

## SCREENING-LEVEL HAZARD CHARACTERIZATION

### SPONSORED CHEMICAL

#### **Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich (CASRN 398141-87-2)**

{Formerly called, Thiophene, 3-(decyloxy)tetrahydro-, 1,1-dioxide (CASRN 18760-44-6)}

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

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

The evaluation is performed according to established EPA guidance<sup>2,3</sup> and is based primarily on hazard data provided by sponsors; however, in preparing the hazard characterization, EPA considered its own comments and public comments on the original submission as well as the sponsor’s responses to comments and revisions made to the submission. In order to determine whether any new hazard information was developed since the time of the HPV submission, a search of the following databases was made from one year prior to the date of the HPV Challenge submission to the present: (ChemID to locate available data sources including Medline/PubMed, Toxline, HSDB, IRIS, NTP, ATSDR, IARC, EXTOXNET, EPA SRS, etc.), STN/CAS online databases (Registry file for locators, ChemAbs for toxicology data, RTECS, Merck, etc.) and Science Direct. OPPT’s focus on these specific sources is based on their being of high quality, highly relevant to hazard characterization, and publicly available.

---

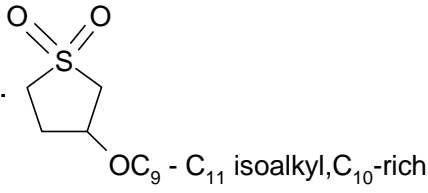
<sup>1</sup> U.S. EPA. High Production Volume (HPV) Challenge Program; <http://www.epa.gov/chemrtk/index.htm>.

<sup>2</sup> U.S. EPA. HPV Challenge Program – Information Sources; <http://www.epa.gov/chemrtk/pubs/general/guidocs.htm>.

<sup>3</sup> U.S. EPA. Risk Assessment Guidelines; <http://cfpub.epa.gov/ncea/raf/rafguid.cfm>.

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

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

<p><b>Chemical Abstract Registry Number (CASRN)</b></p>	<p><b>398141-87-2</b></p>
<p><b>Chemical Abstract Index Name</b></p>	<p><b>Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich</b></p>
<p><b>Structural Formula</b></p>	
<p style="text-align: center;"><b>Summary</b></p> <p>Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is a solid with moderate water solubility and low vapor pressure. It is expected to have moderate mobility in soil. Volatilization of thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is considered moderate based on its Henry's Law constant. The rate of hydrolysis is considered negligible. The rate of atmospheric photooxidation is considered rapid. Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is expected to have high persistence (P3) and low bioaccumulation potential (B1).</p> <p>Acute oral and dermal toxicity of thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is low. Following repeated oral exposure to rats, increased organ size of the thyroid and liver were shown at 175 mg/kg-day; the NOAEL for systemic toxicity was 50 mg/kg-day. A combined repeated-dose/reproductive/developmental toxicity screening test in rats with limited postnatal evaluations, showed no treatment-related effects on reproduction or development; and the NOAEL was 600 mg/kg-day for reproductive and developmental toxicity. Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich did not induce gene mutation in bacteria and did not induce chromosomal aberrations in when tested <i>in vitro</i>.</p> <p>The evaluation of available toxicity data for aquatic organisms exposed to CASRN 398141-87-2 indicates that the 96-h LC<sub>50</sub> to fish is 4.2 mg/L, the 48-h EC<sub>50</sub> to aquatic invertebrates is 4.6 mg/L, and the 72-h EL<sub>50</sub> to aquatic plants are 3.5 mg/L (biomass) and 63mg/L (growth rate) based on the WAF loading rate.</p> <p>No data gaps were identified under the HPV Challenge Program.</p>	

