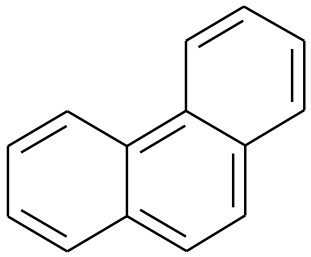
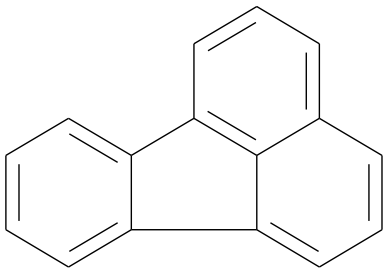
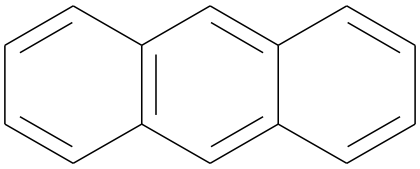
INITIAL TARGETED ASSESSMENT PROFILE (Enviroment)

CAS No.	Anthracene oil 90640-80-5 Anthracene oil, anthracene paste, distn. Lights 91995-17-4 Anthracene oil, anthracene paste, anthracene fraction 91995-15-2 Anthracene oil, anthracene-low 90640-82-7 Anthracene oil, anthracene paste 90640-81-6
Chemical Name	Anthracene oils
Structural Formula	The anthracene oil derivates are complex and have variable compositions. Structures of some components:   

SUMMARY CONCLUSIONS OF THE TARGETED ASSESSMENT

NOTE: The present assessment is targeted to address the following environmental endpoints: stability in water and biodegradability, bioaccumulation potential, screening information on acute and chronic toxicity to aquatic organisms. It cannot be considered as a full SIDS Initial Assessment.

Human health endpoints are not addressed in this assessment. It should be noted that some components of the Anthracene oils are classified as carcinogenic and mutagenic in the European Union.

The full targeted assessment will be published under the responsibility of the European Chemicals Agency (ECHA).

Rationale for Targeting the Assessment

Under Regulation (EC) No 1907/2006 (REACH-Regulation) substances can be identified as substance of "very high concern" (SVHC) and then included in the Candidate List. Substances from the Candidate List are subject to

information requirements for articles and can be included in Annex XIV (Authorisation List).

The dossiers to identify a substance as a SVHC focus on the relevant endpoints. Germany proposed to identify some antracene oils as SVHCs based on the PBT- and vPvB (persistent, bioaccumulative and toxic; very persistent and very bioaccumulative) properties.

The Anthracene oils were investigated in the EU PBT working group before entry into force of the REACH-Regulation. Germany prepared Annex XV-Dossiers to transfer the result from the EU PBT working group to the REACH-Regulation.

More information about the identification of SVHC can be found here:

http://guidance.echa.europa.eu/authorisation_en.htm

Note: More data about the components is available in the EU transitional dossier for Pitch, coal tar, high-temp [http://echa.europa.eu/chem_data/transit_measures/annex_xv_trans_reports_en.asp]

Analogue/Category rationale

Category assessments:

Anthracene oils are UVCB (Unknown, of Variable Composition, or of Biological Origin) substances consisting of a complex mixture of hydrocarbons. Major constituents are three- to five-fused aromatic rings. Minor constituents are three- to four-fused aromatic sulphur-, nitrogen- or oxygen-heterocycles. Anthracene oils are produced from distillation of coal tars, which are condensation products obtained by cooling of the gas evolved by carbonization of coal. The physical state of anthracene oil (CAS 90640-80-5) at 20 °C is an oily liquid with a colour ranging from yellow over dark green to brown. Derivatives from anthracene oil may be either oily liquids (anthracene low, CAS 90640-82-7) or solids (anthracene paste, distn. lights, CAS 91995-17-4; anthracene paste, CAS 91995-15-2 and 90640-81-6). The main components in anthracene oil and its derivatives are the following:

Substance	main components and its concentration range [% w/w]
anthracene oil, CAS 90640-80-5	Acenaphthene: 0.2-16 Anthracene: 3-25 Phenanthrene: 10-35 Fluorene: 1-16 Fluoranthene: 2-15 Pyrene: 1-10 Carbazole: 1-10 Dibenzofurane: 0.1-8
anthracene low, CAS 90640-82-7	Acenaphthene: 1-10 Anthracene: 1-6 Phenanthrene: 10-30 Fluorene: 4-10 Fluoranthene: 5-15 Pyrene: 2-8 Carbazole: 1-3
anthracene oil, anthracene paste, distn. lights, CAS 91995-17-4	Anthracene: 0.5-25 Phenanthrene: 10-45 Fluorene: 15-45 9,10-Dihydroanthracene: 3-15 Carbazole: 0.1-5 Dibenzothiophene: 2-7
anthracene paste, CAS 91995-15-2	Anthracene: 50-70 Phenanthrene: 25-45 Carbazole: 1-5
anthracene paste, CAS90640-81-6	Anthracene: 15-50 Phenanthrene: 5-30 Carbazole: 5-30

Anthracene was identified in the EU as a SVHC in 2008.

