Supporting Documents for Initial Risk-Based Prioritization of High Production Volume Chemicals

Aluminum Alkyls Category

Aluminum triethyl	**(CAS No. 97-93-8)**
Aluminum chlorodiethvl	**(CAS No. 96-10-6)**
Aluminum tri isobutyl	**(CAS No. 100-99-2)**
Aluminum dichloroethyl	**(CAS No. 563-43-9)**
Aluminum tri n-octyl	**(CAS No. 1070-00-4)**
Aluminum tributyl	**(CAS No. 1116-70-7)**
Aluminum trihexyl	**(CAS No. 1116-73-0)**
Aluminum tri (C2 – C20) alkyls*	**(CAS No. 68908-97-4)**
Aluminum trichloro triethyldi	**(CAS No. 12075-68-2)**
Aluminum diisobutyl chloride	**(CAS No. 1779-25-5)**

***Mixture containing the following 14 components**

Aluminum tridodecyl	**(CAS No. 1529-59-5)**
Aluminum tritexadecyl	**(CAS No. 1726-65-4)**
Aluminum tris (decyl)	**(CAS No. 1726-66-5)**
Aluminum trioctadecyl	**(CAS No. 3041-23-4)**
Aluminum tridocosyl	**(CAS No. 6651-25-8)**
Aluminum tritetracosyl	**(CAS No. 6651-26-9)**
Aluminum trioctacosyl	**(CAS No. 6651-27-0)**
Aluminum trihexacosyl	**(CAS No. 10449-71-5)**
Aluminum triethyl	**(CAS No. 97-93-8)**
Aluminum tributyl	**(CAS No. 1116-70-7)**
Aluminum trihexyl	**(CAS No. 1116-73-0)**
Aluminum trioctyl	**(CAS No. 1070-00-4)**
Aluminum trieicosyl	**(CAS No. 1529-57-3)**
Aluminum tritetradecyl	**(CAS No. 1529-58-4**

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BACKGROUND

Screening-level hazard, exposure and risk characterizations for high production volume chemicals (HPV) are important contributions to the chemicals cooperation work being done in North America[1] through the EPA Chemical Assessment and Management Program (ChAMP)[2]. These screening-level characterizations are developed by EPA for individual chemicals or chemical categories to support initial Risk-Based Prioritizations (RBPs) for HPV chemicals. These screening-level characterizations are technical documents intended primarily to inform the Agency's internal decision-making process. Accordingly, they are written for assessment professionals and assume a degree of technical understanding. Each of the support documents is described below.

The Risk-Based Prioritizations are found in an accompanying document and are written for a general audience. They present EPA's initial thinking regarding the potential risks presented by these chemicals and future possible actions that may be needed.

Hazard Characterizations for HPV Chemicals

EPA's screening-level hazard characterizations are based primarily on the review of the summaries of studies and other information submitted by the chemical sponsor(s) under the HPV Challenge Program[3]. These studies included in the scope of the HPV Challenge comprise the Screening Information Data Set (SIDS) of the Organization for Economic Cooperation and Development (OECD)[4], an internationally recognized battery of tests that provides the basic data necessary to make an initial evaluation of a chemical's hazards and fate. In preparing the initial hazard characterizations, EPA also consulted a variety of reliable sources[5] for additional relevant information and 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 an HPV submission, EPA also searched publicly available databases[6] for information entered from one year prior to the HPV submission through May 2008. The screening-level hazard characterization is performed according to established EPA guidance[7]. A more detailed description of the hazard characterization process is available on the EPA website[8].

With respect to chemicals for which internationally-accepted OECD SIDS Initial Assessment Profiles (SIAP) and Initial Assessment Reports (SIAR) were available, EPA did not generate its own screening-level hazard characterization, but did check for and incorporate updated information in the risk characterization.

Exposure Characterizations for HPV Chemicals

EPA recently received exposure-related data on chemicals submitted in accordance with the requirements of Inventory Update Reporting (IUR)[9]. The 2006 IUR submissions pertain to chemicals manufactured in

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[1] U.S. EPA – U.S. Commitments to North American Chemicals Cooperation: http://www.epa.gov/hpv/pubs/general/sppframework.htm.
[2] U.S. EPA – ChAMP information: http://www.epa.gov/champ/.
[3] U.S. EPA – HPV Challenge Program information: http://www.epa.gov/hpv.
[4] U.S. EPA – Technical Guidance Document, OECD SIDS Manual Sections 3.4 and 3.5: http://www.epa.gov/chemrtk/pubs/general/sidsappb.htm.
[5] U.S. EPA – Public Database Hazard Information: http://www.epa.gov/hpvis/hazardinfo.htm.
[6] U.S. EPA – Public Database Update Information: http://www.epa.gov/chemrtk/hpvis/updateinfo.htm.
[7] U.S. EPA – Risk Assessment Guidelines: http://cfpub.epa.gov/ncea/raf/rafguid.cfm.
[8] U.S. EPA – About HPV Chemical Hazard Characterizations: http://www.epa.gov/hpvis/abouthc.htm.
[9] U.S. EPA – Basic IUR Information: http://www.epa.gov/opptintr/iur/pubs/guidance/basic-information.htm.

(including imported into) the U.S. during calendar year 2005 in quantities of 25,000 pounds or more at a single site. The reports include the identity, the quantity, and the physical form of the chemical manufactured or imported, and the number of workers reasonably likely to be exposed during manufacture of the chemical. For chemicals manufactured or imported in quantities of 300,000 pounds or more at a single site, additional reported information includes: the industrial processing and uses of the chemical; the number of industrial processing sites and workers reasonably likely to be exposed to the chemical at those sites; the consumer and commercial uses of the chemical; and an indication whether the chemical was used in products intended for use by children under 14 years of age.