The sponsor, The American Chemistry Council, Petroleum Additives Panel Health, Environmental, and Regulatory Task Group (HERTG) and its member companies, submitted a Test Plan and Robust Summaries to EPA for thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich (CASRN 398141-87-2), on December 19, 2003. (At the time of the submission, this chemical was called, thiophene, 3-(decyloxy)tetrahydro-, 1,1-dioxide (CASRN 18760-44-6).) EPA posted the submission on the ChemRTK HPV Challenge website on August 20, 2003 (<http://www.epa.gov/chemrtk/pubs/summaries/thio3d1d/c14658tc.htm>). EPA comments on the original submission were posted to the HPV Challenge website on January 6, 2003. Public comments were also received and posted to the website. The sponsor submitted updated/revised documents on December 20, 2006, which were posted to the ChemRTK website on February 3, 2007.

## **1** **Chemical Identity**

### **1.1** **Identification and Purity**

At the time of the initial Test Plan submission, this chemical was called, thiophene, 3-(decyloxy)tetrahydro-, 1,1-dioxide (CASRN 18760-44-6). It was determined that the chemical is more accurately identified as thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich (CASRN 398141-87-2). The sponsor's Test Plan identified the substance as a lubricating additive generally blended into finished oils and fluids where the typical concentration is less than 1 wt.% depending on the application.

There is no discussion of the purity of this chemical in the sponsor's Test Plan.

### **1.2** **Physical-Chemical Properties**

The physical-chemical properties of thiophene, tetrahydro-, 1,1-dioxide,3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich are summarized in Table 1.

<b>Table 1. Physical-Chemical Properties of Thiophene, tetrahydro-, 1,1-Dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-Isoalkyloxy)derivs., C<sub>10</sub>-Rich<sup>1</sup></b>	
<b>Property</b>	<b>Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyl-oxy)derivs., C<sub>10</sub>-rich</b>
CASRN	398141-87-2
Molecular Weight	276.44 (C <sub>10</sub> )
Physical State	Solid
Melting Point	33.5–34°C (estimated) <sup>2</sup>
Boiling Point	207–209°C at 2 mm Hg (estimated) <sup>2</sup> 400°C at 760 mm Hg (estimated) <sup>3</sup>
Vapor Pressure	2.8×10 <sup>-6</sup> mm Hg at 25°C (estimated) <sup>3</sup>
Water Solubility	54 mg/L at 20°C (measured)
Dissociation Constant (pK <sub>a</sub> )	Not applicable
Henry's Law Constant	7.3×10 <sup>-7</sup> atm-m <sup>3</sup> /mole (estimated) <sup>4</sup>
Log K <sub>ow</sub>	1.19 (measured)

<sup>1</sup>The Health, Environmental, and Regulatory Task Group (HERTG) of the American Chemistry Council Petroleum Additives Panel. January 12, 2007. Revised Robust Summary and Test Plan for Thiophene, 3-(Decyloxy)tetrahydro-, 1,1-Dioxide. <http://www.epa.gov/oppt/chemrtk/pubs/summaries/thio3d1d/c14658tc.htm>.

<sup>2</sup>Beilstein EV 17/3 p. 66. measured value for Thiophene, 3-(decyloxy)tetrahydro-, 1,1-dioxide (CASRN 18760-44-6)

<sup>3</sup>Extrapolated from measured boiling point at reduced pressure using NOMO5.

<sup>4</sup>Estimated value for Thiophene, 3-(decyloxy)tetrahydro-, 1,1-dioxide (CASRN 18760-44-6) using U.S. EPA. 2008. Estimation Programs Interface Suite™ for Microsoft® Windows, v 3.20. United States Environmental Protection Agency, Washington, DC, USA. <http://www.epa.gov/opptintr/exposure/pubs/episuite.htm>.

## **2 General Information on Exposure**

### **2.1 Production Volume and Use Pattern**

This HPV chemical had an aggregated production/import volume in the United States between 1 million and 10 million pounds during calendar year 2005. Information on this chemical prior to 2003 was submitted under thiophene, 3-(decyloxy)tetrahydro-,1,1-dioxide (CASRN 18760-44-6).

