HAZARD SUMMARY
* Thallium Sulfate can affect you when breathed in and by passing through your skin.
* Contact can irritate the skin and eyes.
* High exposure to Thallium Sulfate can cause nausea, vomiting, diarrhea, salivation, headache, tremors, fatigue, weakness, confusion, convulsions, coma and death.
* Repeated exposure to Thallium Sulfate can cause loss of vision, skin rash, hair loss, and joint pain.
* Thallium Sulfate may damage the liver and kidneys.
* Thallium Sulfate may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.

IDENTIFICATION
Thallium Sulfate is an odorless, colorless, crystalline (sand-like) solid or a white powder. It is used as a rodenticide and an insecticide.

REASON FOR CITATION
* Thallium Sulfate is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP, IRIS and EPA.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED
The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

WORKPLACE EXPOSURE LIMITS
The following exposure limits are for soluble Thallium compounds (measured as Thallium):

OSHA: The legal airborne permissible exposure limit (PEL) is 0.1 mg/m$^3$ averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is 0.1 mg/m$^3$ averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is 0.1 mg/m$^3$ averaged over an 8-hour workshift.

* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE
* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to Thallium Sulfate and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Thallium Sulfate to potentially exposed workers.

* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to Thallium Sulfate:

* Contact can irritate the skin and eyes.
* High exposure to Thallium Sulfate can cause nausea, vomiting, diarrhea, salivation, headache, tremors, fatigue, weakness, confusion, convulsions, coma and death.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to Thallium Sulfate and can last for months or years:

Cancer Hazard
* According to the information presently available to the New Jersey Department of Health and Senior Services, Thallium Sulfate has not been tested for its ability to cause cancer in animals.

Reproductive Hazard
* Thallium Sulfate may damage the testes (male reproductive glands).

Other Long-Term Effects
* Repeated exposure to Thallium Sulfate can cause loss of vision, skin rash, hair loss, and joint pain.
* Thallium Sulfate may damage the liver and kidneys.
* Thallium Sulfate may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.

MEDICAL

Medical Testing
For those with frequent or potentially high exposure (half the PEL or greater), the following are recommended before beginning work and at regular times after that:

* Liver and kidney function tests

If symptoms develop or overexposure is suspected, the following are recommended:

* Exam of the nervous system
* Vision testing

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures
* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by Thallium Sulfate.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically transfer Thallium Sulfate from drums or other storage containers to process containers.

Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by Thallium Sulfate should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Thallium Sulfate.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with Thallium Sulfate, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted Thallium Sulfate, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where Thallium Sulfate is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.
* Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

**PERSONAL PROTECTIVE EQUIPMENT**

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

**Clothing**
* Avoid skin contact with Thallium Sulfate. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

**Eye Protection**
* Wear eye protection with side shields or goggles.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

**Respiratory Protection**

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

* For field applications check with your supervisor and your safety equipment supplier regarding the appropriate respiratory equipment.
* Where the potential exists for exposure over 0.1 mg/m³ (as Thallium), use a NIOSH approved air-purifying, particulate filter respirator with a N95 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.

* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect Thallium Sulfate, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential exists for exposure over 1 mg/m³ (as Thallium), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
* Exposure to 15 mg/m³ (as Thallium), is immediately dangerous to life and health. If the possibility of exposure above 15 mg/m³ exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

**QUESTIONS AND ANSWERS**

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

Q: Who is at the greatest risk from reproductive hazards?
A: Pregnant women are at great risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.
DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A carcinogen is a substance that causes cancer.

The CAS number is assigned by the Chemical Abstracts Service to identify a specific chemical.

CFR is the Code of Federal Regulations, which consists of the regulations of the United States government.

A combustible substance is a solid, liquid or gas that will burn.

A corrosive substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A fetus is an unborn human or animal.

A flammable substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The flash point is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

IRIS is the Integrated Risk Information System database of the federal EPA.

A miscible substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A mutagen is a substance that causes mutations. A mutation is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A reactive substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A teratogen is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The vapor pressure is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.
Common Name: THALLIUM SULFATE
DOT Number: UN 1707
DOT Hazard Class: 6.1 (Poison)
NAERG Code: 151
CAS Number: 10031-59-1

<table>
<thead>
<tr>
<th>Hazard rating</th>
<th>NJDHSS</th>
<th>NFPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLAMMABILITY</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>REACTIVITY</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

POISONOUS GASES ARE PRODUCED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* Extinguish fire using an agent suitable for type of surrounding fire. Thallium Sulfate itself does not burn.
* POISONOUS GASES ARE PRODUCED IN FIRE, including Sulfur Oxides and Thallium fumes.
* If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

SPILLS AND EMERGENCIES

If Thallium Sulfate is spilled, take the following steps:

* Evacuate personnel and secure and control entrance to the area.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* Ventilate and wash area after clean-up is complete.
* It may be necessary to contain and dispose of Thallium Sulfate as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact
* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact
* Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing
* Remove the person from exposure.
* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 0 mm Hg at 68°F (20°C)
Water Solubility: Soluble

OTHER COMMONLY USED NAMES

This fact sheet also covers:
Thallous Sulfate CAS # 7446-18-6 RTK # 2887

Chemical Name:
Sulfuric Acid, Dithallium (1+) Salt

Other Names:
Eccothal; Dithallium Sulfate; CFS

---------------------------------------------------------------------------
Not intended to be copied and sold for commercial purposes.
---------------------------------------------------------------------------

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202