

Initial Risk-Based Prioritization of High Production Volume (HPV) Chemicals

N-oxydiethylenethiocarbamyl-N'-oxydiethylenesulfenamide (CASRN 13752-51-7)
(CA Index Name: 4-Morpholinecarbodithioic acid, 4-morpholinyl ester)

Prioritization Decision: Medium Priority.

- **In order to further evaluate the medium potential risk to aquatic organisms from this chemical, EPA has identified next steps involving efforts to develop a better understanding of exposure and use of this chemical. Examples of information that would assist EPA in its analysis include, but are not limited to:**
 - **Information concerning potential releases to water from manufacturing, industrial, and commercial use of the chemical and products containing the chemical.**
 - **Other information pertinent to environmental exposures to this chemical.**
- **As an initial step in developing this understanding, companies that manufacture, process, or use this chemical are encouraged to provide available information on a voluntary and non-confidential basis.**

Screening-level prioritizations are interim evaluations that do not constitute either final Agency determinations as to risk or final determinations as to whether sufficient data are available to characterize risk. They are based predominantly on screening-level hazard, exposure, and risk characterizations prepared by EPA using data submitted to the Agency under the HPV Challenge Program¹ and the 2006 Inventory Update Reporting (IUR)², and data publicly available through other selected sources. These screening-level characterizations do not constitute full risk assessments. They are intended only to support initial decisions to determine the relative priority for further assessment or risk management activities concerning HPV chemicals, and to identify data needs for individual chemicals or chemical categories. The methodology used in preparing these characterizations and prioritization decisions is available on the EPA website.³

Screening-Level Characterization Summary

Risk Characterization

Potential Risk to Aquatic Organisms from Environmental Releases: *MEDIUM*.

The medium potential for exposure to this chemical and the moderate acute hazard to aquatic organisms suggests a medium potential risk to aquatic organisms from environmental releases.

¹ US EPA, HPV Challenge Program information: <http://www.epa.gov/hpv/>.

² US EPA, IUR information: <http://www.epa.gov/oppt/iur/index.htm>.

³ US EPA, Methodology for Risk-Based Prioritization Under ChAMP: <http://www.epa.gov/champ/pubs/rbp/method.pdf>.

Potential Risk to the General Population from Environmental Releases and Consumers: *LOW*. Although the potential for exposure to this chemical is medium, the low human health hazard suggests a low potential risk to the general population from environmental releases, and to consumers.

Potential Risk to Children: *LOW*. Both the low exposure potential and the low human health hazard for this chemical suggest a low potential risk to children.

Potential Risk to Workers: *LOW*. Although the potential for exposure to this chemical is high, the low human health hazard suggests a low potential risk to workers.

Production Volume, Use, and Release Information

This chemical had an aggregated production/import volume in the U.S. between 500,000 and 1 million pounds in 2005.

Non-confidential IUR information indicates that the industrial processing and uses of the chemical include process regulators used in vulcanization or polymerization processes in the manufacturing of resin and synthetic rubber. It also indicates that the commercial and consumer uses are not readily obtainable (NRO).

No information is available on releases of this chemical to the environment.

Hazard Characterization Summary

The chemical is a solid with moderate water solubility and low vapor pressure. It is expected to have high mobility in soil. Volatilization from water and moist soil is considered low based on its estimated Henry's Law constant. The rate of hydrolysis is moderate to rapid under environmental conditions. The chemical is expected to have low persistence (P1) and low bioaccumulation potential (B1).

The evaluation of available toxicity data for fish, aquatic invertebrates, and aquatic plants for this chemical indicates that the potential acute hazard is moderate.

The acute oral, dermal, and inhalation toxicity of the chemical is low. In a two-year chronic toxicity/carcinogenicity study, systemic toxicity of the chemical was low after 12 months; after two years of exposure, an increase in the incidence of tumors was seen only at the highest tested dose. A combined reproductive/developmental toxicity screening test showed no reproductive or developmental toxicity (pre- and post-natal), and the chemical did not cause any effects on fertility. The chemical was not mutagenic in bacteria, but induced gene mutations and chromosomal aberrations in mammalian cells *in vitro*.

No data gaps were identified under the HPV Challenge Program.

Exposure Characterization Summary

EPA identifies a medium potential that the general population and environment might be exposed to this chemical from environmental releases based on the industrial processing and use information, its high mobility in soil, and the moderate to rapid hydrolysis rate.

