



Dec 2016/
Jan 2017

In this issue:

"Safety Comes First"

Case Western Reserve University Environmental Health and Safety

2220 Circle Drive, Service Building, 1st Floor

Phone: (216) 368-2906/2907

FAX: (216) 368-2236

Website: case.edu/ehs

Strategies To Suppress Stress

*Strategies
To Suppress
Stress*

1

*Ultraviolet
Radiation:
Earth's
Surface*

2

*Preventing
The Spread
of
Norovirus*

6

*Top 10
OSHA
Violations
of 2016*

8

*Chemical
Spotlight:
Mercury*

9

Fun Page

10

Staff

11

2017-1

Experts at the Cleveland Clinic explain that people often take holiday stress for granted—almost expecting it. “Planning for the holidays can leave us feeling impatient, cranky, and—in some cases—depressed. When the realities of day-to-day life conflict with our efforts to make the holiday season perfect, stress results.”

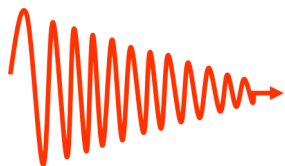
Successful strategies for reducing holiday stress include letting go of unrealistic goals and not forgetting one’s own needs. Consider following these tips for various holiday stressors:

- **Gift giving.** Ask people what they want instead of going to great lengths to find the perfect present. Shop early and stick to your gift budget.
- **Hosting.** Don’t think you have to prepare all your holiday foods from scratch. Ask others to bring their favorite dishes, and prepare and freeze foods ahead of time.
- **Socializing.** Discuss which commitments and traditions are the most important to you and your family. Don’t overschedule, and allow time to relax and recover after visits. Avoid the crunch by scheduling some visits after the holidays when things slow down.
- **Food.** Overindulging is not only stressful, it’s unhealthy. Continue your exercise and good eating habits despite the parties and office sweets that are so common this time of year. Avoid starving yourself in anticipation of holiday meals and parties because this can lead to eating too much of the wrong foods. At events and parties, fill most of your plate with healthy choices like vegetables and lean protein. Then take small portions of treats like stuffing, bread, and desserts.
- **Time management.** Set priorities and let go of goals that seem impossible. Ask others, including spouses and children, for help. Don’t try to complete everything at once, and rest when you need to.

The holiday blues. Unfortunately, the holidays can be a depressing time for some people. Feelings of sadness, loneliness, and anger can intensify when measured against the joy expected during the merry, jolly season. Here are a few strategies for coping: — Try a new tradition or activity. — Volunteer to help someone in need. — Focus on appreciating the good things rather than focusing on past disappointments or losses. — Get help if you need it.

Source: Safety.BLR

Ultraviolet Radiation (Part III): Earth's Surface



“Ozone depletion is greater at higher latitudes, ...”

What Determines How Much Ultraviolet Radiation Reaches the Earth's Surface?

The amount of UV radiation reaching the Earth's surface varies widely around the globe and through time. Several factors account for this variation at any given location. They are discussed below in order of importance, and descriptions of their effects appear in succeeding paragraphs.



The effects of ultraviolet radiation decrease with depth in the water column. (Image courtesy of NOAA)

Cloud Cover

Cloud cover plays a highly influential role in the amount of both UV-A and UV-B radiation reaching the ground. Each water droplet in a cloud scatters some incoming UV radiation back into space, so a thick cover of clouds protects organisms and materials from almost all UV. The larger the percentage of the sky that is covered by clouds, the less UV reaches the ground. The more opaque the cloud, the less UV-B. However, thin or broken cloud cover can be deceiving to people who are sunbathing, and the result can be an unexpected and severe sunburn.

Ozone in the Stratosphere

Ozone is the combination of three oxygen atoms into a single molecule (O_3). It is a gas produced naturally in the stratosphere where it strongly absorbs incoming UV radiation. But as stratospheric ozone decreases, UV radiation is allowed to pass through, and exposure at the Earth's surface increases. Exposure to shorter wavelengths increases by a larger percentage than exposure to longer wavelengths. Scientists can accurately estimate the amount of UV-B radiation at the surface using global data from satellites such as NASA's TOMS (Total Ozone Mapping Spectrometer), GOME (Global Ozone Monitoring Experiment) and Aura. These satellite measurements are compared to ground-based measurements to ensure that the satellite data are valid. To calculate the reduction of UV-B by ozone, scientists consider the total ozone in a column of air from the stratosphere to the Earth's surface. At mid-latitudes, a decrease of one percent in ozone may result in an increase of between one (310 nm) and three (305 nm) percent of potentially harmful UV-B at the surface during mid-summer when UV-B is highest.