Non-confidential IUR information indicates that the industrial processing and uses of this chemical include processing as additives in lubricants. Non-confidential information in the IUR also indicates that the commercial and consumer products containing the chemical include lubricants, greases, and fuel additives. Information from the HPV test plan indicates that 2-thiophene, 3-(decyloxy)tetrahydro-, 1,1-dioxide is used as a lubricating additive in many types of internal combustion engine oils, automatic transmission fluids, and hydraulic fluids.

### **2.2 Environmental Exposure and Fate**

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

The environmental fate properties are provided in Table 2. Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is expected to have moderate mobility in soil. The rate of biodegradation is considered slow based on the results of a ready biodegradation test. The rate of volatilization of thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich from water and moist soil is considered moderate based on its estimated Henry's Law constant. The rate of hydrolysis is considered negligible under environmental conditions. Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is expected to have high persistence (P3) and low bioaccumulation potential (B1).

<b>Table 2. Environmental Fate Characteristics of Thiophene, tetrahydro-, 1,1-Dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-Isoalkyloxy)derivs., C<sub>10</sub>-Rich<sup>1</sup></b>	
<b>Property</b>	<b>Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich</b>
CASRN	398141-87-2
Photodegradation Half-life	0.039 days (estimated) <sup>2</sup>
Hydrolysis Half-life	Stable
Biodegradation	9.6% in 28 days (not readily biodegradable)
Bioconcentration	BCF = 2 (estimated) <sup>2</sup>
Log K <sub>oc</sub>	3.0 (estimated) <sup>2</sup>
Fugacity (Level III Model)	Air = 0.163% Water = 43.2% Soil = 56.5% Sediment = 0.0907%
Persistence <sup>3</sup>	P3 (high)
Bioaccumulation <sup>3</sup>	B1 (low)

<sup>1</sup>The Health, Environmental, and Regulatory Task Group (HERTG) of the American Chemistry Council Petroleum Additives Panel. February 2, 2007. Revised Robust Summary and Test Plan for Thiophene, 3-(Decyloxy)tetrahydro-, 1,1-Dioxide (CASRN 18760-44-6).

<http://www.epa.gov/oppt/chemrtk/pubs/summaries/thio3d1d/c14658tc.htm>.

<sup>2</sup> Estimated value for Thiophene, 3-(decyloxy)tetrahydro-, 1,1-dioxide (CASRN 18760-44-6) using U.S. EPA. 2008. Estimation Programs Interface Suite™ for Microsoft® Windows, v 3.20. United States Environmental Protection Agency, Washington, DC, USA. <http://www.epa.gov/opptintr/exposure/pubs/episuite.htm>.

<sup>3</sup>Federal Register. 1999. Category for Persistent, Bioaccumulative, and Toxic New Chemical Substances. *Federal Register* 64, Number 213 (November 4, 1999) pp. 60194–60204.

**Conclusion:** Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is a solid with moderate water solubility and low vapor pressure. It is expected to have moderate mobility in soil. Volatilization of thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is considered moderate based on its Henry's Law constant. The rate of hydrolysis is considered negligible. The rate of atmospheric photooxidation is considered rapid. Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is expected to have high persistence (P3) and low bioaccumulation potential (B1).

### **3 Human Health Hazard**

A summary of health effects data submitted for SIDS endpoints is provided in Table 3.

#### ***Acute Oral Toxicity***

Wistar rats (5/sex/dose) were administered thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich via oral gavage at 0.67, 1.25, 2.5, 5.0 and 10 mL/kg-bw (roughly 670, 1250, 2500, 5000 and 10,000 mg/kg-bw). No mortalities, changes in clinical observations or body weights resulted from the exposure.