EPA identifies a high relative ranking for potential worker exposure based on the potential for inhalation exposures to dry powders.

EPA identifies a medium potential that consumers might be exposed to this chemical based on uncertainty in the submitted IUR data. IUR data indicate that consumer's use information is Not Readily Obtainable.

EPA identifies a low potential that children might be exposed to this chemical based on the fact that no products intended to be used by children were reported in the IUR or other data sources.

Additional Considerations for Prioritization Decision

Regulatory and Related Information Summary

- This chemical is listed on the TSCA Inventory, and is not otherwise currently regulated under TSCA.

Assumptions and Uncertainties

- EPA has no information on releases of this chemical, and has made assumptions about potential exposures based on generic use scenarios associated with reported uses. The lack of environmental release data for a chemical is a source of uncertainty in the potential that the general population and the environment might be exposed to that chemical. There is uncertainty surrounding the assignment of low, medium, and high to the persistence and bioaccumulation ratings for each chemical. This uncertainty subsequently translates to uncertainty for use of the persistence and bioaccumulation ratings to influence the ranking of the potential that the general population and the environment might be exposed to the chemical.

Appendix A: Screening-Level Hazard Characterization

SPONSORED CHEMICAL

N-oxydiethylenethiocarbamyl-N'-oxydiethylenesulfenamide (CASRN 13752-51-7)
(CA Index Name: 4-Morpholinecarbodithioic acid, 4-morpholinyl ester)

Introduction

The sponsor, Rubber and Plastic Additives Panel of the American Chemistry Council, submitted a Test Plan and Robust Summaries to EPA for the category Sulfenamide Accelerators on November 30, 2001. EPA posted the submission on the ChemRTK HPV Challenge website on December 20, 2001 (<http://www.epa.gov/chemrtk/pubs/summaries/sulfaccl/c13323tc.htm>). EPA comments on the original submission were posted to the website on August 20, 2002. Public comments were also received and posted to the website. The sponsor submitted updated/revised documents on December 19, 2003 and January 13, 2005 which were posted to the ChemRTK website on March 22, 2004 and March 21, 2006, respectively. The revised submission reflects EPA and public comments and contains separate test plans and robust summaries for two chemicals that were originally included as a category. This hazard characterization pertains to N-oxydiethylenethiocarbamyl-N'-oxydiethylenesulfenamide (OTOS, CASRN. 13752-51-7)

1. Physical-Chemical Properties and Environmental Fate

The physical-chemical properties of CASRN 13752-51-7 are summarized in Table 1a, while its environmental fate properties are provided in Table 1b. The structure of the compound is provided in Table 2 at the end of Appendix A.

Physical-Chemical Properties Characterization

CASRN 13752-51-7 is a solid with moderate water solubility and low vapor pressure.

Table 1a. Physical-Chemical Properties of N-oxydiethylenethiocarbamyl-N'-oxydiethylenesulfenamide¹	
Property	Value
CASRN	13752-51-7
Molecular Weight	248.36
Physical State	Solid
Melting Point	Decomposition starts after melting at 130.0–140.0°C (measured)
Boiling Point	Decomposes prior to boiling.
Vapor Pressure	1.15×10^{-5} mm Hg at 25°C (estimated) ²
Water Solubility	127 mg/L at 20°C (measured)
Dissociation Constant (pK _a)	Not applicable
Henry's Law Constant	2.0×10^{-8} atm·m ³ /mole (estimated)
Log K _{ow}	1.65 (measured)

¹Rubber and Plastic Additives Panel. March 21, 2006. Revised Robust Summary for N-Oxydiethylenethiocarbonyl-N-Oxydiethylenesulfenamide.

<http://www.epa.gov/chemrtk/pubs/summaries/sulfaccl/c13323tc.htm>.

²US EPA. 2008. Estimation Programs Interface Suite™ for Microsoft® Windows, v 3.20. United States Environmental Protection Agency, Washington, DC, USA.

Environmental Fate Characterization

CASRN 13752-51-7 is expected to have high mobility in soil. CASRN 13752-51-7 was not readily biodegradable in a modified Sturm (OECD 301B) test; however, these results are likely for the hydrolysis product. The rate of volatilization of CASRN 13752-51-7 from water and moist soil is considered low based on its estimated Henry's Law constant. The rate of hydrolysis is moderate to rapid under environmental conditions. CASRN 13752-51-7 is expected to have low persistence (P1) and low bioaccumulation potential (B1).