EPA's screening-level exposure characterizations are based largely on the information submitted under the IUR reporting, although other exposure information submitted to the Agency (for example, in HPV submissions) or readily available through a limited set of publicly accessible databases[10] was also considered. The screening-level Exposure Characterizations identify a potential (high, medium, or low) that each of five populations – the environment, the general population, workers, consumers, and children – might be exposed to the chemical. In most cases, this potential doesn't address the quantity, frequency, or duration of exposure, but refers only to the likelihood that an exposure could occur.

In many instances EPA is not able to fully disclose to the public all the IUR exposure-related data reviewed or relied upon in the development of the screening-level documents because some of the material was claimed as confidential business information (CBI) when it was submitted to the Agency. These CBI claims do limit the Agency's ability to be completely transparent in presenting some underlying exposure and use data for chemicals in public documents. EPA does consider all data, including data considered to be CBI, in the screening-level exposure and risk characterization process, and endeavors whenever possible to broadly characterize supporting materials claimed as confidential in ways that do not disclose actual CBI.

Risk Characterizations for HPV Chemicals

EPA combines the information from the screening-level exposure characterization with the screening-level hazard characterization to develop a qualitative screening-level risk characterization, as described in the Agency's guidance on drafting risk characterizations[11]. These screening-level risk characterizations are technical documents intended to support subsequent priority-setting decisions and actions by OPPT. The purpose of the qualitative screening-level risk characterization is two-fold: to support initial risk-based decisions to prioritize chemicals, identify potential concerns, and inform risk management options; and to identify data needs for individual chemicals or chemical categories.

These initial characterization and prioritization documents do not constitute a final Agency determination as to risk, nor do they determine whether sufficient data are available to characterize risk. Recommended actions reflect EPA's relative judgment regarding this chemical or chemical category in comparison with others evaluated under this program, as well as the uncertainties presented by gaps that may exist in the available data.

[10] U.S. EPA – Summary of Public Databases Routinely Searched: http://www.epa.gov/chemrtk/hpvis/pubdtsum.htm.
[11] U.S. EPA – Risk Characterization Program: http://www.epa.gov/osa/spc/2riskchr.htm.

QUALITATIVE SCREENING-LEVEL RISK CHARACTERIZATION OF HIGH PRODUCTION VOLUME CHEMICALS

CHEMICAL CATEGORY NAME:
Aluminum Alkyls

SPONSORED CHEMICALS

Aluminum triethyl	**CAS No. 97-93-8**
Aluminum chlorodiethvl	**CAS No. 96-10-6**
Aluminum tri isobutyl	**CAS No. 100-99-2**
Aluminum dichloroethyl	**CAS No. 563-43-9**
Aluminum tri n-octyl	**CAS No. 1070-00-4**
Aluminum tributyl	**CAS No. 1116-70-7**
Aluminum trihexyl	**CAS No. 1116-73-0**
Aluminum tri (C2 – C20) alkyls*	**CAS No. 68908-97-4**
Aluminum trichloro triethyldi	**CAS No. 12075-68-2**
Aluminum diisobutyl chloride	**CAS No. 1779-25-5**

***Mixture containing 14 components**

July 2008

Prepared by

Risk Assessment Division
Economics, Exposure and Technology Division
Office of Pollution Prevention and Toxics
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0001

QUALITATIVE SCREENING-LEVEL RISK CHARACTERIZATION FOR ALUMINUM ALKYLS CATEGORY

1. Category Justification

The category consists of a series of 20 different aluminum alkyls and chloro-aluminum alkyls. The alkyl moieties differ only in the length of the alkyl group. The chlorinated compounds are very similar in structure except for a halide displacement of an alkyl group. The category is based on similar molecular structures and physical-chemical properties, specifically the extreme reactivity of these compounds in the presence of air (oxygen and water) and water. EPA agreed with the sponsor's support of the category and considered this reactivity-based approach reasonable for use in the HPV Challenge Program and ChAMP.

2. Physical-Chemical Properties and Environmental Fate

Aluminum alkyls are colorless liquids except aluminum dichloroethyl, which is a white crystalline solid and aluminum tri (C2-C20) alkyls which are milky colored liquids. The members of this category react immediately and spontaneously upon exposure to air or water; therefore, the fate of aluminum alkyls in the environment could not be evaluated. Since these reactions occur spontaneously, the members of this category are expected to have low persistence (P1) and the bioaccumulation potential is ranked low (B1).

3. Hazard Characterization

Aquatic Organism Toxicity. No data aquatic toxicity data are available. Due to the vigorous and violent reaction with water, aquatic toxicity testing for this category of highly reactive chemicals was not performed and would not be expected to generate meaningful data. Based on extreme reactivity, it is concluded that the chemicals in this category have the potential to be highly hazardous at the point of contact.

Human Health Toxicity. No mammalian toxicity data are available. Due to the known reactivity, testing this category of highly reactive chemicals would not generate meaningful data. Based on strong reactivity of the aluminum alkyls with water, these compounds are expected to cause severe thermal burns to the eye and skin, with risk of explosion during test substance administration via the inhalation route if exposed to test animals.

Based on extreme reactivity, it is concluded that the category members have the potential to be highly hazardous at the point of contact.

4. Exposure Characterization

The 20 aluminum alkyls category chemicals have aggregated production volumes in the ranges of 150 million to 660 million pounds. The aggregated production volumes exclude two of the twenty chemicals, Aluminum, chlorobis (2-methylpropyl) (CAS # 1779-25-5) and Aluminum, tri-C2-20-alkyl complexes (CAS # 68908-94-4), which do not have IUR submissions. Non-confidential IUR information for many of the chemicals in the aluminum alkyls category indicates that these chemicals are used as intermediates in manufacturing of other basic organic

chemicals. There are no reported commercial or consumer uses. Information submitted as part of the HPV Challenge Program indicates that aluminum alkyls are highly reactive materials that are used in a variety of industrial chemical processes such as polymerization, oligomerization, alkylation, and stereochemical synthesis.