**LD<sub>50</sub> > 10,000 mg/kg-bw**

#### ***Acute Dermal Toxicity***

Male rabbits, strain not specified, (3/dose) were dermally exposed to thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich via unabraded skin under occlusive conditions to 2000, 4000 or 8000 mg/kg-bw for 24 hours and observed for 14 days. All animals treated at 8000 mg/kg-bw died. All animals treated at 2000 and 4000 mg/kg-bw survived and exhibited slight weight gain during the study.

**4000 mg/kg-bw < LD<sub>50</sub> < 8000 mg/kg-bw**

#### ***Repeated-Dose Toxicity***

(1) Sprague-Dawley rats (5/sex/dose) were exposed to thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich via oral gavage at 0, 100, 500 or 1000 mg/kg-bw/day for 28 days. At 1000 mg/kg-bw/day, mean absolute liver and kidney weights as well as liver- and kidney-to-body weight ratios were increased in both males and females. At 500 mg/kg-bw/day, absolute kidney weight and liver-to-body weight ratio were increased in females only. Minimal to mild eosinophilia of hepatocytes was observed in all treated males and in the 500 and 1000 mg/kg-bw/day females. Minimal hypertrophy of the thyroid follicular epithelium characterized by a diffuse increase in follicular epithelial cell size was observed in one male at 500 mg/kg-bw/day, in all males at 1000 mg/kg-bw/day and in one female at 1000 mg/kg-bw/day. An increase in the incidence and/or severity of renal hyaline droplets was observed in all treated males. This finding was not observed in female rats. Although the kidney toxicity observed only in male rats is suggestive of an alpha<sub>2u</sub>-globulin-mediated effect, one of the first key events in this mode of action, alpha<sub>2u</sub>-globulin accumulation has not been demonstrated. In addition, kidney weights are increased in females at the 500 and 1000 mg/kg-bw/day dose levels. Therefore, in the absence of a sufficient mode of action analysis, the nephropathy is assumed to be relevant to human health and it is concluded that a NOAEL for nephropathy in male rats was not established.

**LOAEL = 100 mg/kg-bw/day** (based on weight increase and histopathological changes in the kidney and liver)

**NOAEL = Not established**

(2) In a combined repeated-dose/reproductive/developmental toxicity screening test, male and female Sprague-Dawley rats (12/sex/dose) were dosed via oral gavage with thiophene,

tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich (in corn oil) at concentrations of 0, 50, 175 or 600 mg/kg-bw/day. Males were dosed for a total of 56 days (14 days prior to pairing through 1 day prior to scheduled euthanasia). Females were dosed with a total of 39–53 doses (14 days prior to pairing through lactation day 3). The protocol calls for macroscopic examination of the principal thoracic and abdominal organs of all parental animals but only control and high-dose animals have microscopic examination of organs. Salivation and clear or red materials around mouth were noted following dosing. Increased absolute and relative (to body weight and brain weight) thyroid weights were noted in males at 50, 175, and 600 mg/kg-bw/day. The increase was dose-related and there is a statement in the robust summary that the thyroid weight increase was not statistically significant in males at 50 mg/kg-bw/day and females at 600 mg/kg-bw/day. Mean absolute and relative liver weights were higher in males at 175 mg/kg-bw/day and in males and females at 600 mg/kg-bw/day. Mean absolute and relative kidney weights were also higher in males from the 600 mg/kg-bw/day group. Microscopic examination revealed follicular cell hypertrophy of the thyroid gland in the high-dose group males but no changes in the 600 mg/kg-bw/day females. No test-substance-related microscopic changes were reported in the thyroid glands of the 50 or 175 mg/kg-bw/day males. (Thyroids were examined in all treated males because of changes seen in 600 mg/kg-bw/day group). No other histopathological findings were reported in the robust summary.

**LOAEL (systemic toxicity) = 175 mg/kg-bw/day** (based on increased thyroid and liver weights)

**NOAEL (systemic toxicity) = 50 mg/kg-bw/day**

### *Reproductive Toxicity*

In the combined reproductive/developmental toxicity screening test (described above), there were no test substance-related effects on male and female reproductive performance or on mean gestation lengths. No effects were seen in the mean numbers of pups born, live litter size, sex ratio, postnatal survival and general physical condition, or body weights.