Table 1b. Environmental Fate Characteristics of N-oxydiethylenethiocarbamyl-N'-oxydiethylenesulfenamide¹	
Property	Value
Photodegradation Half-life	0.6 hours (estimated) ³
Hydrolysis Half-life	14.2 minutes at pH 4 and 25°C (measured); 44 hours at pH 7 and 25°C (measured); 176 hours at pH 9 and 25°C (measured)
Biodegradation	42% after 28 days (not readily biodegradable)
Bioconcentration	BCF = 3.2 (estimated) ³
Log K _{oc}	1.2 (estimated) ³
Fugacity (Level III Model)	Air = 0.394% Water = 32.2% Soil = 67.4% Sediment = 0.047%
Persistence ²	P1 (low)
Bioaccumulation ²	B1 (low)

¹Rubber and Plastic Additives Panel. March 21, 2006. Revised Robust Summary for N-Oxydiethylenethiocarbonyl-N-Oxydiethylenesulfenamide.

<http://www.epa.gov/chemrtk/pubs/summaries/sulfaccl/c13323tc.htm>.

²Federal Register. 1999. Category for Persistent, Bioaccumulative, and Toxic New Chemical Substances. *Federal Register* 64, Number 213 (November 4, 1999) pp. 60194–60204.

³US EPA. 2008. Estimation Programs Interface Suite™ for Microsoft® Windows, v 3.20. United States Environmental Protection Agency, Washington, DC, USA.

Conclusion: CASRN 13752-51-7 is a solid with moderate water solubility and low vapor pressure. It is expected to have high mobility in soil. Volatilization of CASRN 13752-51-7 from water and moist soil is considered low based on its estimated Henry's Law constant. The rate of hydrolysis is moderate to rapid under environmental conditions. CASRN 13752-51-7 is expected to have low persistence (P1) and low bioaccumulation potential (B1).

2. Environmental Effects – Aquatic Toxicity

Acute Toxicity to Fish

Rainbow trout (*Oncorhynchus mykiss*) were exposed to CASRN 13752-51-7 at measured concentrations of 2.6, 4.6, 8.2, 14.6 and 26 mg/L under semi-static conditions for 96 hours.

96-h LC₅₀ = 9.1 mg/L

Acute Toxicity to Aquatic Invertebrates

Daphnia magna were exposed to CASRN 13752-51-7 at mean measured concentrations of 0.084, 0.144, 0.264, 0.373, 0.730, 1.46, 2.63, 4.34 and 7.92 mg/L under static conditions for 48 hours.

48-h EC₅₀ = 1.6 mg/L

Toxicity to Aquatic Plants

Green algae (*Scenedesmus subspicatus*) were exposed to CASRN 13752-51-7 in a closed system at measured concentrations of 4.23, 9.24, 18.4, 34.9 and 67.4 mg/L for 72 hours. Maximum toxicity to algae occurred within 28 hours following exposure.

72-h EC₅₀ (biomass) = 5.9 mg/L

72-h EC₅₀ (growth) = 6.6 mg/L

Conclusion: The evaluation of available toxicity data for aquatic organisms indicates that the potential acute hazard of CASRN 13752-51-7 to fish, aquatic invertebrates and aquatic plants is moderate.

3. Human Health Effects

Acute Oral Toxicity

(1) Sprague-Dawley rats (5 males/dose) were administered CASRN 13752-51-7 via gavage (50% suspension in corn oil) at 1800, 2700, 4050, 6075, or 9112 mg/kg-bw and were observed for 14 days. Signs of toxicity were not reported.

LD₅₀ (male) = 5000 mg/kg-bw

(2) Rats (5 males/dose, strain unspecified) were administered CASRN 13752-51-7 via gavage at up to 10,000 mg/kg-bw and were observed for 14 days. Signs of toxicity were not reported.

LD₅₀ (male) = 5110 mg/kg-bw

Acute Inhalation Toxicity

Albino rats (10 males, strain not specified) were exposed to CASRN 13752-51-7 via inhalation at 164.4 mg/L for one hour and observed for 14 days. No evidence of systemic toxicity or mortality was observed.

Acute Dermal Toxicity

Albino rabbits (2/ sex/group, strain not specified) were exposed to CASRN 13752-51-7 via dermal route at 1000, 2150, 4640 and 10,000 mg/kg-bw to abraded and intact skin under semi-occlusive conditions for 24 hours and observed for 14 days. One animal exposed to 1000 mg/kg-bw died during the observation period and was not considered treatment -related. No other mortality or signs of toxicity were reported.

