Willowood, LLC

SAFETY DATA SHEET

Willowood Thioben 8EC

Section 1. Identification

GHS product identifier	: Willowood Thioben 8EC
Chemical name	: Thiobencarb
Product code	: Not available.
Other means of identification	: Not available.
EPA Registration Number	: 87290-75
EPA Signal Word	: CAUTION
Product type	: Liquid.
<u>Relevant identified uses of t</u> Identified uses	the substance or mixture and uses advised against : Herbicide.
Supplier's details	: Willowood, LLC 1887 Whitney Mesa Drive #9740, Henderson, NV 89014-2069 Tel: 866 396 0465 cs@genericcropscience.com
Emergency telephone number (with hours of	: CHEMTREC, U.S.: 1-800-424-9300 International: +1-703-527-3887 24/7 Health Emergencies: Call 800-858-7378 (National Pesticide Information Center)

operation)

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: ACUTE TOXICITY (oral) - Category 4 CARCINOGENICITY - Category 2 AQUATIC HAZARD (ACUTE) - Category 1 AQUATIC HAZARD (LONG-TERM) - Category 1
GHS label elements Hazard pictograms	
Signal word	: Warning
Hazard statements	: H302 - Harmful if swallowed.
	H351 - Suspected of causing cancer. H410 - Very toxic to aquatic life with long lasting effects.
Precautionary statements	

Section 2. Hazards identification

Prevention	 P201 - Obtain special instructions before use. P202 - Do not handle until all safety precautions have been read and understood. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P273 - Avoid release to the environment. P270 - Do not eat, drink or smoke when using this product. P264 - Wash hands thoroughly after handling.
Response	 P391 - Collect spillage. P308 + P313 - IF exposed or concerned: Get medical attention. P301 + P312 + P330 - IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth.
Storage	: P405 - Store locked up.
Disposal	 P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazards not otherwise classified	: None known.

Section 3. Composition/information on ingredients

Substance/mixture	: Mixture
Chemical name	: Thiobencarb
Other means of identification	: Not available.

Ingredient name	%	CAS number
Thiobencarb	≥75 - ≤90	28249-77-6
Solvent Naphtha (Petroleum), Heavy Arom.	≥1 - ≤3	64742-94-5
2-Ethylhexan-1-ol	≥1 - ≤3	104-76-7
Naphthalene	≤0.3	91-20-3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	 Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. Get medical attention.
Inhalation	: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Skin contact	 Flush contaminated skin with plenty of water. Continue to rinse for at least 20 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Section 4. First aid measures

Ingestion

: Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/e	ffects, acute and delayed
Potential acute health effe	<u>ots</u>
Eye contact	: No known significant effects or critical hazards.
Inhalation	: No known significant effects or critical hazards.
Skin contact	: No known significant effects or critical hazards.
Ingestion	: Harmful if swallowed.
Over-exposure signs/symp	i <u>toms</u>
Eye contact	: No known significant effects or critical hazards.
Inhalation	: No known significant effects or critical hazards.
Skin contact	: No known significant effects or critical hazards.
Ingestion	: No known significant effects or critical hazards.
Indication of immediate med	lical attention and special treatment needed, if necessary
Notes to physician	 In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	: No specific treatment.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media	
Suitable extinguishing media	: Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	: None known.
Specific hazards arising from the chemical	: This material is very toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Hazardous thermal decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides sulfur oxides halogenated compounds

Section 5. Fire-fighting measures

Special protective actions	: Promptly isolate the scene by removing all persons from the vicinity of the incident if
for fire-fighters	there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protect	tiv	e equipment and emergency procedures
For non-emergency personnel	-	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	:	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Methods and materials for containment and cleaning up

Small spill	: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures	: Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Avoid release to the environment. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
Advice on general occupational hygiene	 Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Thiobencarb Solvent Naphtha (Petroleum), Heavy Arom. 2-Ethylhexan-1-ol Naphthalene	None. None. None. ACGIH TLV (United States, 3/2017). Absorbed through skin. TWA: 10 ppm 8 hours. TWA: 52 mg/m ³ 8 hours. NIOSH REL (United States, 10/2016). TWA: 10 ppm 10 hours. TWA: 10 ppm 10 hours. STEL: 15 ppm 15 minutes. STEL: 15 ppm 15 minutes. STEL: 75 mg/m ³ 15 minutes. OSHA PEL (United States, 6/2016). TWA: 10 ppm 8 hours. TWA: 50 mg/m ³ 8 hours.