**NOAEL (reproductive toxicity) = 600 mg/kg-bw/day** (based on no effects at highest dose tested)

### *Developmental Toxicity*

In the combined reproductive/developmental toxicity screening test (described above), the mean number of pups born, live litter size on postnatal day 0, the percentage of males at birth and postnatal survival in the treated groups were similar to those in the control group. The general physical condition of the F1 pups and mean F1 body weights were not affected by treatment of the F0 parental animals. The robust summary states that there were no macroscopic findings in the F1 pups that were found dead that could be attributed to F0 treatment with the test article.

**LOAEL (maternal toxicity) = 600 mg/kg-bw/day** (based on increased liver weights)

**NOAEL (maternal toxicity) = 175 mg/kg-bw/day**

**NOAEL (developmental toxicity) = 600 mg/kg-bw/day** (based on no effects at highest dose tested)

### ***Genetic Toxicity – Gene Mutation***

#### ***In vitro***

In a bacterial reverse mutation test, *Salmonella typhimurium* TA1535, TA1537, TA1538, TA98 and TA100 strains and *Escherichia Coli* strain WP2uvrA were exposed to thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich at concentrations of 1, 5, 10, 50, 100, 500, 1000 or 5000 µg/plate with and without metabolic activation. Positive and solvent controls gave appropriate responses.

**Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich was not mutagenic in this assay.**

### ***Genetic Toxicity – Chromosomal Aberrations***

#### ***In vitro***

Human peripheral blood lymphocytes were exposed to thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich under the following conditions: (1) at 25, 50, 75, 100, 125, 150, 175 µg/mL with and without metabolic activation for 4 hours and (2) at 6.25, 25, 50, 65, 75 µg/mL without metabolic activation for 20 hours. All cells were harvested at 20 hours. At the highest concentration of each test, all responses were similar to solvent control. Positive and vehicle controls gave appropriate responses.

**Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich did not induce chromosomal aberrations in this assay.**

**Conclusion:** Acute oral and dermal toxicity of thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich is low. Following repeated oral exposure to rats, increased organ size and histopathological effects on the liver and kidney were shown at 175 mg/kg-day; the NOAEL for systemic toxicity was 50 mg/kg-day. A combined repeated-dose/reproductive/developmental toxicity screening test in rats with limited postnatal evaluations, showed no treatment-related effects on reproduction or development; and the NOAEL was 600 mg/kg-day for reproductive and developmental toxicity. Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich did not induce gene mutation in bacteria and did not induce chromosomal aberrations in when tested *in vitro*.

## **4 Hazards to the Environment**

### ***Acute Toxicity to Fish***

Fathead minnows (*Pimephales promelas*; 20 fish/concentration, 10/replicate) were exposed to thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich at nominal concentrations of 0, 0.38, 0.75, 1.5, 3.0, 6.0 or 12 mg/L under static conditions for 96 hours. No signs of toxicity were evident at concentrations up to and including 1.5 mg/L. At 3.0 mg/L, 35% of the fish exhibited loss of equilibrium and surfacing at study termination. Mortality was seen in all fish exposed to 6 or 12 mg/L.

**96-h LC<sub>50</sub> = 4.2 mg/L**

### ***Acute Toxicity to Aquatic Invertebrates***

*Daphnia magna* were exposed to thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich at nominal concentrations of 0, 0.31, 0.63, 1.3, 2.5, 5.0 or 10.0 mg/L under static conditions for 48 hours. At 1.3 and 2.5 mg/L, 25 to 75% of the daphnids appeared lethargic at test termination. Surviving daphnids in the 5.0 mg/L treatment group also appeared lethargic at test termination.