Potential Exposures to the General Population and the Environment: Based on the totality of the information considered, especially the extremely high reactivity that dictates enclosed processes for these chemicals, EPA identifies, for purposes of risk-based prioritization, that the potential for exposure to the general population and the environment is low.

Potential Exposures to Workers: Based on the totality of the information considered including the HPV Revised Test Plan and IUR data (both CBI and non-CBI) and in combination with the Agency's professional judgment, EPA identifies, for the purposes of risk-based prioritization, a low relative ranking for the potential worker exposure for all of the chemicals in the aluminum alkyls category. The low relative ranking is due to the high flammability and reactivity (to oxygen and water) of the chemicals in this category. EPA believes that these chemicals or mixtures containing these chemicals would need to be handled in equipment that will minimize contact with air (e.g. under nitrogen blanket) and therefore substantially reduce the potential for worker exposure. Aluminum alkyls chemicals do not have OSHA Permissible Exposure Limits (PELs).

Potential Exposures to Consumers: EPA identifies, for the purposes of risk-based prioritization, that the potential for exposures to consumers from products containing these chemicals is low. There are no reported commercial or consumer uses and correspondence concerning IUR submissions indicate that these chemicals would not continue to exist in products produced through these processes because there are fully reacted.

Potential Exposures to Children: EPA identifies, for the purposes of risk-based prioritization, that the potential for exposures to children is low. The IUR submissions report that they are not in products intended to be used by children. There are no reported commercial or consumer uses and correspondence concerning IUR submissions indicate that these chemicals would not continue to exist in products produced through these processes because there are fully reacted.

5. Risk Characterization

The statements and rationale provided below are intended solely for the purpose of this screening-level and qualitative risk characterization and will be used for prioritizing substances for future work in the Chemical Assessment and Management Program (ChAMP).

Risk Statement and Rationale

Based on the strong reactivity of the aluminum alkyls with water and air, and the high flammability, the category members have the potential to be highly hazardous at the point of contact. Therefore, potential exposures are mitigated through the use of enclosed processes and minimizing contact with air and water. There is no toxicity information available on these chemicals due to the high reactivity. Taken together, the available information

suggests a low concern for potential risks to aquatic organisms and the general population from environmental releases, and also to workers, consumers, and children.

SCREENING-LEVEL HAZARD CHARACTERIZATION OF HIGH PRODUCTION VOLUME CHEMICALS

CHEMICAL CATEGORY NAME:
Aluminum Alkyls

SPONSORED CHEMICALS

Aluminum triethyl	**CAS No. 97-93-8**
Aluminum chlorodiethvl	**CAS No. 96-10-6**
Aluminum tri isobutyl	**CAS No. 100-99-2**
Aluminum dichloroethyl	**CAS No. 563-43-9**
Aluminum tri n-octyl	**CAS No. 1070-00-4**
Aluminum tributyl	**CAS No. 1116-70-7**
Aluminum trihexyl	**CAS No. 1116-73-0**
Aluminum tri (C2 – C20) alkyls*	**CAS No. 68908-97-4**
Aluminum trichloro triethyldi	**CAS No. 12075-68-2**
Aluminum diisobutyl chloride	**CAS No. 1779-25-5**

***Mixture containing 14 components**

July 2008

Prepared by

Risk Assessment Division
Economics, Exposure and Technology Division
Office of Pollution Prevention and Toxics
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0001

SCREENING-LEVEL HAZARD CHARACTERIZATION OF HIGH PRODUCTION VOLUME CHEMICALS

SCREENING-LEVEL HAZARD CHARACTERIZATION
Aluminum Alkyls Category

Introduction

The sponsor, The Aluminum Alkyls Consortium, submitted a Test Plan and Robust Summaries to EPA for the Aluminum Alkyls Category on March 20, 2001. EPA posted the submission on the ChemRTK HPV Challenge website on October 3, 2001 (http://www.epa.gov/chemrtk/pubs/summaries/alalkyls/c12977tc.htm). EPA comments on the original submission were posted to the website on February 19, 2002. Public comments were also received and posted to the website. The sponsor submitted updated documents on August 23, 2001, which were posted to the ChemRTK website on October 3, 2001. The Aluminum Alkyls category consists of the following chemicals:

Aluminum triethyl	CAS No. 97-93-8
Aluminum chlorodiethvl	CAS No. 96-10-6
Aluminum tri isobutyl	CAS No. 100-99-2
Aluminum dichloroethyl	CAS No. 563-43-9
Aluminum tri n-octyl	CAS No. 1070-00-4
Aluminum tributyl	CAS No. 1116-70-7
Aluminum trihexyl	CAS No. 1116-73-0
Aluminum tri (C2 – C20) alkyls*	CAS No. 68908-97-4
Aluminum trichloro triethyldi	CAS No. 12075-68-2
Aluminum diisobutyl chloride	CAS No. 1779-25-5