Appropriate engineering controls	:	If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
Environmental exposure controls	:	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.
Individual protection measu	<u>res</u>	
Hygiene measures	:	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection	:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
Skin protection		
Hand protection	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Section 8. Exposure controls/personal protection

Other skin protection	:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	:	Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance	
Physical state	: Liquid.
Color	: Amber.
Odor	: Sweet.
Odor threshold	: Not available.
рН	: 6.03 (corrected to 25°C)
Melting point	: Not available.
Boiling point	: Not available.
Flash point	: Not available.
Evaporation rate	: Not available.
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Not available.
Vapor pressure	: Not available.
Vapor density	: Not available.
Relative density	: 1.143 g/ml @ 20°C
Solubility	: Not available.
Partition coefficient: n- octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Not available.
Flow time (ISO 2431)	: Not available.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: Reactive or incompatible with the following materials: oxidizing materials.



Section 10. Stability and reactivity

Hazardous decomposition products

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Thiobencarb	LD50 Dermal	Rat	2900 mg/kg	-
	LD50 Oral	Rat	920 mg/kg	-
2-Ethylhexan-1-ol	LD50 Oral	Rat	3730 mg/kg	-
Naphthalene	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	490 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Solvent Naphtha (Petroleum), Heavy Arom.	Skin - Mild irritant	Rabbit	-	24 hours 500 µl	-
2-Ethylhexan-1-ol	Eyes - Moderate irritant	Rabbit	-	24 hours 20 mg	-
	Eyes - Moderate irritant	Rabbit	-	20 µg	-
	Eyes - Severe irritant	Rabbit	-	20 mg	-
	Skin - Mild irritant	Rabbit	-	415 mg	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 mg	-
	Skin - Severe irritant	Rabbit	-	0.5 ml	-
Naphthalene	Skin - Mild irritant	Rabbit	-	495 mg	-

Sensitization

There is no data available.

Mutagenicity

There is no data available.

Carcinogenicity

Classification

ſ	Product/ingredient name	OSHA	IARC	NTP
	Naphthalene	-	2B	Reasonably anticipated to be a human carcinogen.

Reproductive toxicity

There is no data available.

Teratogenicity

There is no data available.

Specific target organ toxicity (single exposure)

Name	Category	Target organs
2-Ethylhexan-1-ol	Category 3	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

There is no data available.

Aspiration hazard

Name	Result
Solvent Naphtha (Petroleum), Heavy Arom.	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure

: Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Section 11. Toxicological information

Eye contact	hown significant effects or critical hazards.	
Inhalation	hown significant effects or critical hazards.	
Skin contact	hown significant effects or critical hazards.	
Ingestion	armful if swallowed.	
Symptoms related to the phy	chemical and toxicological characteristics	
Eye contact	hown significant effects or critical hazards.	
Inhalation	hown significant effects or critical hazards.	
Skin contact	hown significant effects or critical hazards.	
Ingestion	hown significant effects or critical hazards.	
Delayed and immediate effect	l also chronic effects from short and long term exposure	
<u>Short term exposure</u>		
Potential immediate	hown significant effects or critical hazards.	
effects		
Potential delayed effects	hown significant effects or critical hazards.	
Long term exposure	a la seconda da Marca da Marca da Contra da Co	
Potential immediate effects	hown significant effects or critical hazards.	
Potential delayed effects	hown significant effects or critical hazards.	
Potential chronic health eff		
General	hown significant effects or critical hazards.	
Carcinogenicity	ispected of causing cancer. Risk of cancer depends on duration	n and level of
ouromogeneity	posure.	
Mutagenicity	hown significant effects or critical hazards.	
Teratogenicity	hown significant effects or critical hazards.	
Developmental effects	hown significant effects or critical hazards.	
Fertility effects	hown significant effects or critical hazards.	

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Dermal	1088.8 mg/kg 3452.4 mg/kg 550 mg/L



Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Thiobencarb	Acute EC50 17.34 µg/L Fresh water	Algae - Pseudokirchneriella subcapitata	3 days
	Acute EC50 0.017 ppm Fresh water	Algae - Scenedesmus acutus - Exponential growth phase	96 hours
	Acute EC50 170 µg/L Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours
	Acute EC50 101.2 ppb Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 110 µg/L Fresh water	Fish - Cyprinus carpio	96 hours
	Chronic NOEC 0.005 ppm Fresh water	Algae - Scenedesmus acutus - Exponential growth phase	96 hours
	Chronic NOEC 1 ppb Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 0.028 mg/L	Fish - Oncorhynchus tshawytscha - Egg	90 days
Naphthalene	Acute EC50 1600 µg/L Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 2350 µg/L Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 213 µg/L Fresh water	Fish - Melanotaenia fluviatilis - Larvae	96 hours
	Chronic NOEC 0.5 mg/L Marine water	Crustaceans - Uca pugnax - Adult	3 weeks
	Chronic NOEC 1.5 mg/L Fresh water	Fish - Oreochromis mossambicus	60 days

Persistence and degradability

There is no data available.

