1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

COMMON NAME: ZANOSAR® Sterile Powder

USE: Human drug used in the treatment of some types of pancreatic cancer.

MANUFACTURER/SUPPLIER:

PHARMACIA & UPJOHN
7171 PORTAGE RD.
KALAMAZOO, MI 49001-0199

TELEPHONE NUMBERS:

(616) 833-5122 (24 Hours)
(616) 833-7555 (8:00 AM - 4:30 PM)

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT 1

COMMON NAME: Streptozocin.
% BY WEIGHT: <100%
CAS NUMBER: 18883-66-4

EXPOSURE LIMIT(S): Not established.

3. HAZARDS IDENTIFICATION

PRIMARY ROUTE(S) OF EXPOSURE: Skin contact, eye contact, ingestion and inhalation.

EFFECTS OF OVEREXPOSURE: The most common toxic effect to occur from streptozocin is renal (kidney) toxicity. Such toxicity is dose-related and cumulative and may be severe or fatal. Other major toxicities are nausea, vomiting and alterations in liver function. Streptozocin may affect glucose metabolism, causing mild to moderate abnormalities of glucose tolerance. A diabetic effect has been reported. Effects of the blood are rare but some toxicity has been observed. This is the most often characterized by a mild decrease in hematocrit values, but more severe effects have been observed. Streptozocin is an irritant to tissues and may lead to local ulceration and necrosis and may cause irritation to eyes and severe irritation to skin. Streptozocin is mutagenic to bacteria, plants, and mammalian cells. It has been shown to be carcinogenic in mice. Animal studies show streptozocin to be a teratogen and cause adverse affects on
fertility.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Not established.

### 4. FIRST AID MEASURES

**EYES:** Flush with water for 15 minutes. Hold eyelids open to assure complete contact with water.

**SKIN:** Wash with soap and water for 15 minutes.

**INHALATION:** Remove from exposure.

**INGESTION:** Contact a physician or poison control center.

### 5. FIRE FIGHTING MEASURES

**FLASH POINT:** Nonflammable.

**LOWER EXPLOSION LIMIT (LEL):** Not applicable.

**UPPER EXPLOSION LIMIT (UEL):** Not applicable.

**EXTINGUISHING MEDIA:** Water, carbon dioxide or dry chemical.

**FIRE FIGHTING PROCEDURES:** Wear self-contained breathing apparatus and full-body protective equipment.

**UNUSUAL FIRE OR EXPLOSION HAZARDS:** As with all finely divided organic powders, it is advisable to eliminate explosion hazards by methods such as grounding mechanical equipment in contact with the material to prevent the buildup of static electricity, inerting the atmosphere or controlling dust levels.

**HAZARDOUS COMBUSTION PRODUCTS:** Carbon monoxide. Carbon dioxide. Nitrogen oxides.

### 6. ACCIDENTAL RELEASE MEASURES

**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Remove ignition sources; control the generation of dust/vapors; provide ventilation and respiratory, skin and eye protection to prevent overexposure. Keep out of drains; prevent entry to surface water, groundwater and soil. Vacuum (with HEPA-filtered and explosion-proof equipment) or scoop spilled material and place in container. The product can be degraded by strong alkali very rapidly, but does generate diazomethane.

### 7. HANDLING AND STORAGE

**PRECAUTIONS FOR HANDLING AND STORING:** Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Launder contaminated clothes before reuse. Store in a cool, dry place and protect from light. Keep out of the reach of children.
PRODUCT PREPARATION AND ADMINISTRATION: Hospital personnel preparing or administering parenteral antineoplastic agents should wear latex or surgical rubber gloves, safety glasses, a closed-front gown with knit cuffs and masks. Preparation of all antineoplastic agents should be done in a class II laminar flow biological safety cabinet with exhaust air discharged external to the room environment. All needles, syringes, vials, ampules and other equipment or disposable clothing that have been in contact with streptozocin should be segregated and incinerated at a temperature not less than 1,000°C. Sealed containers should be opened prior to incineration.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: Approved respirator if there is opportunity for splash, mist or aerosol generation (especially with large quantities).

VENTILATION: Local exhaust.

PROTECTIVE GLOVES: Rubber.

EYE PROTECTION: Safety glasses with side shields.

OTHER PROTECTIVE EQUIPMENT: Protective covering for exposed areas of skin.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE: White powder packaged in vials.

SOLUBILITY IN SOLVENTS: Alcohols and ketones.

SOLUBILITY IN WATER: Soluble.

10. STABILITY AND REACTIVITY

STABILITY: Stable.

PHYSICAL CONDITIONS TO AVOID: None.