Ozone depletion is greater at higher latitudes (toward the North and South Poles) and negligible at lower latitudes (between 30 degrees N and 30 degrees S). This means that decreases in ozone over Toronto are likely to be greater than those over Boston, and those over Boston greater than those over Los Angeles, while Miami will typically see the least ozone depletion of the four cities. However, cities at lower latitudes generally receive more sunlight because they are nearer the equator, so UV levels are higher even in the absence of ozone depletion. If ozone were to decrease at lower latitudes, southern cities would experience a greater absolute increase in UV-B than cities in the north for the same amount of ozone depletion.

Oblique angle of sunlight reaching the surface

At any given time, sunlight strikes most of the Earth at an oblique angle. In this way,

(Continued on page 3)

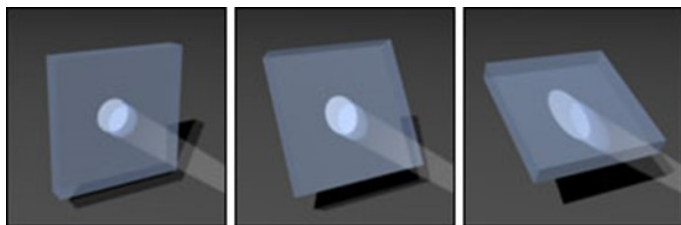
Ultraviolet Radiation (Part III): Earth's Surface, cont.

(Continued from page 2)

The U.S. Department of Agriculture maintains an extensive network of radiometers to monitor ultraviolet B (UV-B) radiation across the country. The one pictured at right is in Beltsville, Maryland. (Photograph by Jeannie Allen)



the number of UV photons is spread over a wider surface area, lowering the amount of incoming radiation at any given spot, compared to its intensity when the sun is directly overhead. In addition, the amount of atmosphere crossed by sunlight is greater at oblique angles than when the sun is directly overhead. Thus, the light travels through



The three images above illustrate how a change in angle between the sun and the Earth's surface affect the intensity of sunlight (and UV-B) on the surface. When the sun is directly overhead, forming a 90° angle with the surface, sunlight is spread over the minimum area. Also, the light only has to pass through the atmosphere directly above the surface. An increased angle between the sun and the surface—due to latitude, time of day, and season—spreads the same amount of energy over a wider area, and the sunlight passes through more atmosphere, diffusing the light. Therefore, UV-B radiation is stronger at the equator than the poles, stronger at noon than evening, and stronger in summer than winter. (Illustration by Robert Simmon)

nuclei for these particles are thought to be sulfuric acid aerosol, possibly of volcanic origin. The ice particles provide the surfaces that allow complex chemical reactions to take place in a manner than can deplete stratospheric ozone.

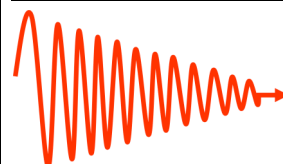
more ozone before reaching the Earth's surface, thereby increasing the amount of UV-B that is absorbed by molecules of ozone and reducing UV-B exposure at the surface.

Aerosols

Unlike clouds, aerosols in the troposphere, such as dust and smoke, not only scatter but also absorb UV-B radiation. Usually the UV reduction by aerosols is only a few percent, but in regions of heavy smoke or dust, aerosol particles can absorb more than 50 percent of the radiation.

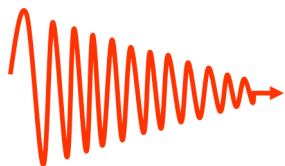
While the presence of aerosols anywhere in the atmosphere will always scatter some UV radiation back to space, in some circumstances, aerosols can contribute to an increase in UV exposure at the surface. For example, over Antarctica, cold temperatures cause ice particles (polar stratospheric clouds) to form in the stratosphere. The

"...aerosols can contribute to an increase in UV exposure at the surface."



(Continued on page 4)

Ultraviolet Radiation (Part III): Earth's Surface, cont.



“Living organisms at high elevations are generally exposed to more solar radiation ...”

(Continued from page 3)

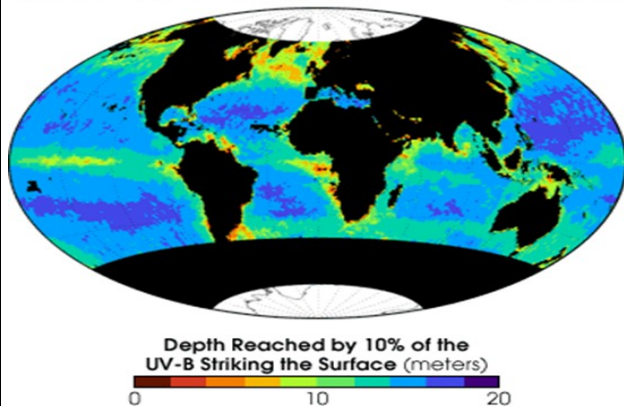


Water Depth

The eruption of Mt. Pinatubo in 1991 injected sulfate aerosols into the stratosphere, significantly though temporarily depleting stratospheric ozone and resulting in an increase of UV-B reaching the Earth's surface. Over millions of years, the biosphere has evolved to deal with temporary increases in UV from reductions in stratospheric ozone by natural causes such as volcanic eruptions, but has not had the time required to adjust to long-term ozone reductions attributed to human activities of the last 30 years. (Photograph courtesy USGS)