LD₅₀ > 10,000 mg/kg-bw

Repeated-Dose Toxicity

In a two-year bioassay, Sprague-Dawley rats (60/sex/dose) were exposed daily to CASRN 13752-51-7 via diet at 0, 20, 60, 200 or 600 ppm (0, approximately 1, 3, 10 or 30 mg/kg-bw/day). At the end of the 2-year exposure period, a significant decrease in body weights and effects on kidney weights, increased incidence of rales and non-neoplastic urinary tract

abnormalities (enlargements, thickening or distension, surface irregularities, the presence of blood in the lumen, dilation of renal pelvis and grossly evident masses/nodules) were seen in males and females at 30 mg/kg-bw/day. Non-neoplastic microscopic abnormalities, at 30 mg/kg-bw/day, were cortical or medullary mineralization, hydronephrosis, papillary necrosis, hemorrhage and blood in the kidneys, urothelial hyperplasia and the presence of blood in the urinary bladder). These changes were not seen at the lower doses and at the earlier sacrifice time points. No compound related effects were noted on hematology, clinical chemistry or urinalysis parameters.

LOAEL ~ 30 mg/kg-bw/day (based on effects on body weights, kidney weights and urinary tract abnormalities)

NOAEL ~ 10 mg/kg-bw/day

Reproductive Toxicity

(1) In a combined reproductive/developmental toxicity study, Sprague-Dawley rats (10/sex/dose) were administered CASRN 13752-51-7 continuously in the diet at 0, 60, 200 and 600 ppm (0, approximately 3, 10 and 30 mg/kg-bw/day) to males for 14 days prior to mating through 14 days mating and to females for 14 days prior to mating through mating, gestation and lactation day 4. On post-partum day 5, all surviving animals were sacrificed and examined macroscopically. Histopathology examination was performed on reproductive and target organs from control and high-dose parental animals. At 600 ppm, there were no mortalities or clinical signs of toxicity in the adult males or females. An initial reduction in food consumption led to a transient reduction in body weight gain. No macroscopic or microscopic abnormalities were observed at post-mortem examination. At 60 and 200 ppm there was no treatment-related toxicity. There were no treatment-related effects on fertility, mating performance, gestation length and pre- and post-natal viability.

NOAEL (systemic and reproductive toxicity) ~ 30 mg/kg-be/day (based on no effects at the highest dose tested)

(2) Fertility of male rats (12/dose) was evaluated following administration of CASRN 13752-51-7 via diet at 0, 60, 200 or 600 ppm (0, approximately 3, 10 or 30 mg/kg-bw/day) for 12 weeks. The exposed males were mated with untreated females. No clear dose-related effect on body weights was observed in either the parents or the pups. No evidence of compound related effects on mating, fertility, gestation length, number of implantations or live birth, pup growth or survival was observed. No morphological changes in the testes from the high-dose males were observed by either light or electron microscopy.

NOAEL (male reproductive toxicity) ~ 30 mg/kg-bw/day (based on no effects on the highest dose tested)

Developmental Toxicity

In the combined reproductive/developmental toxicity study described previously, there were no treatment-related effects on litter size at birth or on subsequent offspring survival throughout lactation (day 4). Litter sizes and group mean total litter weight were comparable between all dose groups. There were no effects on offspring reflexological responses and no effect on the sex ratios.

NOAEL (maternal/developmental toxicity) = ~ 30 mg/kg-bw/day (based on no effects at the highest dose tested)

Genetic Toxicity – Gene Mutation

In vitro

(1) *Salmonella typhimurium* strains TA98, TA100, TA1535, TA1537 and TA1539, *Escherichia coli* (WP2uvrA) and *Saccharomyces* were exposed to CASRN 13752-51-7 at concentrations ranging from 0.5 – 5000 µg/plate in the presence and absence of metabolic activation. The cytotoxic concentration was 100 µg/plate. No increase in mutant frequency was evident at any concentration. Precipitate was not reported at the maximum concentration tested. Positive and solvent controls were employed and responded appropriately.

CASRN 13752-51-7 was not mutagenic in this assay.