*Mixture containing the following 14 components

Aluminum tridodecyl	CAS No. 1529-59-5
Aluminum tritexadecyl	CAS No. 1726-65-4
Aluminum tris (decyl)	CAS No. 1726-66-5
Aluminum trioctadecyl	CAS No. 3041-23-4
Aluminum tridocosyl	CAS No. 6651-25-8
Aluminum tritetracosyl	CAS No. 6651-26-9
Aluminum trioctacosyl	CAS No. 6651-27-0
Aluminum trihexacosyl	CAS No. 10449-71-5
Aluminum triethyl	CAS No. 97-93-8
Aluminum tributyl	CAS No. 1116-70-7
Aluminum trihexyl	CAS No. 1116-73-0
Aluminum trioctyl	CAS No. 1070-00-4
Aluminum trieicosyl	CAS No. 1529-57-3
Aluminum tritetradecyl	CAS No. 1529-58-4

This screening-level hazard characterization is based primarily on the review of the test plan and robust summaries of studies submitted by the sponsor(s) under the HPV Challenge Program. 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 search of the following databases was made from 2000 to May 2008: the NLM databases (ChemID to locate available data sources including Medline/PubMed, Toxline, HSDB, ATSDR, EPA SRS, etc.), STN/CAS online databases (Registry file for locators, ChemAbs for toxicology data, RTECS, Merck, etc.) and Science Direct. Structure(s) of the sponsored chemical(s) is included in the appendix. The screening-level hazard characterization for environmental and human health toxicity is based largely on SIDS endpoints and is described according to established EPA or OECD effect level definitions and hazard assessment practices.

Category Justification

The category consists of a series of aluminum alkyls and chloro-aluminum alkyls (see Appendix). The alkyl moieties differ only in length of the alkyl group. The chlorinated compounds are very similar in structure except for a halide displacement of an alkyl group. The category is based on similar molecular structures and physical-chemical properties, specifically the extreme reactivity of these compounds in the presence of air (oxygen and water) and water. EPA agreed with the sponsor's support of the category and considered this reactivity-based approach reasonable for the purposes of both the HPV Challenge Program and ChAMP.

Hazard Characterization

Aluminum alkyls are colorless liquids except aluminum dichloroethyl, which is a white crystalline solid and aluminum tri (C2-C20) alkyls which are milky colored liquids. The members of this category react immediately and spontaneously upon exposure to air or water; therefore, the fate of aluminum alkyls in the environment could not be evaluated. Since these reactions occur spontaneously, the members of this category are expected to have low persistence (P1) and the bioaccumulation potential is ranked low (B1).

No data are available for aquatic toxicity. Based on the vigorous and violent reaction with water, toxicity of aluminum alkyls to aquatic organisms could not be evaluated. Based on extreme reactivity, it is concluded that the chemicals in this category have the potential to be highly hazardous at the point of contact.

No data in experimental animals are available. Due to the known reactivity, testing this category of highly reactive chemicals would not generate meaningful data. Based on strong reactivity of the aluminum alkyls with water, these compounds are expected to cause severe thermal burns to the eye and skin, with risk of explosion during test substance administration via the inhalation route if exposed to test animals.

Based on extreme reactivity, it is concluded that the chemicals in this category have the potential to be highly hazardous at the point of contact.

It is concluded that it is not feasible or necessary to perform environmental fate, mammalian or ecotoxicity tests based on the highly reactive nature of these chemicals when in contact with air (oxygen and water) and water.

1. Physical-Chemical Properties and Environmental Fate

Physical-Chemical Properties Characterization

Aluminum alkyls are colorless liquids except aluminum dichloroethyl, which is a white crystalline solid and aluminum tri (C2-C20) alkyls which are milky colored liquids.

Environmental Fate Characterization

Aluminum alkyls are highly reactive chemicals, immediately reacting with air (oxygen and water) and water resulting in rapid exothermic and explosive breakdown of the compounds. Shorter chain compounds are more reactive based on their flash points; however, all compounds in the category are strongly reactive. The reactions with air (oxygen and water) and water are vigorous, violent and will cause the material to either explode or ignite resulting in a fire that is difficult to extinguish. Based on their high reactivity, it is assumed that aluminum alkyls have low persistence (P1) and low bioaccumulation potential (B1).

Conclusion: Aluminum alkyls are colorless liquids except aluminum dichloroethyl, which is a white crystalline solid and aluminum tri (C2-C20) alkyls which are milky colored liquids. The members of this category react immediately and spontaneously upon exposure to air or water; therefore, the fate of aluminum alkyls in the environment could not be evaluated. Since these reactions occur spontaneously, the members of this category are expected to have low persistence (P1) and the bioaccumulation potential is ranked low (B1).

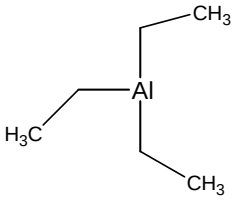
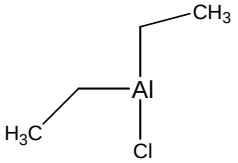
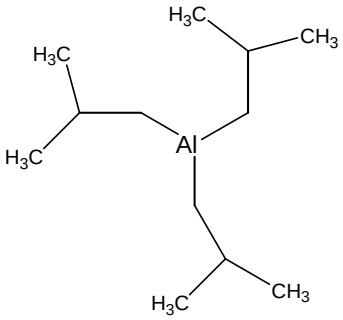
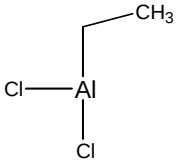
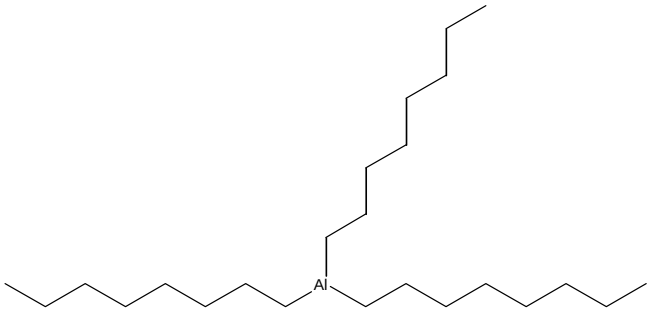
2. Environmental Effects – Aquatic Toxicity