[http://echa.europa.eu/doc/candidate_list/svhc_supdoc_anthracene_publication.pdf]

Physical-chemical properties

Anthracene oil CAS-No 90640-80-5 is a solid or liquid with a melting point <80 °C, a boiling point of >270 °C and a vapour pressure of <100 Pa at 20 °C. The octanol-water partition coefficient (log K_{ow}) is 3.45-4.8, and the water solubility is 0.041-1.98 mg/L at 20 °C.

Anthracene oil, anthracene paste CAS-No 90640-81-6 is solid with a melting point of 150-200 °C, a boiling point of 300-350 °C and a vapour pressure of $9.4*10^{-4}$ - 0.091 Pa (20°C). The octanol-water partition coefficient (log K_{ow}) is 4.57-4.68, and the water solubility is 0.047-1.6 mg/L at 25 °C.

Anthracene oil, anthracene-low CAS-No 90640-82-7 is liquid or solid with a melting point of 20-70 °C, a boiling point of 230-400 °C and a vapour pressure of ≤200 Pa at 25 °C. The octanol-water partition coefficient (log K_{ow}) is 3.84-5.20, and the water solubility is <100 mg/L at 20 °C.

Anthracene oil, anthracene paste, anthracene fraction, CAS-No 91995-15-2 is solid with a melting point of 170-200 °C, a boiling point of 300-350 °C and a vapour pressure of <0.01 Pa at 25 °C. The octanol-water partition coefficient (log K_{ow}) is 3.84-4.68, and the water solubility is < 1.29 mg/L at 20 °C.

Anthracene oil, anthracene paste, distn. lights CAS-No 91955-17-4 is solid with a melting point of <109 °C, a boiling point of <333 °C and a vapour pressure of <100 Pa at 20 °C. The octanol-water partition coefficient (log K_{ow}) is 3.84-4.68, and the water solubility is < 1.98 mg/L at 20 °C."

Human Health

Not part of the targeted assessment

Environment

Hydrolysis as a way of abiotic degradation can be considered as not relevant for the main components of the anthracene oils because of their chemical structures. E.g. the component anthracene (CAS-No 120-12-7) is stable against hydrolysis. This has been observed in laboratory and in "in situ" experiments. Because of the similar chemical structure (consisting of aromatic rings) similar assumptions for hydrolytic behaviour of the other components can be made. Half-lives for primary photodegradation in water have been reported in the range of 20 minutes to 125 hours depending on the experimental conditions used. The highest value corresponds to photolysis in winter conditions. Anthraquinone has been identified as the main abiotic degradation product of anthracene.

Anthracene oil contains hardly degradable Polycyclic Aromatic Hydrocarbons (PAHs). Biodegradation screening tests with sludge indicate that anthracene is not readily degradable. Biodegradation tests employing water and sediment-water mixtures are available showing slow to very slow mineralization. Mineralization half-lives up to 210 days have been reported for aerobic sediment, whereas under anaerobic conditions anthracene is completely recalcitrant. In addition, a half-life of 7.9 years has been observed in soil in a field study. Based on these data, anthracene is considered to have very high biodegradation half lives in water, sediment and soil.

Screening studies (OECD TG 301C) show, that acenaphtene, fluorene and carbazole – components present in anthracene oil - are not readily biodegradable.

Further laboratory studies show relatively long dissipation times for fluoranthene (DisDT50 > 173 d), pyrene (DisDT50 > 131 d), and carbazole (Degradation half-life: DegDT50 > 184 d) in soil.

Additionally in a field study half lives of 5.7 years for phenanthrene, 7.8 years for fluoranthene, and 8.5 years for pyrene, have been measured in soil.

Anthracene oils are expected to bioaccumulate in the aquatic environment based on a measured bioconcentration factor of >5000 for the main components (Anthracene [Fish], Phenanthreren [fish], Fluoranthene [Mollusca], Pyrene [Mollusca, Fish]).

According to the components' Henry' Law constants, anthracene oils are appreciated to be moderately volatile. Anthracene oils have a high potential to adsorb to organic matter and are only little mobile in soil and sediment.

The following acute toxicity test results have been determined for aquatic species with the main components:

Anthracene

Fish [*Lepomis macrochirus*]; 96 h LC_{50} = 0.026 mg/L (nominal)

Invertebrate [*Daphnia magna*]	48 h EC_{50} = 0.0095 mg/L (nominal)

The following chronic toxicity test results have been determined

Invertebrate [*Daphnia magna*]	21 d, NOEC = 0.0068 mg/L (nominal)

Fluoranthene

Fish [*Pseudopleuronectes*];	96 h LC_{50} = 0.0001 mg/L (nominal)
Invertebrate [*Americamyses bahia*]	96 h EC_{50} = 0.0014 mg/L (nominal)

Anthracene oils possess properties indicating a hazard for the environment (acute and chronic toxicity to fish, invertebrates < 1 mg/L; long biodegradation half lives and high potential for bioconcentration in aquatic organisms.

Exposure

Not part of the targeted assessment