	Subcategory I: Light Oxidized Distillates	**Subcategory II: Petroleum Oxidates and Derivatives**						
Property	**Distillates (petroleum), oxidized light**	**Hydrocarbon waxes (petroleum), oxidized**	**Petrolatum (petroleum), oxidized**	**Petrolatum (petroleum), oxidized, calcium salt**	**Hydrocarbon waxes (petroleum), oxidized Me esters**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, sodium salts**
CASRN	64742-98-9	64743-00-6	64743-01-7	68425-34-3	68602-85-7	68603-10-1	68603-11-2	68603-12-3
Molecular Weight	285 (average molecular weight)	744 (average molecular weight)	2,037 (average molecular weight)	2,260 (average molecular weight)	1,294 (average molecular weight)	1,189 (average molecular weight)	>600[2]	>600[2]
Physical State	Liquid	Solid or waxy solid	Solid or waxy solid	Solid or waxy solid	Solid or waxy solid	Solid or waxy solid	Solid or waxy solid	Solid or waxy solid
Melting Point	-31.03°C (measured)	33.64°C (measured)	38.9°C (measured)	49.87°C (measured)	38.02°C (measured)	42.86°C (measured)	41.84°C (measured)	No data. 41.84°C (measured for CASRN 68603-11-2)
Boiling Point	91.1 to 450.0°C (measured)	200.6 to >648.9°C (measured)	213.9 to >648.9°C (measured)	351.7 to >648.9°C (measured)	204.4 to >648.9°C (measured)	193.3 to >648.9°C (measured)	192.8 to >648.9°C (measured)	No data. 192.8 to >648.9°C (measured for CASRN 68603-11-2)
Vapor Pressure	0.52 mm Hg at 25°C (measured)	<0.0075 mm Hg at 25°C (estimated); $<1\times10^{-7}$ to 0.48 mm Hg at 25°C (estimated)[3]	<0.0075 mm Hg at 25°C (estimated); $<1\times10^{-7}$ to 0.25 mm Hg at 25°C (estimated)[3]	<0.0075 mm Hg at 25°C (estimated); $<1\times10^{-7}$ to 9.3×10^{-5} mm Hg at 25°C (estimated)[3]	<0.0075 mm Hg at 25°C (estimated); $<1\times10^{-7}$ to 0.40 mm Hg at 25°C (estimated)[3]	<0.0075 mm Hg at 25°C (estimated); $<1\times10^{-7}$ to 0.68 mm Hg at 25°C (estimated)[3]	<0.0075 mm Hg at 25°C (estimated); $<1\times10^{-7}$ to 0.70 mm Hg at 25°C (estimated)[3]	No data. $<1\times10^{-7}$ to 0.70 mm Hg at 25°C (estimated for CASRN 68603-11-2)[3]
Dissociation	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75

Table 1. Physical-Chemical Properties of the Petroleum Oxidates and Derivatives Category[1]

Property	Subcategory I: Light Oxidized Distillates	Subcategory II: Petroleum Oxidates and Derivatives						
	Distillates (petroleum), oxidized light	**Hydrocarbon waxes (petroleum), oxidized**	**Petrolatum (petroleum), oxidized**	**Petrolatum (petroleum), oxidized, calcium salt**	**Hydrocarbon waxes (petroleum), oxidized Me esters**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, sodium salts**
Constant (pK_a)	(estimated)[4,5]	(estimated)[4,5]	(estimated)[4,5]	(estimated)[4,5]	(estimated)[4,5]	(estimated)[4,5]	(estimated)[4,5]	(estimated)[4,5]
Henry's Law Constant	1.6×10^{-6} to 29 atm-m^3/mol (estimated)[5,6]	0.019 to 6.1×10^{4} atm-m^3/mol (estimated)[5,6]	0.019 to 6.1×10^{4} atm-m^3/mol (estimated)[5,6]	0.019 to 6.1×10^{4} atm-m^3/mol (estimated)[5,6]	0.019 to 6.1×10^{4} atm-m^3/mol (estimated)[5,6]	1.3×10^{-8} to 6.1×10^{4} atm-m^3/mol (estimated)[5,6]	1.3×10^{-8} to 6.1×10^{4} atm-m^3/mol (estimated)[5,6]	0.019 to 6.1×10^{4} atm-m^3/mol (estimated)[5,6]
Water Solubility	59.34 mg/L at 25°C (measured)	1.25 mg/L at 25°C (measured)	3.47 mg/L at 25°C (measured)	0.35 mg/L at 25°C (measured)	0.54 mg/L at 25°C (measured)	0.50 mg/L at 25°C (measured)	1.29 mg/L at 25°C (measured)	1.29 mg/L at 25°C (measured for CASRN 68603-11-2)
Log K_{ow}	3.42–8.05 (estimated)[5,6]	15.1–21.0 (estimated)[5,6]	13.3–21.0 (estimated)[5,6]	13.3–21.0 (estimated)[5,6]	14.5–21.0 (estimated)[5,6]	13.3–21.0 (estimated)[5,6]	13.3–21.0 (estimated)[5,6]	14.5–21.0 (estimated)[5,6]

[1] Lubrizol Corporation. 2006. Revised Robust Summary and Test Plan for Petroleum Oxidates and Derivatives Thereof Category. Available online at http://www.epa.gov/chemrtk/pubs/summaries/petroxid/c14068tc.htm as of April 21, 2011.
[2] Lubricating Grease Thickeners Consortium. 2009. Revised Robust Summary and Test Plan for Lubricating Grease Thickeners. Available online at http://www.epa.gov/chemrtk/pubs/summaries/lbgrease/c15019tc.htm as of April 26, 2011.
[3] NOMO5. 1987. Programs to Enhance PC-Gems Estimates of Physical Properties for Organic Compounds. The Mitre Corp.
[4] SPARC On-Line Calculator. 2009. w4.5.1522-s4.5.1522. Available online at http://archemcalc.com/sparc/ as of April 21, 2011.
[5] Estimated based on the representative carboxylic acid or fully protonated salt structure shown in the Appendix.
[6] U.S. EPA. 2011. Estimation Programs Interface Suite™ for Microsoft® Windows, v4.00. U.S. Environmental Protection Agency, Washington, DC, USA. Available online at http://www.epa.gov/opptintr/exposure/pubs/episuitedl.htm as of April 21, 2011.