**48-h EC<sub>50</sub> = 4.6 mg/L**

#### ***Toxicity to Aquatic Plants***

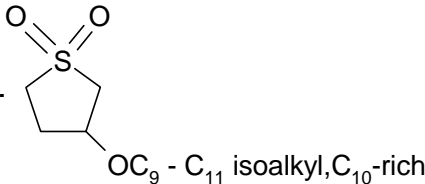
Green algae, *Scenedesmus subspicatus*, were exposed to thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyloxy)derivs., C<sub>10</sub>-rich at nominal concentrations of 0.313, 0.625, 1.25, 2.5, 5.0 and 10 mg/L under static conditions using the water accommodated fraction (WAF) method for 72 hours. No analytical monitoring was performed. Both biomass and growth rate were reduced by the exposure to the test substance.

**72-h EL<sub>50</sub> (biomass) = 3.5 mg/L loading rate WAF**

**72-h EL<sub>50</sub> (growth rate) = 63 mg/L loading rate WAF**

**Conclusion:** The evaluation of available toxicity data for aquatic organisms exposed to CASRN 398141-87-2 indicates that the 96-h LC<sub>50</sub> to fish is 4.2 mg/L, the 48-h EC<sub>50</sub> to aquatic invertebrates is 4.6 mg/L, and the 72-h EL<sub>50</sub> to aquatic plants are 3.5 mg/L (biomass) and 63mg/L (growth rate) based on the WAF loading rate.

Table 3

Summary Table of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program	
<b>Endpoints</b>	<b>SPONSORED CHEMICAL</b> <b>Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyl- oxy)derivs., C<sub>10</sub>-rich</b> <b>(398141-87-2)</b>
<b>Structure</b>	 <p style="text-align: center;">OC<sub>9</sub> - C<sub>11</sub> isoalkyl, C<sub>10</sub>-rich</p>
Summary of Human Health Data	
<b>Acute Oral Toxicity</b> <b>LD<sub>50</sub> (mg/kg-bw)</b>	<b>10,000</b>
<b>Acute Dermal Toxicity</b> <b>LD<sub>50</sub> (mg/kg-bw)</b>	<b>4000 – 8000</b>
<b>Repeated-Dose Toxicity</b> <b>NOAEL/LOAEL</b> <b>Oral (mg/kg-bw/day)</b>	<b>NOAEL = 50</b> <b>LOAEL = 175</b>
<b>Reproductive Toxicity</b> <b>(mg/kg-bw/day)</b>	
<b>Reproductive Toxicity</b>	<b>NOAEL = 600</b>
<b>Developmental Toxicity</b> <b>(mg/kg-bw/day)</b>	
<b>Maternal Toxicity</b>	<b>NOAEL = 175</b> <b>LOAEL = 600</b>
<b>Developmental Toxicity</b>	<b>NOAEL = 600</b>
<b>Genetic Toxicity –</b> <b>Gene Mutation</b> <i>In vitro</i>	<b>Negative</b>
<b>Genetic Toxicity –</b> <b>Chromosomal Aberrations</b> <i>In vitro</i>	<b>Negative</b>

<b>Summary Table of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program</b>	
<b>Endpoints</b>	<b>SPONSORED CHEMICAL Thiophene, tetrahydro-, 1,1-dioxide, 3-(C<sub>9</sub>-C<sub>11</sub>-isoalkyl- oxy)derivs., C<sub>10</sub>-rich (398141-87-2)</b>
<b>Summary of Environmental Effects – Aquatic Toxicity Data</b>	
<b>Fish 96-h LC<sub>50</sub> (mg/L)</b>	<b>4.2</b>
<b>Aquatic Invertebrates 48-h EC<sub>50</sub> (mg/L)</b>	<b>4.6</b>
<b>Aquatic Plants 72-h EL<sub>50</sub> (mg/L)</b>	
<b>Biomass</b>	<b>3.5</b>
<b>Growth rate</b>	<b>63</b>