INCOMPATIBILITY WITH OTHER MATERIALS: None.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION: The drug is characterized by a strong exotherm beginning at 108°C. The gas that is evolved accounts for approximately 38% of the sample. The heat given off during thermal decomposition indicates that the powder should be stored at temperatures no higher than controlled room temperature (recommended 4°C), since the first trace of decomposition would quickly raise the temperatures of the material, resulting in “runaway” decomposition. There are obvious potential risks associated with streptozocin if it is improperly stored or sent to disposal. If proper storage and disposal requirements for this material are met, the potential risks during production and manufacture are minimal.

11. TOXICOLOGICAL INFORMATION
ACUTE STUDIES:

SENSITIZATION: No information found.

INTRAVENOUS LD50 (DOG): 25 to 50 mg/kg.

INTRAVENOUS LD50 (RAT): 108 to 176 mg/kg.

INTRAVENOUS LD50 (MOUSE): 274.8 mg/kg.

ORAL LD50 (RAT): 5,150 mg/kg.

ORAL LD50 (MOUSE): >3,000 mg/kg.

INTRAPERITONEAL LD50 (MOUSE): 219 mg/kg.

SUBCUTANEOUS LD50 (MOUSE): 335 mg/kg.

OTHER STUDIES:

GENOTOXICITY: Mutagenicity: Streptozocin is mutagenic in bacteria, plants and mammalian cells (Ames assay and mammalian cell mutation assay).

REPRODUCTION/FERTILITY: Reproductive studies revealed that streptozocin is teratogenic in the rat and has abortifacient effects in rabbits. When administered intravenously to pregnant monkeys, it appears rapidly in the fetal circulation. As no studies have been completed in pregnant women, the safety of the use of this drug in pregnant women is not known.

CARCINOGENICITY: When streptozocin was administered parenterally, it has been shown to induce renal tumors in rats and to induce liver tumors and other tumors in hamsters. Stomach and pancreatic tumors were observed in rats treated orally with streptozocin. Streptozocin may pose a carcinogenic hazard following repeated topical exposure.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE:

MOBILITY: Streptozocin melts at 115°C. It has assumably no measurable vapor pressure and negligible volatility, therefore it is not expected to enter the air. Because of its estimated low octanol water partition coefficient (log P estimate -2.704) it would not be expected to sorb to most organic soils. Streptozocin is soluble in water and would be expected to be relatively mobile and migrate toward the aquatic compartment.

PERSISTENCE/DEGRADABILITY: No information found.

BIOACCUMULATIVE POTENTIAL: Streptozocin has a low octanol water partition coefficient (-2.704) and would be expected to have a low bioaccumulative potential.

ABIOTIC POTENTIAL: Streptozocin, as with all antibiotics, may have some initial inhibitory effects on the most sensitive microorganisms until it is degraded.

ECOTOXICITY: No information found.
13. DISPOSAL CONSIDERATIONS

**WASTE DISPOSAL METHOD:** Incinerate according to local, state and federal regulations at 1,000°C or greater. Streptozocin is listed under the Resource Recovery and Conservation Act (RCRA) as a hazardous waste. Streptozocin can be safely deactivated by a reaction with sulfamic acid. The procedure is as follows: (1) Inject 3 mL sulfamic acid solution (0.5 g sulfamic acid/3 mL) into the vial. (2) Vent vial by leaving needle in vial. (3) Swirl vial to dissolve material (nitrogen gas evolves immediately). (4) Let stand approximately 16 hours.

14. SHIPPING REGULATIONS

**TRANSPORTATION MODE:** AIR, SURFACE, WATER

**PROPER SHIPPING NAME:** ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (STREPTOZOCIN)

**HAZARD CLASS:** 9 (MISCELLANEOUS)

**SUBSIDIARY RISK:** (NONE)

**UN/NA NUMBER:** UN3077

**PACKING GROUP:** III

**EMERGENCY RESPONSE GUIDE:** 171

**IMDG CODE PAGE:** 9028

**TRANSPORTATION LABELS:** CLASS 9

**REPORTABLE QUANTITY:** 0.454 KG

**SPECIAL PROVISIONS:** None known.

This material is only regulated when the quantity per package is equal to or exceeds the CERCLA reportable quantity listed in Appendix A to 49CFR 172.101.

15. OTHER INFORMATION

**DISCLAIMER:** The information contained in the MSDS is believed to be correct as of its date of issuance. BY MAKING THE MSDS AVAILABLE, PHARMACIA & UPJOHN DOES NOT MAKE ANY EXPRESS OR IMPLIED WARRANTY (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) REGARDING THE MSDS, ITS ACCURACY OR THE PRODUCT TO WHICH IT RELATES. Anyone using this information agrees that Pharmacia & Upjohn shall not be held liable (based on its negligence or otherwise) for any personal injury or other damage relating to, or arising from such use, including direct, incidental, or consequential damage and such user agrees to indemnify Pharmacia & Upjohn for any claims arising out of its use.
16. LABELING

This drug is subject to FDA labeling requirements; therefore, it is exempt from the labeling requirements of the OSHA Hazard Communication Standard.