2. General Information on Exposure

2.1 Production Volume and Use Pattern

The Petroleum Oxidates and Derivatives category chemicals had an aggregated production and/or import volume in the United States between 3.5 million pounds and 31.5 million pounds during calendar year 2005.

- CASRN 64743-00-6: 1 million to <10 million pounds
- CASRN 64743-01-7: < 500,000 pounds
- CASRN 68425-34-3: 1 million to <10 million pounds
- CASRN 68603-10-1: 1 million to <10 million pounds
- CASRN 68603-11-2: 500,000 pounds to <1 million pounds

CASRN 64742-98-9, 68602-85-7 and 68603-12-3 were not reported in the 2006 IUR.

CASRN 64743-00-6, 64743-01-7, 68425-34-3, 68603-10-1 and 68603-11-2:
Non-confidential information in the IUR indicated that the industrial processing and uses for the chemicals include all other chemical product and preparation manufacturing as lubricants. Non-confidential commercial and consumer uses of the chemicals include lubricants, greases and fuel additives.

2.2 Environmental Exposure and Fate

The environmental fate properties are provided in Table 2. The substances in the Petroleum Oxidates and Derivatives Category are expected to possess low mobility in soil, with the exception of CASRN 64742-98-9, distillates (petroleum), oxidized light, a low molecular weight mixture which may contain substances with both high and low mobility. CASRN 64742-98-9, was degraded 59% over the course of a 28-day incubation period as measured by oxygen consumption using the Manometric respirometry (OECD 301F) test. Subcategory II members CASRN 64743-00-6 (hydrocarbon waxes (petroleum), oxidized) and CASRN 68603-11-2 (hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts), were degraded 55 and 48%, respectively, in 28 days using the Manometric respirometry (OECD 301F) test. These results indicate that these chemicals are not readily biodegradable. Volatilization ranges from low to high based upon the estimated Henry's Law constants for representative structures for these mixtures. The components of this category are not subject to hydrolysis because they lack functional groups that hydrolyze. The data suggest that all the substances in this category are expected to possess low (P1) to moderate (P2) persistence. CASRN 64742-98-9 is expected to contain substances with low (B1) to high (B3) bioaccumulation potential. All Subcategory II members are expected to possess substances with low bioaccumulation potential (B1).

Table 2. Environmental Fate Characteristics of the Petroleum Oxidates and Derivatives Category[1]								
	Subcategory I: Light Oxidized Distillates	**Subcategory II: Petroleum Oxidates and Derivatives**						
Property	**Distillates (petroleum), oxidized light**	**Hydrocarbon waxes (petroleum), oxidized**	**Petrolatum (petroleum), oxidized**	**Petrolatum (petroleum), oxidized, calcium salt**	**Hydrocarbon waxes (petroleum), oxidized Me esters**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, sodium salts**
CASRN	64742-98-9	64743-00-6	64743-01-7	68425-34-3	68602-85-7	68603-10-1	68603-11-2	68603-12-3
Photodegradation Half-life	5.6–13.1 hours (estimated)[2,3]	2.2–2.9 hours (estimated)[2,3]	2.2–2.9 hours (estimated)[2,3]	1.6–2.9 hours (estimated)[2,3]	1.6–2.9 hours (estimated)[2,3]	1.6–2.9 hours (estimated)[2,3]	1.6–2.9 hours (estimated)[2,3]	1.6–2.9 hours (estimated)[2,3]
Hydrolysis Half-life	Stable	Stable	Stable	Stable	Stable	Stable	Stable	Stable
Biodegradation	59% after 28 days (not readily biodegradable)	55% after 28 days (not readily biodegradable)	No data	No data	No data	No data	48% in 28 days (not readily biodegradable)	No data
Bioaccumulation Factor	BAF = 150.3–1.5×10^5 (estimated)[2,3,4]	BAF = 0.9–4.1 (estimated)[2,3,4]	BAF = 0.9–4.1 (estimated)[2,3,4]	BAF = 0.9–99 (estimated)[2,3,4,5]	BAF = 0.9–7.9 (estimated)[2,3,4]	BAF = 0.9–99 (estimated)[2,3,4]	BAF = 0.9–99 (estimated)[2,3,4]	BAF = 0.9–7.9 (estimated)[2,3,4]
Log K_{oc}	1.7–4.6 (estimated)[2,3]	7.9–11.4 (estimated)[2,3]	7.9–11.4 (estimated)[2,3]	7.9–11.4 (estimated)[2,3]	7.9–11.4 (estimated)[2,3]	7.9–11.4 (estimated)[2,3]	7.9–11.4 (estimated)[2,3]	7.9–11.4 (estimated)[2,3]
Fugacity (Level III Model)[2,3]	2.3–8.4	0.2–0.6	0.2–0.6	0.2–0.6	0.1–0.6	0.1–0.6	0.1–0.6	0.1–0.6
Air (%)	21.3–75.8	18.0–39.3	18.0–39.3	18.0–39.3	13.2–39.3	13.2–39.3	13.2–39.3	13.2–39.3
Water (%)	2.5–76.1	60.0–81.8	60.0–81.8	60.0–81.3	60.0–86.7	60.0–86.7	60.0–86.7	60.0–86.7
Soil (%)	0.1–33.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Table 2. Environmental Fate Characteristics of the Petroleum Oxidates and Derivatives Category[1]								
	Subcategory I: Light Oxidized Distillates	**Subcategory II: Petroleum Oxidates and Derivatives**						
Property	**Distillates (petroleum), oxidized light**	**Hydrocarbon waxes (petroleum), oxidized**	**Petrolatum (petroleum), oxidized**	**Petrolatum (petroleum), oxidized, calcium salt**	**Hydrocarbon waxes (petroleum), oxidized Me esters**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, sodium salts**
Sediment (%)								
Persistence[5]	P1 (low) to P2 (moderate)	P1 (low) to P2 (moderate)	P1 (low) to P2 (moderate)	P1 (low) to P2 (moderate)	P1 (low) to P2 (moderate)	P1 (low) to P2 (moderate)	P1 (low) to P2 (moderate)	P1 (low) to P2 (moderate)
Bioaccumulation[5]	B1 (low) to B3 (high)	B1 (low)	B1 (low)	B1 (low)	B1 (low)	B1 (low)	B1 (low)	B1 (low)