(2) In three separate assays, mouse lymphoma L5178Y cells were exposed to CASRN 13752-51-7 at concentrations ranging from 0.313 – 250 µg/mL in the presence and absence of metabolic activation. Cytotoxicity was reported at concentrations of 12.5 µg/mL (with metabolic activation) and 1.8 µg/mL (without activation). Precipitation was reported in one assay at 12.5 µg/mL. All cultures exhibited increases in mutant frequencies with and without metabolic activation. All positive and solvent controls responded appropriately.

CASRN 13752-51-7 was mutagenic in these assays.

Genetic Toxicity – Chromosomal Aberrations

In vitro

In two separate assays, Chinese Hamster Ovary Cells (CHO) were exposed to CASRN 13752-51-7 at concentrations ranging from 0.31 – 20 µg/mL with and without metabolic activation. Cytotoxicity was not reported. Both assays showed positive results without metabolic activation and equivocal results with metabolic activation. Positive and solvent controls were employed and responded appropriately.

CASRN 13752-51-7 induced chromosomal aberrations in these assays.

Genetic Toxicity – Other

In vitro

(1) In two separate DNA Repair assays *Escherichia coli* W3110 (*pol A+*) and W3078 (*pol A-*) were exposed to CASRN 13752-51-7 at concentrations ranging from 100 – 5000 µg/plate with and without metabolic activation. Both assays reported positive results. Positive and solvent controls were explicitly employed and responded appropriately.

CASRN 13752-51-7 induced DNA effects in these assays.

(2) In three separate cell transformation assays, mouse cells (BALB 3T3) were exposed to CASRN 13752-51-7 at concentrations ranging from 0.00625 – 0.2 µg/ml without metabolic activation. Cytotoxic concentrations were reported at 0.24 and 0.488 µg/mL. Precipitate was reported at concentrations greater than 250 µg/ml. Two of the three assays reported positive results. Positive and solvent controls were employed and responded appropriately.

CASRN 13752-51-7 was mutagenic in these assays.

In vivo

In dominant lethal assay, male Sprague-Dawley rats (10/dose) were administered CASRN 13752-51-7 via gavage at 0, 6.25, 12.5 or 25 mg/kg-bw/day for 56-days (consecutively) and were mated with virgin females. No evidence of dominant lethal mutations was observed in the treatment groups. Positive and negative controls were employed and responded appropriately.

CASRN 13752-51-7 did not induce dominant lethal effects in this assay.

Additional Information

Eye Irritation

In two eye irritation studies in rabbits (strain, number and sex not specified), CASRN 13752-51-7 was irritating in one study and not irritating in the other. No other information was provided.

CASRN 13752-51-7 was irritating to rabbit eyes in one assay.

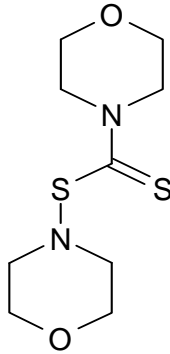
Carcinogenicity

Sprague-Dawley rats (60/sex/dose) were exposed to CASRN 13752-51-7 via diet at 0, 20, 60, 200 or 600 ppm (0, approximately 1, 3, 10 or 30 mg/kg-bw/day, respectively) for two-years. A treatment-related increase in the incidence of tumors of the urinary system was observed in the high-dose males and females. These included kidney (urothelia carcinoma, squamous cell carcinoma), ureters (urothelial carcinoma); urinary bladder (urothelial papilloma, urothelial carcinoma, squamous cell papilloma, squamous cell carcinoma). The combined total incidence of these neoplasms was 17/60 vs 1/60 (high-dose males vs control) and 15/60 vs 0/60 (high-dose females vs control). Tumors of the urinary system were not found in the mid- and low-dose groups. Ureters were not evaluated in the controls, low- or mid- dose groups.

CASRN 13752-51-7 induced in a 2-year dietary study in rats.

Conclusion: Acute toxicity of CASRN 13752-51-7 in rats via oral, dermal and inhalation exposure is low. In the two-year chronic toxicity/carcinogenicity study with CASRN 13752-51-7 in rats, systemic toxicity was low at the interim sacrifice after 12 months. After 2-years of exposure, an increase in the incidence of tumors was seen only at the highest tested dose. A combined reproductive/developmental toxicity screening test showed no reproductive or developmental toxicity (pre- and postnatal) in rats. CASRN 13752-51-7 did not cause any effects on fertility in male rats. It was not mutagenic in bacteria, but induced gene mutations and chromosomal aberrations in mammalian cells *in vitro*.