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
Thiobencarb Solvent Naphtha (Petroleum), Heavy Arom.	3.4 2.8 to 6.5	169.82 99 to 5780	low high
2-Ethylhexan-1-ol Naphthalene	2.9 3.4	25.33 36.5 to 168	low low

Mobility in soil

Soil/water partition coefficient (Koc)

: Not available.

Other adverse effects

: No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling empty containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.



Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	UN3082	UN3082	UN3082
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Thiobencarb)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Thiobencarb). Marine pollutant (Thiobencarb)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Thiobencarb)
Transport hazard class(es)	9	9	9
Packing group	Ш		III
Environmental hazards	Yes.	Yes.	Yes.
	•	·	AERG : 171

DOT-RQ Details Additional information	:	Naphthalene	100 lbs / 45.4 kg	
DOT Classification	:	sizes less than the product reportab The marine pollutant mark is not rec sizes of ≤5 L or ≤5 kg. <u>Reportable quantity</u> 41738 lbs / 18	are not regulated as hazardous materials in packag ole quantity, unless transported by inland waterway quired when transported on inland waterways in 8949 kg [4379.5 gal / 16578.3 L]. Package sizes product reportable quantity are not subject to the Re requirements.	
IMDG	:		langerous good when transported in sizes of ≤5 L o et the general provisions of 4.1.1.1, 4.1.1.2 and 4.1	
ΙΑΤΑ	:		langerous good when transported in sizes of ≤5 L o et the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 a	
Special precautions for user	:	• •	a: always transport in closed containers that are ersons transporting the product know what to do in .	

Section 15. Regulatory information

U.S. Federal regulations	: United States inventory (TSCA 8b): All components are listed or exempted. Clean Water Act (CWA) 307: Naphthalene
	Clean Water Act (CWA) 301: Naphthalene; Acetaldehyde
Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)	: Listed
Clean Air Act Section 602 Class I Substances	: Not listed



Section 15. Regulatory information

Clean Air Act Section 602 Class II Substances	: Not listed
DEA List I Chemicals (Precursor Chemicals)	: Not listed
DEA List II Chemicals (Essential Chemicals)	: Not listed

SARA 302/304

Composition/information on ingredients

		SARA 302 TPQ SARA 304 RQ		RQ	
Name	EHS	(lbs)	(gallons)	(lbs)	(gallons)
Ethylene oxide	Yes.	1000	-	10	-

SARA 304 RQ

SARA 311/312

: 1111111.1 lbs / 504444.4 kg [116588 gal / 441333.7 L]

Classification

: ACUTE TOXICITY (oral) - Category 4 CARCINOGENICITY - Category 2

Composition/information on ingredients

Name	Classification
Thiobencarb Solvent Naphtha (Petroleum), Heavy Arom. 2-Ethylhexan-1-ol	ACUTE TOXICITY (oral) - Category 4 ASPIRATION HAZARD - Category 1 FLAMMABLE LIQUIDS - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN CORROSION/IRRITATION - Category 2 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
Naphthalene	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 FLAMMABLE SOLIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 CARCINOGENICITY - Category 2

SARA 313

	Product name	CAS number
Form R - Reporting requirements		28249-77-6 91-20-3
Supplier notification		28249-77-6 91-20-3

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts

- : The following components are listed: 2-Ethylhexan-1-ol
- New York

: The following components are listed: Naphthalene

New Jersey

- : The following components are listed: Thiobencarb; Naphthalene
- Pennsylvania
- : The following components are listed: 2-Ethylhexan-1-ol; Naphthalene

California Prop. 65

▲ WARNING: This product can expose you to Ethylene oxide, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to chemicals including Naphthalene, 1,4-Dioxane, Acetaldehyde, which are known to the State of California to cause cancer, and Ethanediol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.



Section 16. Other information

Procedure used to derive the classification

Calculation method Calculation method
Calculation mothod
Calculation method
Calculation method

Date of issue mm/dd/yyyy	: 05/15/2018
Date of previous issue	: Not applicable.
Version	: 1
Prepared by	: KMK Regulatory Services Inc.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