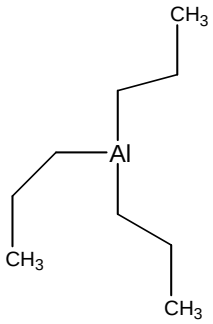
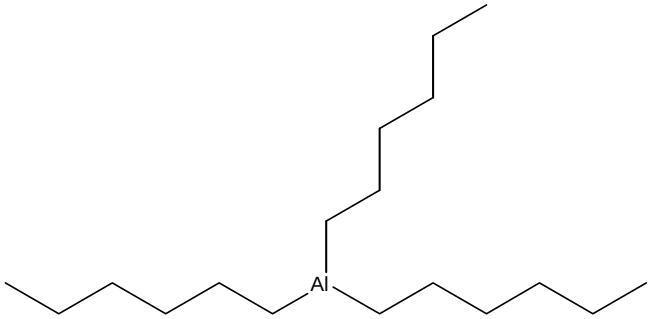
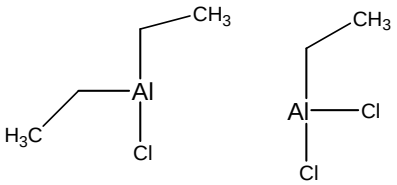
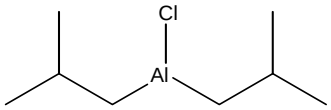
Conclusion: No data aquatic toxicity data are available. Due to the vigorous and violent reaction with water, aquatic toxicity testing for this category of highly reactive chemicals was not performed and would not be expected to generate meaningful data. Based on extreme reactivity, it is concluded that the chemicals in this category have the potential to be highly hazardous at the point of contact.

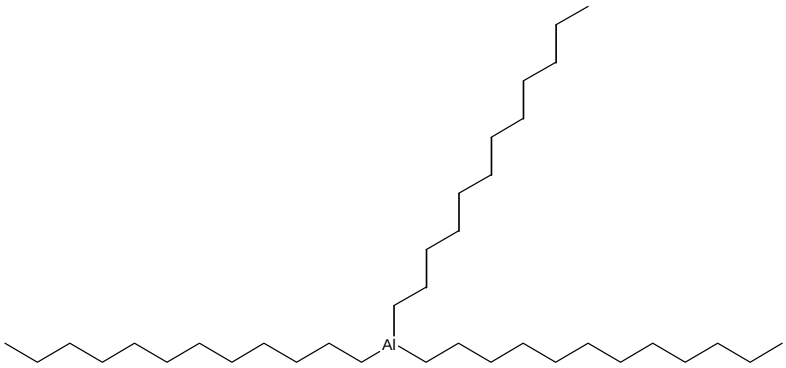
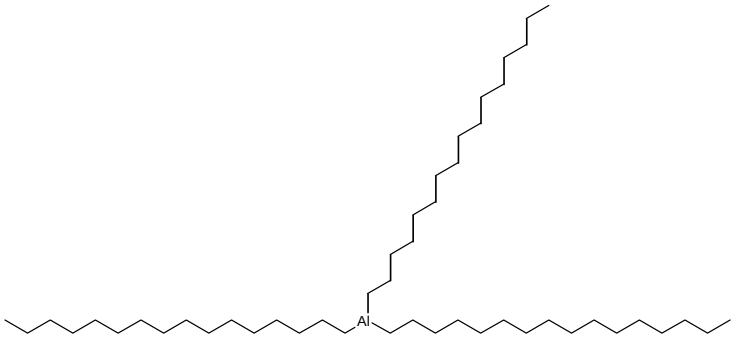
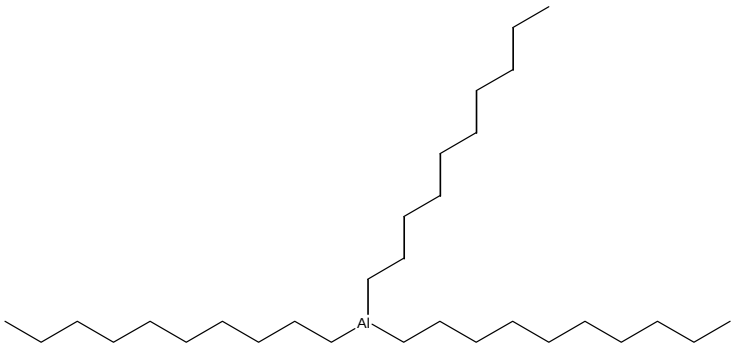
3. Human Health Effects