Table 2

Summary Table of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program	
Endpoints	SPONSORED CHEMICAL N-oxydiethylenethiocarbamyl-N'- oxydiethylenesufenamide (13752-51-7)
Structure	
Summary of Environmental Effects – Aquatic Toxicity Data	
Fish	
96-h LC₅₀ (mg/L)	9.1
Aquatic Invertebrates	
48-h EC₅₀ (mg/L)	1.6
Aquatic Plants	
72-h EC₅₀ (mg/L)	
(growth)	6.6
(biomass)	5.9
Summary of Human Health Data	
Acute Oral Toxicity	
LD₅₀ (mg/kg-bw)	5,000-5200
Acute Dermal Toxicity	
LD₅₀ (mg/kg-bw)	>10,000
Acute Inhalation Toxicity	
LC₅₀ (mg/L)	>164.4 (1-h)
Repeated-Dose Toxicity	
NOAEL/LOAEL	NOAEL = 10
(mg/kg-bw/day)	LOAEL = 30
Reproductive/Developmental Toxicity	
NOAEL/LOAEL	
(mg/kg-bw/day)	NOAEL = 30 (highest dose tested)

Summary Table of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program	
Endpoints	SPONSORED CHEMICAL N-oxidiethylenethiocarbamyl-N'- oxidiethylenesufenamide (13752-51-7)
Genetic Toxicity – Gene Mutation <i>In vitro</i> (in bacteria) Gene Mutation <i>In vitro</i> (in mammalian cells)	Negative Positive
Genetic Toxicity – Chromosomal Aberrations <i>In vitro</i>	Positive
Genetic Toxicity – Other DNA Repair Assay Dominant Lethal Assay	Positive Negative
Additional Information – Eye irritation	Irritating
Carcinogenicity	CASRN 13752-51-7 induced tumors of the urinary system at the highest dose.

Appendix B: Screening-Level Exposure Characterization

SPONSORED CHEMICAL

N-oxydiethylenethiocarbamyl-N'-oxydiethylenesulfenamide (CASRN 13752-51-7) (CA Index Name: 4-Morpholinecarbodithioic acid, 4-morpholinyl ester)

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

Volume and Use Information

N-oxydiethylenethiocarbamyl-N'-oxydiethylenesulfenamide had aggregated production and/or import volume in the United States between 500,000 and 1 million pounds. Non-confidential information in the IUR indicates that this chemical was manufactured and/or imported at the following companies and sites: Emerald Performance Materials LLC / Henry, IL. There may be other companies and sites that are claimed confidential. Persons submitting IUR information for 2005 asserted that some or all of the information was confidential. Only non-confidential versions of reported IUR data are included in this summary.

Table 1 at the end of this summary lists the non-confidential industrial processing and uses from IUR submissions. Table 2 at the end of this summary lists the non-confidential commercial/consumer uses from IUR submissions.

Non-confidential IUR information indicates that the industrial processing and uses of the chemical include process regulators used in vulcanization or polymerization processes in the manufacturing of resin and synthetic rubber. It also indicates that the commercial and consumer uses are not readily obtainable (NRO).

Environmental Releases

Environmental releases may impact general population and environmental exposures. Factors affecting releases include volumes produced, processed, and used; numbers of sites; and processes of manufacture, processing, and use.

Based on IUR data, the maximum total number of industrial sites manufacturing, processing, or using this chemical is confidential.

The following release statements are made based on inferences regarding the non-confidential use information found in public sources or reported in IUR and summarized in Table 1 below.

Many chemicals designated as product component have industrial releases that are a relatively low percentage of the volume. Lower percentage releases occur when a high percentage of the volume is incorporated without significant process losses during its incorporation into formulation, mixture, or product. The actual percentage and quantity of release of the reported chemical associated with this processing or use are not known.

Chemicals designated to have industrial use as process regulators, used in vulcanization or polymerization processes can have variable release percentages during industrial processing and use. The actual percentage and quantity of release of the reported chemical associated with this category is not known.

The chemical is not on the Toxics Release Inventory.⁴

Experience has shown that air releases due to volatilization have not been an issue for chemicals with vapor pressures below 0.01 mm Hg. The vapor pressure for CASRN 13752-51-7 is 1.15×10^{-5} mm Hg.

Exposures to the General Population and the Environment

Based on the information under the release section above, there is potential for environmental releases although the quantity and media of releases are unknown. A search of additional relevant databases did not provide any further information on releases of this chemical.