[1] Lubrizol Corporation. 2006. Revised Robust Summary and Test Plan for Petroleum Oxidates and Derivatives Thereof Category. Available online at http://www.epa.gov/chemrtk/pubs/summaries/petroxid/c14068tc.htm as of April 21, 2011.

[2] U.S. EPA. 2011. Estimation Programs Interface Suite™ for Microsoft® Windows, v4.00. U.S. Environmental Protection Agency, Washington, DC, USA. Available online at http://www.epa.gov/opptintr/exposure/pubs/episuitedl.htm as of April 21, 2011.

[3] Data range is based upon the representative structures; see Appendix for detailed information on the structures.

[4] This range of estimated BAF values results from using the log K_{ow} of the representative carboxylic acid or salt drawn in the appendix as fully protonated species.

[5] Federal Register. 1999. Category for Persistent, Bioaccumulative, and Toxic New Chemical Substances. Federal Register 64, Number 213 (November 4, 1999) pp. 60194–60204.

Conclusion: The Petroleum Oxidates and Derivatives Category consists of 8 complex mixtures separated into two subcategories. Subcategory I consists of a single substance, CASRN 64742-98-9, which is a mixture of oxidized light distillates (petroleum) derived from aliphatic hydrocarbons with carbon numbers ranging from C9 to C16. It is a liquid with moderate vapor pressure and moderate water solubility. Subcategory II consists of seven mixtures containing higher molecular weight components (carbon chain length ranging from C33 to C43) that are derived from the oxidation of slack wax or petrolatum streams. These seven members are waxy, solid substances which have negligible to moderate vapor pressure and low to moderate water solubility. All of the substances in Subcategory II are expected to possess low mobility in soil; however, Subcategory I member, CASRN 64742-98-9 (distillates (petroleum), oxidized light) may contain substances that possess high mobility. Volatilization ranges from low to high based upon the estimated Henry's Law constants for representative structures for these mixtures. The components of this category are not subject to hydrolysis because they lack functional groups that hydrolyze. The rate of atmospheric oxidation ranges from moderate to rapid for the substances in this category. The substances in this category are not readily biodegradable. The data suggests that the substances in this category are expected to possess low (P1) to moderate (P2) persistence. Subcategory I member, CASRN 64742-98-9, is expected to contain substances with low (B1) to high (B3) bioaccumulation potential. All Subcategory II members are expected to possess substances with low bioaccumulation potential (B1).

3. Human Health Hazard

A summary of the human health toxicity data submitted for SIDS endpoints is provided in Table 3.

Acute Oral Toxicity

Subcategory I: Light Oxidized Distillate

No data are available. However, no mortality was noted in the repeated-dose//reproductive/developmental toxicity screening test.

Subcategory II: Petroleum Oxidates and Derivatives

Hydrocarbon waxes (petroleum), oxidized (CASRN 64743-00-6)
Sprague-Dawley rats (5/sex) were administered CASRN 64743-00-6 via the diet at a concentration resulting in a 24-hour dose of 5000 mg/kg and observed for 14 days. No mortalities were observed.
LD_{50} > 5000 mg/kg

Petrolatum (petroleum), oxidized (CASRN 64743-01-7)
Ten male rats (strain unspecified) were administered 64743-01-7in corn oil, via gavage, at 5000 mg/kg and observed for 14 days. No mortalities were observed.
LD_{50} > 5000 mg/kg

Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts (CASRN 68603-10-1)
Wistar rats (3/sex) were administered CASRN 68603-10-1 via gavage at 2000 mg/kg and observed for 14 days. No mortalities were observed.
LD_{50} > 2000 mg/kg

Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts (CASRN 68603-11-2)
Sprague-Dawley rats (5/sex/dose) were administered CASRN 68603-11-2 via gavage at 5, 10 or 15 mL/kg and observed for 14 days. No mortalities were observed.
LD_{50} > 15 mL/kg

Repeated-Dose Toxicity

Subcategory I: Light Oxidized Distillate

Distillates (petroleum), oxidized light (CASRN 64742-98-9)
In a combined repeated-dose/reproductive/developmental toxicity screening test, male and female Sprague-Dawley rats (10/sex/group) were administered CASRN 64742-98-9 via gavage at 0, 100, 300 or 1000 mg/kg-day, 7 days/week. Males and females were administered distillates (petroleum), oxidized light for 14 days prior to mating and for up to 14 days during mating. Females were continued on treatment throughout gestation and parturition and until postpartum day 4. There were no treatment-related mortalities and no adverse effects on body weight or food consumption in parental rats. Parental rats exhibited no signs of treatment-related neurological effects in a functional observation battery of tests. Both males and females treated with 1000 mg/kg-day exhibited increased salivation after 3 days. Transient incidences of noisy respiration were observed in animals treated with 1000 mg/kg-day (sex and incidence not specified). There was a statistically significant decrease in hemoglobin levels in females treated with 1000 mg/kg-day. Statistically significant changes observed in the clinical chemistry parameters include: increases in plasma albumin and total protein and decreased chloride levels in females treated with 1000 mg/kg-day and increased creatinine in females treated with ≥300 mg/kg-day. There were no treatment-related changes in gross pathology. Male rats of all dose levels exhibited globular accumulation of eosinophilic material in the kidneys. Microscopic changes observed include: follicular cell hypertrophy of the thyroid in females treated with 1000 mg/kg-day and males treated with ≥300 mg/kg-day and acanthosis occasionally associated with hyperkerotosis in the stomach of animals of either sex treated with 1000 mg/kg-day.
LOAEL = 300 mg/kg-day (based on follicular cell hypertrophy of the thyroid in males)
NOAEL = 100 mg/kg-day

Subcategory II: Petroleum Oxidates and Derivatives

No data are available.

