

Radiology Compliance Branch RADIATION PROTECTION SECTION



Division of Health Service Regulation • N.C. Department of Health and Human Services

Just so You Know....EXIT SIGNS

Exit signs are mounted in almost every building we enter, such as high schools, grocery stores, movie theaters professional buildings, and shopping malls. Many exit signs contain [tritium](#), the radioactive form of hydrogen. Mixing tritium with a chemical that emits light in the presence of radiation, known as "phosphor in a tube" (a sealed source), creates a continual, self-powered light source. This useful property of tritium can be applied to situations where low light is needed but where using batteries or electricity is not feasible.

Using tritium in exit signs ensures that the sign will remain lit in the event of a power outage or a fire. If the tubes in the exit signs are severely damaged, the tritium, which exists in the sign as a high temperature gas, might escape into the hall or surrounding area, but most likely will quickly disperse in the air. Since a damaged exit sign will have relatively high levels of tritium in it, you should not handle it.

While damage to tritium exit signs is uncommon, it is most likely to occur when a sign is dropped during installation or smashed in the destruction of a building. If not damaged during destruction, tritium exit signs can be broken when they are illegally dumped in community landfills.

Tritium is naturally produced by the interaction of cosmic rays with the air around us. Tritium can also be produced by man-made processes, such as when these tritium exit signs are made. Tritium breaks down by emitting a low-energy beta particle that cannot penetrate the outer layer of human skin. Therefore, the main hazard associated with tritium is internal exposure by inhalation. Internal contamination occurs when people swallow or breathe in radioactive materials, or when radioactive materials enter the body through an open wound or are absorbed through the skin. Some types of radioactive materials stay in the body and are deposited in different body organs. Other types are eliminated in blood, sweat, urine, and feces.

Who is protecting you?

U.S. Environmental Protection Agency (EPA)

Under the Clean Air Act, EPA establishes regulatory requirements for hazardous air pollutants including tritium air releases. Under the Safe Water Drinking Act,

EPA sets limits for acceptable levels of tritium in drinking water. EPA also responds to emergencies involving tritium releases to the environment. In addition, before being approved for public use, sites previously contaminated with tritium must meet EPA's risk-based criteria for soil and ground water.

U.S. Department of Labor (DOL)

DOL's Occupational Safety and Health Administration issues regulations and standards for the safety of workers in a wide range of occupational settings including construction and demolition.



U.S. Nuclear Regulatory Commission (NRC)

The primary mission of NRC is to protect public health and safety and the environment from the effects of radiation from nuclear reactors, sealed sources containing radioactive materials, and radioactive waste facilities.

The States

Each state has one or more programs to address radiation protection issues and respond to and investigate incidents involving tritium.

The tritium in exit signs can be identified by the tube (sealed source) that contains tritium. In an exit sign, the tubes are used to spell out the word "EXIT."

- ❖ **Never tamper** with a tritium exit sign.
- ❖ **A tritium exit sign** should be clearly labeled with a statement that it contains tritium.
- ❖ **Return** outdated tritium exit signs to the manufacturer. The address of the manufacturer usually can be found on the back of the tritium exit sign. The manufacturer can provide instructions on how to ship the tritium exit sign safely.

Disposal of the broken sign should be arranged through the manufacturer or a health physics consultant. When an exit sign containing tritium is damaged and the sealed tube within the sign is broken, you should:

- ❖ **Leave** the sign alone; do not touch it.
- ❖ **Evacuate** the area immediately.
- ❖ **Isolate** the area; do not allow entry.
- ❖ **Ventilate** the area to the outside.
- ❖ **Identify** all individuals possibly exposed.
- ❖ If you think you have been contaminated, you should:
 - ❖ **Shower** with soap and water (or at least wash face and hands).
 - **Change clothing** and put the potentially contaminated clothes in a plastic bag for testing to confirm exposure.
 - **Drink plenty of fluids** to help the tritium leave the body more quickly.
 - **Collect** a urine sample for testing to confirm or rule out internal exposure.
- ❖ **Call** your local fire or police departments.
- ❖ **Call** your [state's radiation control program](#). 919-814-2250
- ❖ **Call** the manufacturer for technical information.

Pass it On!