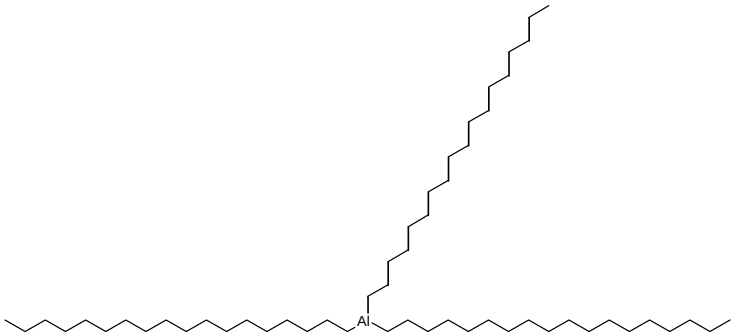
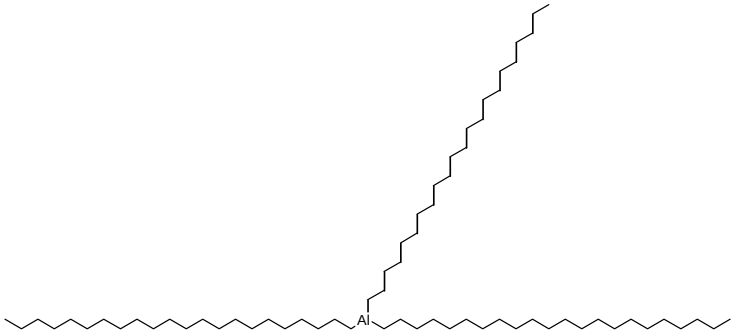
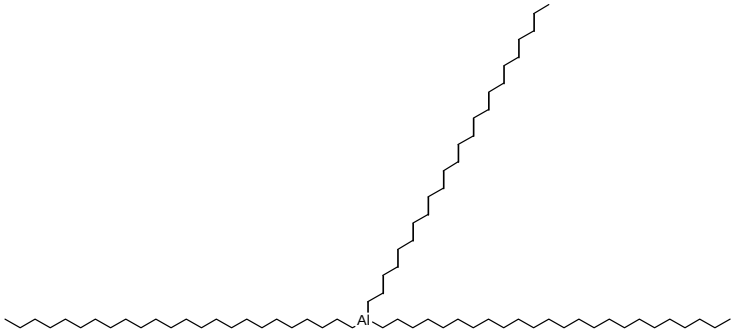
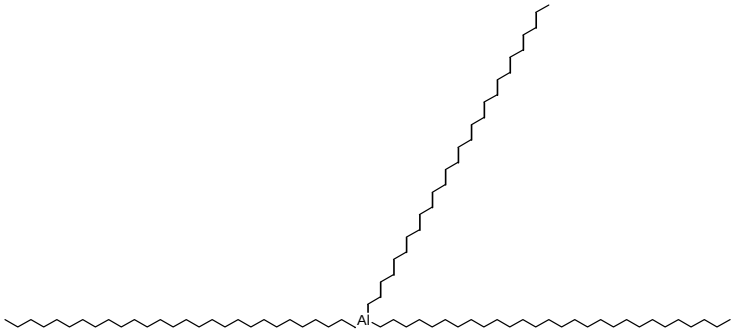
Conclusion: No mammalian toxicity data are available. Due to the known reactivity, testing this category of highly reactive chemicals would not generate meaningful data. Based on strong reactivity of the aluminum alkyls with water, these compounds are expected to cause severe thermal burns to the eye and skin, with risk of explosion during test substance administration via the inhalation route if exposed to test animals.

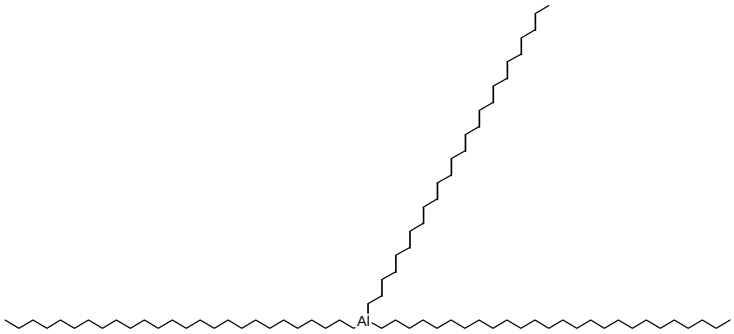
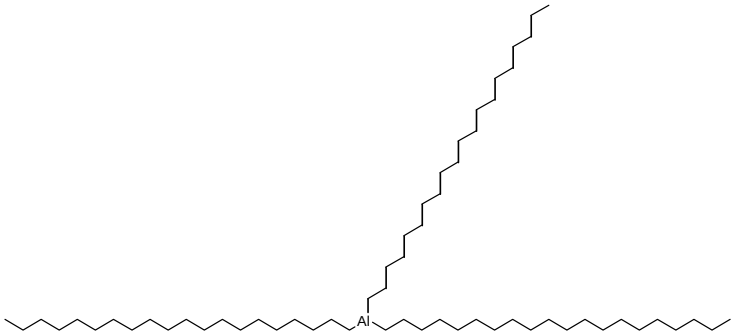
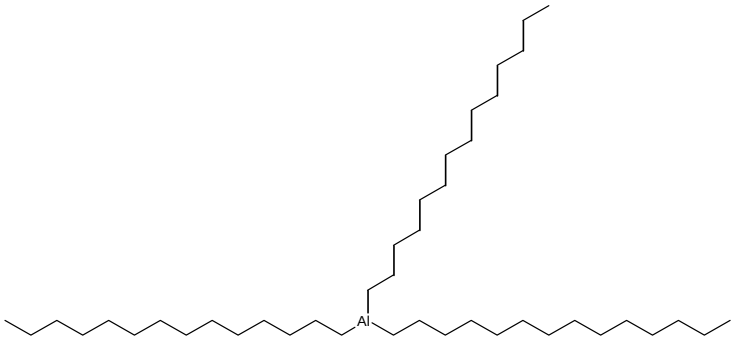
APPENDIX

Aluminum Alkyls Category		
CAS Reg. No.	**Chemical Name**	**Structure**
97-93-8	Aluminum triethyl	 $C_6H_{15}Al$
96-10-6	Aluminum chlorodiethyl	 $C_4H_{10}AlCl$
100-99-2	Aluminum tri isobutyl	 $C_{12}H_{27}Al$
563-43-9	Aluminum dichloroethyl	 $C_2H_5AlCl_2$
1070-00-4	Aluminum tri-n-octyl	 $C_{24}H_{51}Al$