Reproductive/Developmental Toxicity

Subcategory I: Light Oxidized Distillate

Distillates (petroleum), oxidized light (CASRN 64742-98-9)
In the combined repeated-dose/reproductive/developmental toxicity screening test described above, there were no treatment-related effects on mating, fertility, pregnancy rates, litter size, viability, growth or development when compared to controls.
NOAEL (maternal toxicity) = 1000 mg/kg-day
NOAEL (reproductive/developmental toxicity) = 1000 mg/kg-day

Subcategory II: Petroleum Oxidates and Derivatives

No data are available.

Genetic Toxicity – Gene Mutation

In vitro

Subcategory I: Light Oxidized Distillate

Distillates (petroleum), oxidized light (CASRN 64742-98-9)
In a reverse-mutation assay, *S. typhimurium* strains TA98, TA100, TA1535 and TA1537 and *E. coli* WP2uvrA were exposed to CASRN 64742-98-9 at concentrations of 0, 0.15, 0.5, 1.5, 5, 15, 50, 150, 500, 1500 or 5000 µg/plate in the presence and absence of metabolic activation. Cytotoxicity was observed in TA100 at 5000 µg/plate in the absence of metabolic activation. No precipitate was observed. No substantial increases in mutation frequency were noted at any concentration tested, with or without metabolic activation.
CASRN 64742-98-9 was not mutagenic in this assay.

Subcategory II: Petroleum Oxidates and Derivatives
Hydrocarbon waxes (petroleum), oxidized (CASRN 64743-00-6)
In a reverse-mutation assay, *S. typhimurium* strains TA98, TA100, TA1535 and TA1537 and *E. coli* WP2uvrA were exposed to CASRN 64743-00-6 at concentrations of 0, 50, 150, 500, 1500 and 5000 µg/plate in the presence and absence of metabolic activation. No cytotoxicity was observed. A particulate was observed at 5000 µg/plate. No significant increases in mutation frequency were noted at any concentration tested, with or without metabolic activation.
CASRN 64743-00-6 was not mutagenic in this assay.

Genetic Toxicity – Chromosomal Aberrations

In vitro
Subcategory I: Light Oxidized Distillate
Distillates (petroleum), oxidized light (CASRN 64742-98-9)
Human lymphocytes were exposed to CASRN 64742-98-9 at one of three unspecified concentrations for 4 hours in the presence and absence of metabolic activation. A positive control was used, but the results were not provided. Distillates (petroleum), oxidized light was cytotoxic, but did not induce an increase in the frequency of cells with aberrations.
CASRN 64742-98-9 did not induce chromosomal aberrations in this assay.

Subcategory II: Petroleum Oxidates and Derivatives

Hydrocarbon waxes (petroleum), oxidized (CASRN 64743-00-6)
Human lymphocytes were exposed to CASRN 64743-00-6 at one of three unspecified concentrations for 4 hours in the presence and absence of metabolic activation. A positive control was used, but the results were not provided. Hydrocarbon waxes (petroleum), oxidized was cytotoxic, but did not induce an increase in the frequency of cells with aberrations. **CASRN 64743-00-6 did not induce chromosomal aberrations in this assay.**

Conclusion:

Subcategory I: Light Oxidized Distillate

Acute mammalian toxicity data were not submitted for CASRN 64742-98-9; however, there were no mortalities in the combined repeated-dose/reproductive/developmental toxicity screening test on CASRN 64742-98-9. In a combined repeated-dose/reproductive/developmental toxicity screening test of CASRN 64742-98-9 via gavage, male rats exhibited follicular cell hypertrophy of the thyroid at 300 mg/kg-day; the NOAEL is 100 mg/kg-day. In the same study, there were no treatment-related effects on mating, fertility, pregnancy rates, litter size, viability, growth or development; the NOAEL for reproductive and developmental toxicity is 1000 mg/kg-day. CASRN 64742-98-9 was not mutagenic in bacteria *in vitro* and did not induce chromosomal aberrations in human lymphocyte cells *in vitro*.

Subcategory II: Petroleum Oxidates and Derivatives

The acute toxicity of the petroleum oxidates and derivatives is low via the oral route. There are no repeated-dose, reproductive or developmental toxicity studies available for members of this subcategory. CASRN 64743-00-6 was not mutagenic in bacteria *in vitro* and did not induce chromosomal aberrations in human lymphocyte cells *in vitro*.