Persistence and bioaccumulation ratings for this chemical are P1 and B1. These ratings suggest that this chemical is not persistent in the environment; and is not bioaccumulative. It is expected to have high mobility in soil. Volatilization of CASRN 13752-51-7 from water and moist soil is considered low based on its estimated Henry's Law constant. The rate of hydrolysis is moderate to rapid under environmental conditions.

Based on the information considered, including environmental fate, known uses, and the Agency's expert judgment, EPA identifies, for purposes of risk-based prioritization, a medium potential that the general population and the environment might be exposed to this chemical.

Exposures to Workers

Worker exposures may be impacted by many factors, including but not limited to volumes produced, processed, and used; physical forms and concentrations; processes of manufacture, processing, and use; chemical volatility, and exposure controls, such as engineering controls and personal protective equipment.

Based on IUR data, the maximum total number of workers reasonably likely to be exposed to this chemical during manufacturing and industrial processing and use may be less than 100. There may be additional potentially exposed industrial workers who are not included in this estimate. This estimate does not include potentially exposed commercial workers.

The National Occupational Exposure Survey (NOES) has no data for total number of workers potentially exposed to this chemical under the CASRN 13752-51-7.⁵

⁴ USEPA, 2006. Toxic Release Inventory. Accessed, 10/6/08. <http://www.epa.gov/triexplorer/>

⁵ NIOSH, 1983. National Occupational Exposure Survey (NOES, 1981-1983). Accessed, 10/9/08. <http://www.cdc.gov/noes/>

Based on IUR data, the chemical is manufactured in dry powder, pellets, or large crystal forms, and worker exposures are possible for this chemical in these forms. There may be other physical forms that are claimed confidential. Also, the non-confidential maximum concentration is up to 100%. There may be other concentrations that are claimed confidential.

Experience has shown that worker exposures to vapors have not been an issue for chemicals with vapor pressures below 0.001 mmHg. The vapor pressure for CASRN 13752-51-7 is 1.15×10^{-5} mmHg.

This chemical does not have OSHA Permissible Exposure Limits (PELs).⁶

Based on the information considered, including IUR data, and in combination with the Agency's professional judgment, EPA identifies, for the purposes of risk-based prioritization, a high relative ranking for potential worker exposure. This high relative ranking is based primarily on the potential for inhalation exposures to dry powders.

Exposures to Consumers

The non-confidential consumer uses included in the IUR submissions are not readily obtainable. Table 2 at the end of this summary provides additional details.

EPA identifies, for the purposes of risk-based prioritization, a medium potential that consumers might be exposed to this chemical from products containing this chemical, based on uncertainty in the IUR data.

Exposures to Children

No uses in products intended to be used by children were reported in the IUR.

Therefore, EPA identifies, for the purposes of risk-based prioritization, a low potential that children might be exposed to this chemical from products containing this chemical.

⁶ NIOSH, 1988. OSHA PEL Project Documentation. <http://www.cdc.gov/niosh/pel88/npelcas.html> Accessed, 10/9/08.

Non Confidential IUR Data Summary CASRN 13752-51-7

Manufacturing/Import Information

Production (including import) volume: 500,000 pounds to 1 million pounds
 List of non-CBI companies/sites*: Emerald Performance Materials LLC / Henry, IL
 Maximum number of exposed workers**: less than 100
 Highest non-CBI maximum concentration*: up to 100%
 Non-CBI physical forms*: dry powder; pellets or large crystals

* There may be other companies/ sites, concentrations and physical forms that are claimed confidential.

** Includes all manufacturing and industrial processing and use workers. There may be additional potentially exposed industrial workers that are not included in this estimate since not all submitters were required to report on industrial processing and use and/or there may be at least one use that contains a "Not Readily Obtainable" (NRO) response among the submissions.

Table 1 Industrial Processing and Use Information		
Processing Activity	Industrial Sector	Function in Industrial Sector
Processing--incorporation into formulation, mixture, or reaction product	Resin and Synthetic Rubber Manufacturing	Process regulators, used in vulcanization or polymerization processes
One or more items may have been claimed as confidential.		

Table 2 Commercial/ Consumer Use Information		
Commercial/ Consumer Product Category Description	Highest Maximum Concentration Range	Use in Children's Products
Not Readily Obtainable (NRO)	NRO	No
One or more items may have been claimed as confidential.		