Aluminum Alkyls Category		
CAS Reg. No.	**Chemical Name**	**Structure**
1116-70-7	Aluminum tributyl	 $C_9H_{21}Al$
1116-73-0	Aluminum trihexyl	 $C_{18}H_{39}Al$
12075-68-2	Aluminum trichloro triethyldi	 $C_6H_{15}Cl_3Al_2$
1779-25-5	Aluminum diisobutyl chloride	 $C_8H_{18}AlCl$

Aluminum Alkyls Category		
CAS Reg. No.	**Chemical Name**	**Structure**
68908-97-4	Aluminum tri (C2-C20) alkyls (*Mixture containing the following 14 components)	
1529-59-5	Aluminum, tridodecyl-	 $C_{36}H_{75}Al$
1726-65-4	Aluminum, trihexadecyl-	 $C_{48}H_{99}Al$
1726-66-5	Aluminum, tris(decyl)-	 $C_{30}H_{63}Al$

Aluminum Alkyls Category		
CAS Reg. No.	**Chemical Name**	**Structure**
3041-23-4	Aluminum trioctadecyl	 $C_{54}H_{111}Al$
6651-25-8	Aluminum, tridocosyl-	 $C_{66}H_{135}Al$
6651-26-9	Aluminum, tritetracosyl-	 $C_{72}H_{147}Al$
6651-27-0	Aluminum, trioctacosyl-	 $C_{84}H_{171}Al$

Aluminum Alkyls Category		
CAS Reg. No.	**Chemical Name**	**Structure**
10449-71-5	Aluminum, trihexacosyl-	 $C_{78}H_{159}Al$
1529-57-3	Aluminum, trieicosyl-	 $C_{60}H_{123}Al$
1529-58-4	Aluminum, tritetradecyl-	 $C_{42}H_{87}Al$
97-93-8; 1116-70-7; 1116-73-0; 1070-00-4	Aluminum triethyl; Aluminum tributyl ; Aluminum trihexyl ; Aluminum tri-n-octyl	See Structures above

Screening Level Exposure Characterization for HPV Challenge Chemicals

Aluminum Alkyls Category

July 2008

Prepared by

Exposure Assessment Branch
Chemical Engineering Branch
Economics, Exposure, and Technology Division
Office of Pollution Prevention and Toxics
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0001

Screening Level Exposure Characterization
Aluminum Alkyls Category

Non-CBI Executive Summary

The 20 aluminum alkyls category chemicals have aggregated production volumes in the ranges of 150 million to 660 million pounds.[12] The aggregated production volumes exclude those of two of the twenty chemicals, Aluminum, chlorobis (2-methylpropyl) (CAS # 1779-25-5) and Aluminum, tri-C2-20-alkyl complexes (CAS # 68908-94-4), which do not have IUR submissions. Non-confidential IUR information for many of the chemicals in the aluminum alkyls category indicates that these chemicals are used as intermediates in manufacturing of other basic organic chemicals. There are no reported commercial or consumer uses. Information submitted as part of the HPV Challenge Program indicates that aluminum alkyls are highly reactive materials that are used in a variety of industrial chemical processes such as polymerization, oligomerization, alkylation, and stereochemical synthesis.[13]

Potential Exposures to the General Population and the Environment: Based on the totality of the information considered, especially the extremely high reactivity that dictates enclosed processes for these chemicals, EPA identifies, for purposes of risk-based prioritization, a low potential for exposure to the general population and the environment.

Persistence and bioaccumulation ratings for these chemicals are P1 and B1. These ratings suggest that these chemicals are neither persistent nor bioaccumulative in the environment. All chemicals in this category react immediately and spontaneously with air and water in rapid exothermic breakdown.[14]

Potential Exposures to Workers: Based on the totality of the information considered including the HPV Revised Test Plan and IUR data (both CBI and non-CBI) and in combination with the Agency's professional judgment, EPA identifies, for the purposes of risk-based prioritization, a low relative ranking for the potential worker exposure for all of the chemicals in the aluminum alkyls category. The low relative ranking is due to the high flammability and reactivity (to oxygen and water) of the chemicals in this category. EPA believes that these chemicals or mixtures containing these chemicals would need to be handled in equipment that will minimize contact with air (e.g. under nitrogen blanket) and therefore substantially reduce the potential for worker exposure. Aluminum alkyls chemicals do not have OSHA Permissible Exposure Limits (PELs).[15]

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[12] USEPA, 2006. Partial Updating of TSCA Chemical Inventory.
[13] Aluminum Alkyls Consortium, 2001. HPV Revised Test Plan. Accessed at http://www.epa.gov/chemrtk/pubs/summaries/alalkyls/c12977tc.htm.
[14] USEPA, 2008. Screening-Level Hazard Characterization for Aluminum Alkyls Category.
[15] NIOSH, 1989. OSHA PEL Project Documentation. http://www.cdc.gov/niosh/pel88/npelcas.html. Accessed, 4/30/08.

Potential Exposures to Consumers: EPA identifies, for the purposes of risk-based prioritization, a low potential for exposures to consumers from products containing these chemicals. There are no reported commercial or consumer uses and correspondence concerning IUR submissions indicate that these chemicals would not continue to exist in products produced through these processes because they are fully reacted.

Potential Exposures to Children: EPA identifies, for the purposes of risk-based prioritization, a low potential for exposures to children. The IUR submissions report that they are not in products intended to be used by children. There are no reported commercial or consumer uses and correspondence concerning IUR submissions indicate that these chemicals would not continue to exist in products produced through these processes because there are fully reacted.

Below are tables summarizing non-confidential processing and use information in the Inventory Update Reporting (IUR) for each of the individual chemicals in this category.