Table 3. Summary Table of the Screening Information Data Set as Submitted under the U.S. HPV challenge Program: Human Health Data

	Subcategory I	**Subcategory II**						
Endpoints	**Distillates (petroleum), oxidized light (64742-98-9)**	**Hydrocarbon waxes (petroleum), oxidized (64743-00-6)**	**Petrolatum (petroleum), oxidized (64743-01-7)**	**Petrolatum (petroleum), oxidized, Ca salts (68425-34-3)**	**Hydrocarbon waxes (petroleum), oxidized, Me esters (68602-85-7)**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts (68603-10-1)**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts (68603-11-2)**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Na salts (68603-12-3)**
Acute Oral Toxicity LD_{50} (mg/kg)	No data	**> 5000**	**> 5000**	No Data > 2000 (RA)	No Data > 2000 (RA)	**> 2000**	**> 15 mL/kg**	No Data > 2000 (RA)
Repeated-Dose Toxicity NOAEL/LOAEL Oral gavage (mg/kg-day)	**NOAEL =100 LOAEL =300**	No data						
Reproductive/ Developmental Toxicity NOAEL/LOAEL Oral gavage (mg/kg-day) **Maternal Toxicity** **Developmental Toxicity**	**NOAEL=1000** **NOAEL=1000**	No data						
Genetic Toxicity – Gene Mutation *In vitro*	**Negative**	**Negative**	No Data Negative (RA)	No Data Negative (RA)	No Data Negative (RA)	No Data Negative (RA)	No Data Negative (RA)	No Data Negative (RA)
Genetic Toxicity – Chromosomal Aberrations *In vitro*	**Negative**	**Negative**	No Data Negative (RA)	No Data Negative (RA)	No Data Negative (RA)	No Data Negative (RA)	No Data Negative (RA)	No Data Negative (RA)

Measured data in bold; (RA) = Read Across;

4. Hazard to the Environment

A summary of aquatic toxicity data submitted for SIDS endpoints is provided in Table 4.

Aquatic Toxicity to Fish, Aquatic Invertebrates, and Aquatic Plants

Subcategory I: Light Oxidized Distillate
The sponsor's submitted acute ecotoxicity data are considered not adequate for assessing hazard for CASRN 64742-98-9 (Subcategory I) because the use of WAF testing without sufficient analytical monitoring. Furthermore, based on the physical-chemical properties of CASRN 64742-98-9 (log Kow = 3.4 to 8.0), there is also a chronic concern for aquatic invertebrate toxicity.

Subcategory II: Petroleum Oxidates and Derivatives
Based on the physical-chemical properties (log K_{ow} = 13.3 to 21.0) for the CASRNs within Subcategory II (CASRNs 64743-00-6, 64743-01-7, 68425-34-3, 68602-85-7, 68603-10-1, 68603-11-2, 68603-12-3), the acute toxicity to aquatic organisms (fish, aquatic invertebrates and aquatic plants), and chronic toxicity to aquatic invertebrates are expected to result in no effects at saturation.

Conclusion:

Subcategory I: Light Oxidized Distillate

The sponsor's submitted acute ecotoxicity data are considered not adequate for assessing hazard for CASRN 64742-98-9 (Subcategory I) because the use of water accommodated fraction (WAF) testing without sufficient analytical monitoring. Furthermore, based on the physical-chemical properties of CASRN 64742-98-9 (log Kow = 3.4 to 8.0), there is also a chronic concern for aquatic invertebrate toxicity.

The acute toxicity to aquatic organisms (fish, aquatic invertebrates and aquatic plants), and chronic toxicity to aquatic invertebrates are identified as data gaps for Subcategory I under the HVP Challenge Program.

Subcategory II: Petroleum Oxidates and Derivatives

Based on the physical-chemical properties (log K_{ow} = 13.3 to 21.0) for the CASRNs within Subcategory II (CASRNs 64743-00-6, 64743-01-7, 68425-34-3, 68602-85-7, 68603-10-1, 68603-11-2, 68603-12-3), the acute toxicity to aquatic organisms (fish, aquatic invertebrates and aquatic plants), and chronic toxicity to aquatic invertebrates are expected to result in no effects at saturation.

Table 4. Summary Table of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program: Aquatic Toxicity Data

	Subcategory I	Subcategory II						
Endpoints	**Distillates (petroleum), oxidized light (64742-98-9)**	**Hydrocarbon waxes (petroleum), oxidized (64743-00-6)**	**Petrolatum (petroleum), oxidized (64743-01-7)**	**Petrolatum (petroleum), oxidized, Ca salts (68425-34-3)**	**Hydrocarbon waxes (petroleum), oxidized, Me esters (68602-85-7)**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts (68603-10-1)**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts (68603-11-2)**	**Hydrocarbon waxes (petroleum), oxidized, Me esters, Na salts (68603-12-3)**
Fish 96-h LC_{50} (mg/L)	No adequate data	NES	NES	NES	NES	NES	NES	NES
Aquatic Invertebrates 48-h EC_{50} (mg/L)	No adequate data	NES	NES	NES	NES	NES	NES	NES
Aquatic Plants 72-h EC_{50} (mg/L)	No adequate data	NES	NES	NES	NES	NES	NES	NES
Chronic Toxicity Aquatic Invertebrates	No data	NES	NES	NES	NES	NES	NES	NES

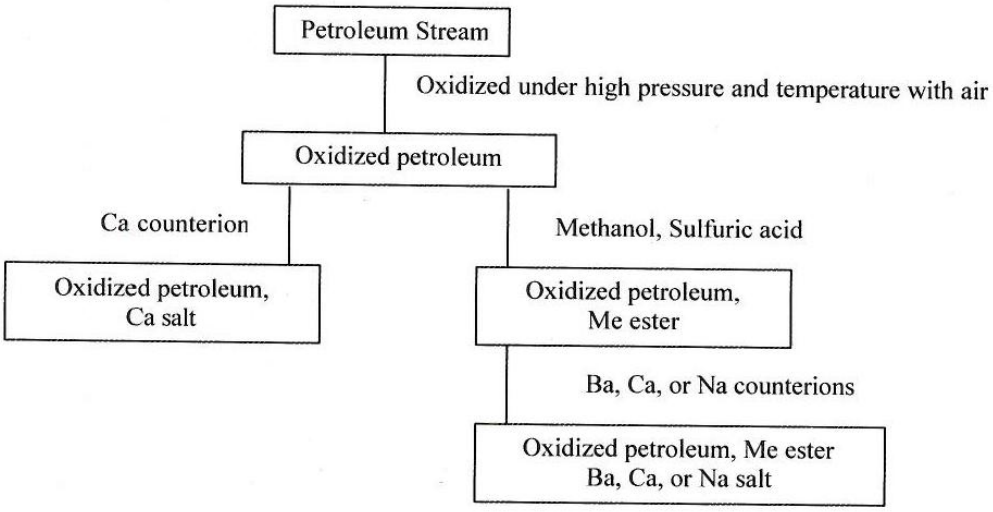
NES = no effects at saturation (water solubility limit)

APPENDIX

The following pages show:

- Figure 1: Production process for the oxidate derivatives.
- Table 5: Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category

Figure 1. Production process for the oxidate derivatives



Notes on representative structures: Limited compositional data was provided for the majority of category members. The petroleum oxidates described in this test plan are derived from slack wax, petrolatum, or petroleum distillate. The slack wax and petrolatum starting materials range in chain length from C33 to C43 while the petroleum distillate starting material ranges in chain length from C9 to C16.

