Schools Helping Schools

SISC Risk Management Bulletin

The Hidden Danger of Fundraising: Dry Ice

Background

Many school districts, parent organizations, and booster club organizations market food items as part of their fundraising efforts. For some, selling frozen pizzas and cookie dough has evolved into the mainstay of the organization's fundraising activities.

In many cases, the perishable food supplies are delivered safely to their destination using refrigerated or freezer trucks. However, in other cases, the trucking service may use non-refrigerated vehicles and place the food products on dry ice to preserve it until it is delivered. Although this practice may be sufficient to prevent degradation of the food supplies, the use of dry ice can pose a significant health and safety threat. **Thus we have the hidden danger of fundraising: dry ice.**

In order to protect the safety and health of staff, students, and volunteers, all food deliveries should be made via refrigerated or freezer trucks. Check with your fundraising vendor to ensure that deliveries are coordinated appropriately.

Rationale

Dry ice (a solid form of carbon dioxide, or CO_2) presents an inhalation hazard when present in concentrations of 5,000 parts per million or 0.5% carbon dioxide or greater. Dry ice sublimes, which means that it changes directly from a solid to a gas. Unlike regular ice, it does not melt into water. The CO_2 gas can cause death because it displaces oxygen in the air. CO_2 levels can reach hazardous exposures when the dry ice evaporates in an enclosed truck or trailer.

To ensure safety, the atmosphere should be measured to determine if the environment is oxygen deficient, and if so, adequate ventilation provided before entry into the space unless respiratory protection (self-contained breathing apparatus) is provided.

When food deliveries are made to the school site, there may be an assortment of individuals who may be involved in off-loading the material. It is likely that such individuals are unaware of the potential dangers involved and it is even more likely that they have never received training in how to protect themselves. **Dry ice should never be off-loaded onto the school property, and it should never be handled by minors.**

Symptoms of overexposure to CO_2 include: headache, dizziness, restlessness, narcosis, breathing difficulty, sweating, increased heart rate and cardiac output, increased blood pressure, coma, convulsions and asphyxia. In extreme cases, death can occur.

Dry ice can also present physical hazards of tissue damage or cryogenic "burns" to individuals if they handle the materials without proper protective gear (for example, gloves, aprons, and safety goggles). The protective gear should be resistant to temperatures lower than –109 degrees F. The "burns" that can result freeze the exposed tissue and can result in frostbite. Amputation of body parts. Dry ice can also be fatal if even a small amount is swallowed.

The ABCs of Dry Ice Hazards

Asphyxiation: This means suffocation—a life threatening condition in which oxygen is prevented from reaching body tissues.

Burns and Bombs: Dry ice is cold but it can create cryogenic "burns" when bare skin is exposed to the substance during handling. These "burns" can cause frostbite or tissue death. Such "burns" can cause irreversible damage.

Also, when carbon dioxide builds up in the atmosphere it can create pressures that can eventually lead to explosions. It is ideal for mischief makers who are looking for a low-tech bomb device. Unfortunately, the unpredictability of the bomb and timing of the explosion make these devices very dangerous to anyone who may be nearby. Whether intentional or unintentional, dry ice placed in any tight container can be a bomb/explosion hazard.

Carbon Dioxide: This is the gaseous form of dry ice and at high concentrations, displaces oxygen and can create an environment immediately dangerous to life and health. Although carbon dioxide is not considered a "toxic" or poisonous gas, it will not sustain life. Therefore proper ventilation is mandatory before entering any area where dry ice has been stored and has changed from the solid to gaseous state.

Legal Issues For Fundraising Organizations

Unless dry ice is properly disposed of, it can present an attractive nuisance to minors, who may be tempted to handle it in an unsafe manner. Remember, dry ice is not a fun toy that smokes and is unusually cold. Because dry ice bombs are so dangerous, in some areas possession of these devices is a felony. Other state laws mandate expulsion of students who possess dry ice as a component of prohibited weapons on school property. The liability to school districts, parent organizations, and/or booster organizations that do not properly handle dry ice is great.

The Safe Way

The California Occupational Safety and Health Administration (Cal-OSHA) has several regulations that, if followed, can help provide safety while handling dry ice. Conversely, if not followed, these regulations can provide the basis for stiff penalties and fines (some up to $70,000 per violation).

The specific regulations that would cover the scope of handling dry ice include:

- Hazard Communication (Title 8 Sec. 5194): This regulation outlines requirements for training, product labeling, and Material Safety Data Sheets (MSDS).

- Air Contaminants (Title 8 Sec 5155): This standard requires monitoring of certain chemicals to ensure that levels in the workplace do not exceed the "permissible exposure limit".

- Personal Protective Equipment (Title 8 Secs. 3382 and 3384): Because dry ice poses such a threat to skin and eyes, handlers must wear appropriate gloves and eye protection.

- Injury and Illness Prevention Program (IIPP) (Title 8 Sec. 3203): This regulation covers hazard identification and task-specific training.

The Safer Way

Although it is possible for school districts to put programs and procedures into place that will ensure safety when it comes to dry ice, there is a safer way. **As the customer, you have the power to require that all deliveries arrive in refrigerated or freezer trucks.** This is simply the safest and best way to ensure a safe outcome with your fundraising events.