This draft exposure characterization was completed using both public, non-confidential sources, and IUR submissions that were available as of this writing.

Non Confidential IUR Data Summary: Aluminum, chlorodiethyl- (CAS # 96-10-6)

Manufacturing / Import Information

Production (including import volume):	1 million to 10 million pounds
List of non-CBI companies/ sites:	Akzo Nobel Polymer Chemicals LLC / Deer Park, TX Albemarle Corporation / Pasadena, TX Chemtura Corporation / Mapleton, IL
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 100% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
None reported		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, triethyl- (CAS# 97-93-8)

Manufacturing/ Import Information

Production (including import volume):	50 million to 100 million pounds
List of non-CBI companies/ sites:	Akzo Nobel Polymer Chemicals LLC / Deer Park, TX Albemarle Corporation / Pasadena, TX Chemtura Corporation / Mapleton, IL Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	1000 or greater (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 100% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, tris(2-methylpropyl)- (CAS #100-99-2)

Manufacturing/ Import Information

Production (including import volume):	1 million – 10 million lbs
List of non-CBI companies/ sites:	Akzo Nobel Polymer Chemicals LLC / Deer Park, TX Albemarle Corporation / Pasadena, TX
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 100% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
None reported		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, dichloroethyl- (CAS # 563-43-9)

Manufacturing / Import Information

Production (including import volume):	1 million to 10 million pounds
List of non-CBI companies/ sites:	Akzo Nobel Polymer Chemicals LLC / Deer Park, TX Albemarle Corporation / Pasadena, TX Chemtura Corporation / Mapleton, IL
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 100% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None Reported		

Non Confidential IUR Data Summary: Aluminum, trioctyl (CAS # 1070-00-4)

Manufacturing / Import Information

Production (including import volume): 10 million to 50 million pounds
List of non-CBI companies/ sites: Akzo Nobel Polymer Chemicals LLC / Deer Park, TX
Albemarle Corporation / Pasadena, TX
Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers: 1000 or greater (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration: 100% by weight
Non-CBI physical forms: liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
None Reported		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None Reported		

Non Confidential IUR Data Summary: Aluminum, tributyl- (CAS #1116-70-7)

Manufacturing / Import Information

Production (including import volume):	10 million to 50 million pounds
List of non-CBI companies/ sites:	Albemarle Corporation / Pasadena, TX Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	100% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
None Reported		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None Reported		

Non Confidential IUR Data Summary: Aluminum, trihexyl- (CAS # 1116-73-0)

Manufacturing/ Import Information

Production (including import volume):	10 million to 50 million pounds
List of non-CBI companies/ sites:	Akzo Nobel Polymer Chemicals LLC / Deer Park, TX Albemarle Corporation / Pasadena, TX Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	1000 or greater (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 100% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
None reported		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, trieicosyl- (CAS# 1529-57-3)

Manufacturing (including import) Information

Production (including import volume):	10 million to 50 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 30% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, tritetradecyl- (CAS# 1529-58-4)

Manufacturing (including import) Information

Production (including import volume)	10 million to 50 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 30% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, tridodecyl- (CAS #1529-59-5)

Manufacturing (including import) Information

Production (including import volume):	10 million to 50 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 30% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, trihexadecyl- (CAS #1726-65-4)

Manufacturing (including import) Information

Production (including import volume):	10 to 50 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 499 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 30% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None Reported		

Non Confidential IUR Data Summary Aluminum, tris(decyl)- (CAS # 1726-66-5)

Manufacturing/Import Information

Production (including import volume): 10 million to 50 million pounds
List of non-CBI companies/ sites: Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers: between 100 and 500 (including those of manufacturing, industrial processing and use)

Highest non-CBI maximum concentration: 30% by weight
Non-CBI physical forms: liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, trioctadecyl- (CAS # 3041-23-4)

Manufacturing / Import Information

Production (including import volume):	10 million to 50 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 30% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, tridocosyl- (CAS # 6651-25-8)

Manufacturing / Import Information

Production (including import volume):	1 million to 10 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 1% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, tritetracosyl- (CAS # 6651-26-9)

Manufacturing / Import Information

Production (including import volume):	1 million to 10 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 1% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, trioctacosyl- (CAS # 6651-27-0)

Manufacturing/ Import Information

Production (including import volume):	500,000 to 1 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 499 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 1% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, trihexacosyl- (CAS # 10449-71-5)

Manufacturing/ Import Information

Production (including import volume):	1 million to 10 million pounds
List of non-CBI companies/ sites:	Sasol North America Inc. / Westlake, LA
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 1% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Processing as a reactant	Other Basic Organic Chemical Manufacturing	Intermediates
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		

Non Confidential IUR Data Summary: Aluminum, di-mu-chlorochlorotriethyldi- (CAS# 12075-68-2)

Manufacturing/ Import Information

Production (including import volume):	10 million to 50 million pounds
List of non-CBI companies/ sites:	Akzo Nobel Polymer Chemicals LLC / Chicago, IL Akzo Nobel Polymer Chemicals LLC / Deer Park, TX Albemarle Corporation / Pasadena, TX Chemtura Corporation / Mapleton, IL Chemtura Corporation / Middlebury, CT
Number of potentially exposed workers:	between 100 and 999 (including those of manufacturing, industrial processing and use)
Highest non-CBI maximum concentration:	up to 100% by weight
Non-CBI physical forms:	liquid

Table 1
Industrial Processing and Use
Information Reported in 2006 IUR

Processing Activity	Industrial Sector	Functional Use
Claimed as CBI		

Table 2
Commercial/ Consumer Uses
Information Reported in 2006 IUR

Commercial/ Consumer Product Category Description	Highest maximum concentration range	Use in Children's Products
None reported		