The typical composition of the petroleum oxidate in Subcategory I is 50% unreacted petroleum starting material, 10% carboxylic acid (mono-and di-), 25% ketone, and the remainder a composition of oxyacids, aldehydes, and methyl ester. The typical composition of the petroleum oxidates in Subcategory II, CASRN 64743-01-7 and CASRN 64743-00-6 is 40–50% unreacted petroleum starting material, 30–35% monocarboxylic acid, and the remainder a composition of dicarboxylic acids, oxyacids, aldehydes, and ketones. The oxidized methyl ester, CASRN 68602-85-7, is created by an esterification reaction of the petroleum oxidate using methanol and sulfuric acid. The product of this reaction is a mixture of methyl esters, unreacted starting material, mono and di-carboxylic acids, oxyacids, aldehydes, and ketones. The oxidized petroleum or the oxidized methyl ester intermediates are reacted with Ba, Ca, and Na bases to form the oxidized salts. It is unclear whether the methyl esters survive this treatment or are hydrolyzed to the metal carboxylates.

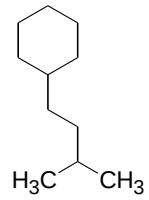
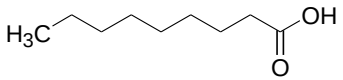
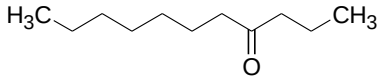
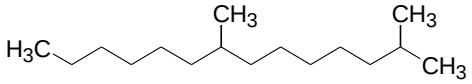
Table 5. Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category		
Chemical Name	**CASRN**	**Structure**
Subcategory I: Light Oxidized Distillates		
Distillates (petroleum), oxidized light	64742-98-9	 CC(C)CCC1CCC(C(C)CC)CC1  O=C(O)CCCCCCCC  CCCCCCCC(CCC)=O  CCCCCCC(C)CCCCCC(C)C Plus small quantities of oxyacids, aldehydes, and methyl esters TSCA definition: A complex combination of organic compounds, predominantly carboxylic acids, obtained by the air oxidation of a petroleum fraction having carbon numbers predominantly in the range of C11 through C30.

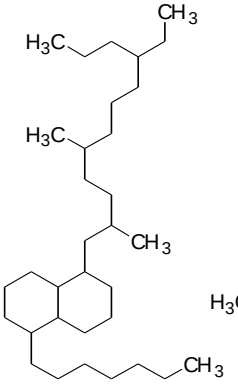
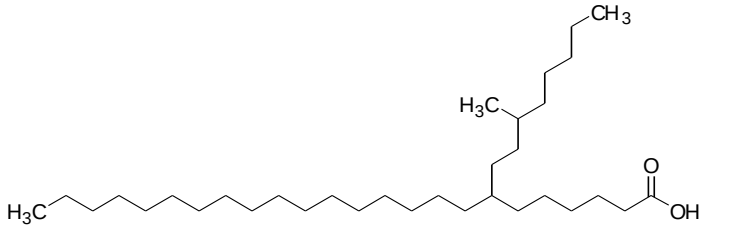
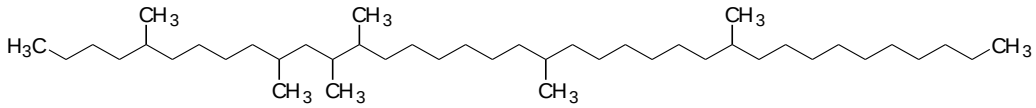
Table 5. Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category		
Chemical Name	**CASRN**	**Structure**
Subcategory II: Petroleum Oxidates and Derivatives		
Hydrocarbon waxes (petroleum), oxidized	64743-00-6	 CC(CCC(CCCC(CCC)CC)C)CC2CCCC1C(CCCCCCC)CCCC12  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC)CCCCCC(O)=O  CC(CCCCCCC(C)CCCCCCCCCC)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC **Plus small quantities of dicarboxylic acids, oxyacids and aldehydes and ketones** No TSCA definition.

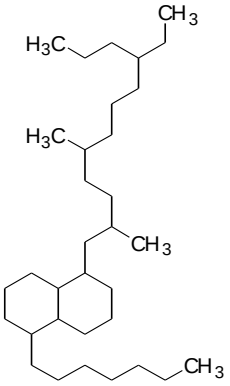
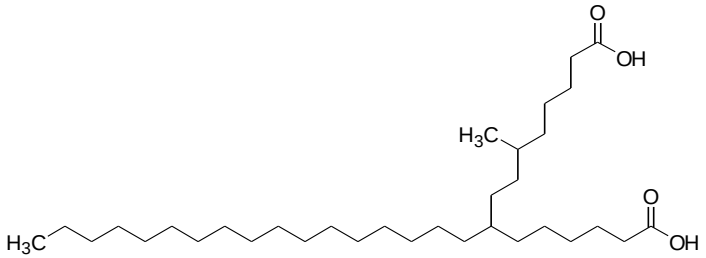
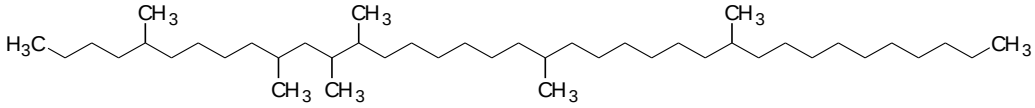
Table 5. Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category		
Chemical Name	**CASRN**	**Structure**
Petrolatum (petroleum), oxidized	64743-01-7	 CC(CCC(CCCC(CCC)CC)C)CC2CCCC1C(CCCCCCC)CCCC12  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC(O)=O)CCCCCC(O)=O  CC(CCCCCCC(C)CCCCCCCCC)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC **Plus small quantities of monocarboxylic acids, oxyacids and aldehydes and ketones** TSCA definition: A complex combination of organic compounds, predominantly high molecular weight carboxylic acids, obtained by the air oxidation of petrolatum.

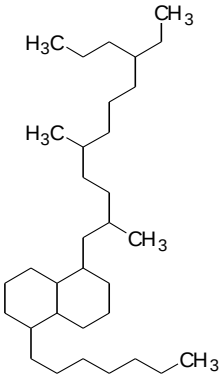
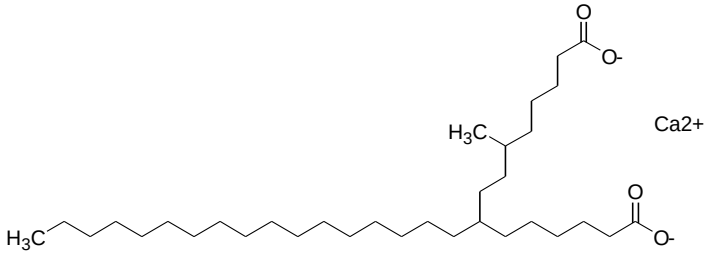
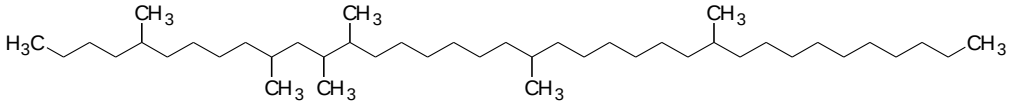
Table 5. Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category		
Chemical Name	**CASRN**	**Structure**
Petrolatum (petroleum), oxidized calcium salt	68425-34-3	 CC(CCC(CCCC(CCC)CC)C)CC2CCCC1C(CCCCCCC)CCCC12  CCCCCCCCCCCCCCCCCCC(CCC(C)CCCCC([O-])=O)CCCCCC([O-])=O  CC(CCCCCCC(C)CCCCCCCCC)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC **Plus small quantities of monocarboxylic acids, oxyacids and aldehydes and ketones** No TSCA definition.

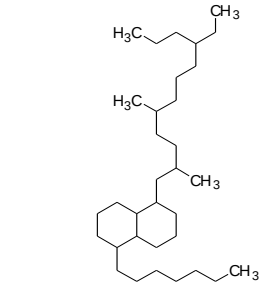
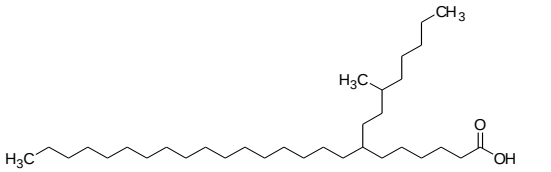
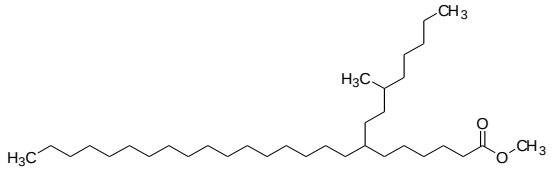
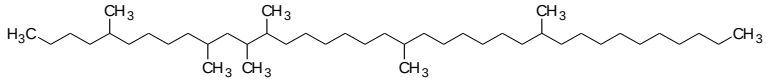
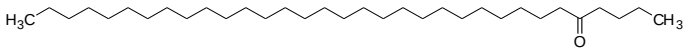
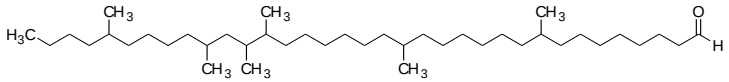
Table 5. Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category		
Chemical Name	**CASRN**	**Structure**
Hydrocarbon waxes (petroleum), oxidized Me esters	68602-85-7	 CC(CCC(CCCC(CCC)CC)C)CC2CCCC1C(CCCCCCC)CCCC12  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC)CCCCCC(O)=O  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC)CCCCCC(OC)=O  CC(CCCCCCC(C)CCCCCCCCC)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC(CCCC)=O  CC(CCCCCCC(C)CCCCCCCC([H])=O)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC **Plus di- carboxylic acids and oxyacids** No TSCA definition.

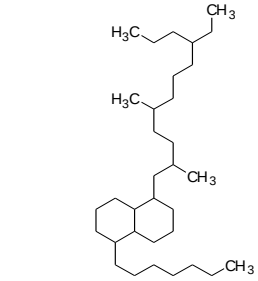
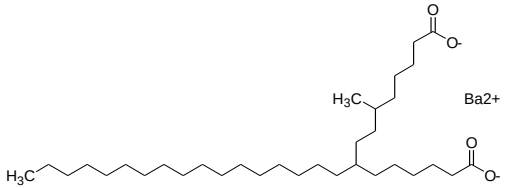
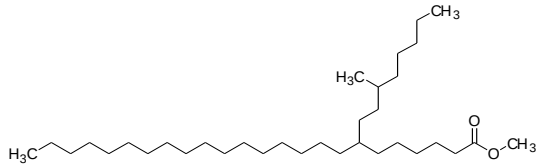
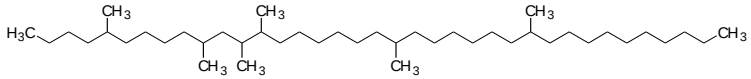
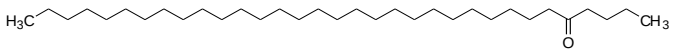
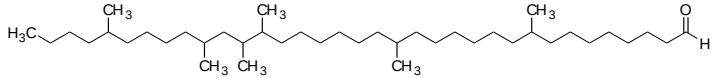
Table 5. Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category		
Chemical Name	**CASRN**	**Structure**
Hydrocarbon waxes (petroleum), oxidized, Me esters, Ba salts	68603-10-1	 CC(CCC(CCCC(CCC)CC)C)CC2CCCC1C(CCCCCCC)CCCC12  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC([O-])=O)CCCCCC([O-])=O  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC)CCCCCC(OC)=O  CC(CCCCCCC(C)CCCCCCCCC)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC  CCCCCCCCCCCCCCCCCCCCCCCCCCCC(CCCC)=O  CC(CCCCCCC(C)CCCCCCCC([H])=O)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC **Plus monocarboxylic acids and oxyacids** No TSCA definition.

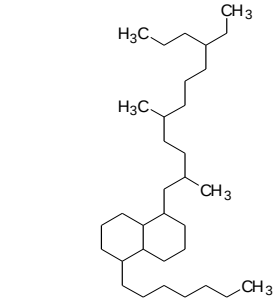
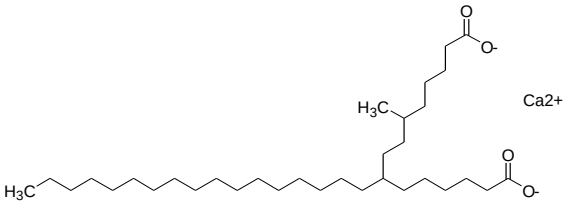
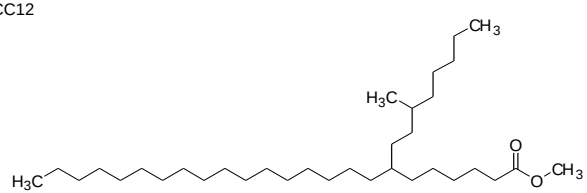
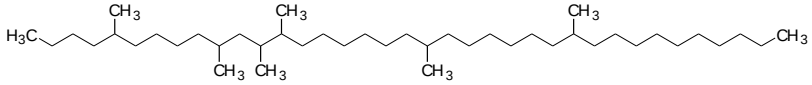
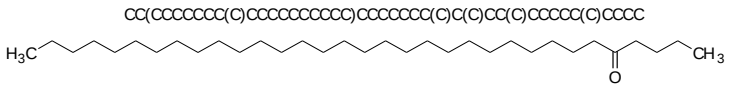
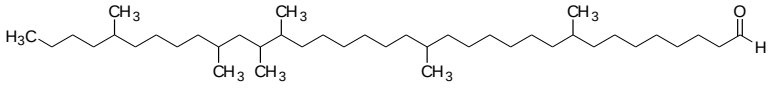
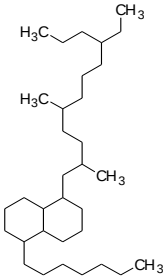
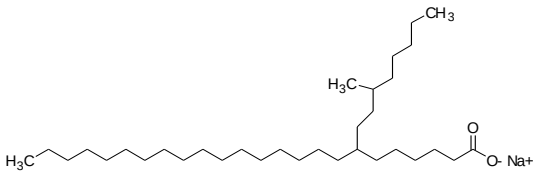
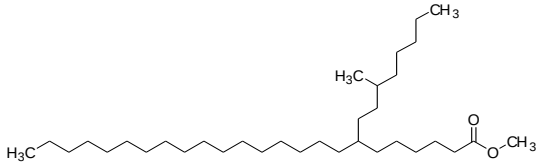
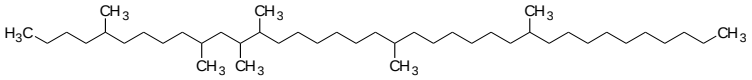
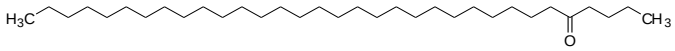
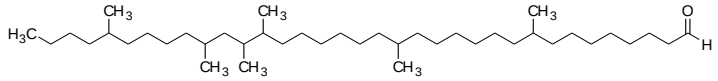
Table 5. Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category		
Chemical Name	**CASRN**	**Structure**
Hydrocarbon waxes (petroleum), oxidized, Me esters, Ca salts	68603-11-2	 CC(CCC(CCCC(CCC)CC)C)CC2CCCC1C(CCCCCCC)CCCC12  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC([O-])=O)CCCCCC([O-])=O  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC)CCCCCC(OC)=O  CC(CCCCCCC(C)CCCCCCCCC)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC(CCCC)=O  CC(CCCCCCC(C)CCCCCCCC([H])=O)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC **Plus monocarboxylic acids and oxyacids** No TSCA definition.

Table 5. Representative Structures for the Mixtures Contained in the Petroleum Oxidates and Derivatives Category		
Chemical Name	**CASRN**	**Structure**
Hydrocarbon waxes (petroleum), oxidized, Me esters, Na salts	68603-12-3	 CC(CCC(CCCC(CCC)CC)C)CC2CCCC1C(CCCCCCC)CCCC12  CCCCCCCCCCCCCCCCCC(CCC(CCCCC)C)CCCCCC([O- Na+])=O  CCCCCCCCCCCCCCCCCC(CCC(C)CCCCC)CCCCCC(OC)=O  CC(CCCCCCC(C)CCCCCCCCC)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC(CCCC)=O  CC(CCCCCCC(C)CCCCCCCC([H])=O)CCCCCCC(C)C(C)CC(C)CCCCC(C)CCCC **Plus di- carboxylic acids and oxyacids** No TSCA definition.