Penetration of UV-B into Ocean Water

June 6, 2001



Ultraviolet B (UV-B) radiation reaches different depths in ocean water depending on water chemistry, the density of phytoplankton, and the presence of sediment and other particulates. The map above indicates the average depth UV-B penetrates into ocean water. At the depth indicated, only 10 percent of the UV-B radiation that was present at the water's surface remains. The rest was absorbed or scattered back towards the ocean surface. (Image courtesy Vasilkov et al., JGR-Oceans, 2001)

UV-B exposure decreases rapidly at increasing depths in the water column. In other words, water and the impurities in it strongly absorb and scatter incoming UV-B radiation. Some substances that are dissolved in water, such as organic carbon from nearby land, will also absorb UV-B radiation and enhance protection of microorganisms, plants, and animals from UV-B. Different masses of water at different locations contain different amounts of such dissolved substances and other particles, making evaluation of UV damage very difficult.

Elevation

Living organisms at high elevations are generally exposed to more solar radiation, and with it, more UV-B than organisms at low elevations. This is because at high elevations UV-B

(Continued on page 5)

Ultraviolet Radiation (Part III): Earth's Surface, cont.

(Continued from page 4)

radiation travels through less atmosphere before it reaches the ground, and so it has fewer chances of encountering radiation-absorbing aerosols or chemical substances (such as ozone and sulfur dioxide) than it does at lower elevations.



Ecosystems at high altitudes, such as this lake in the Rocky Mountains of Colorado, receive more exposure to ultraviolet radiation than ecosystems at low altitudes.
(Photo courtesy [Philip Greenspun](#) © 1994)

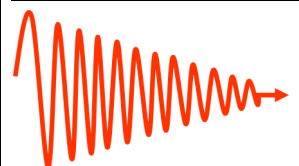
Reflectivity of the Earth's Surface

As a highly reflective substance, snow dramatically increases UV-B exposure near the Earth's surface as it reflects most of the radiation back into the atmosphere, where it is then scattered back toward the surface by aerosols and air molecules. Fresh snow can reflect much as 94 percent of the incoming UV radiation. In contrast, snow-free lands typically reflect only 2-4 percent of UV and ocean surfaces reflect about 5-8 percent (Herman and Celarier 1997).

next: *Ultraviolet Radiation: How Much Are We Getting?*

Source: NASA

***"...snow
dramati-
cally
increases
UV-B
exposure
near the
Earth's
surface..."***



Prevent the Spread of Norovirus



“alcohol-based products...are not a substitute for washing with soap and water.”

Norovirus causes many people to become ill with vomiting and diarrhea each year. You can help protect yourself and others by washing your hands often and following simple tips to stay healthy.

Noroviruses are a group of related viruses that can cause gastroenteritis (GAS-tro-en-ter-I-tis), which is inflammation of the stomach and intestines. This leads to cramping, nausea, vomiting, and diarrhea.

Norovirus Is the Most Common Cause of Gastroenteritis in the U.S.

CDC estimates that each year Norovirus causes 19 to 21 million illnesses, 56,000 to 71,000 hospitalizations and 570 to 800 deaths. Anyone can get infected with Norovirus and you can get it more than once. It is estimated that a person will get Norovirus about 5 times during their lifetime. Many people usually get sick with Norovirus in cooler months, especially from November to April.

Norovirus spreads quickly. It is found in the vomit and stool of infected people. You can get it by:

- Eating food or drinking liquids that are contaminated with Norovirus.
- Touching surfaces or objects with Norovirus on them and then putting your hand or fingers in your mouth.
- Having direct contact with a person who is infected with Norovirus, for example, when caring for someone with Norovirus or sharing foods or eating utensils with them.

People with Norovirus illness are contagious from the moment they begin feeling sick and for the first few days after they recover. Some people may be contagious for even longer. There is no vaccine to prevent Norovirus infection or drug to treat sick people. Learn how to protect yourself and others by following a few simple steps.



Wash hands carefully with soap and water.

Protect Yourself and Others from Norovirus

- **Practice proper hand hygiene** Wash your hands carefully with soap and water, especially after using the toilet and changing diapers and always before eating or preparing food. If soap and water aren't available, use an alcohol-based hand sanitizer. These alcohol-based products can help reduce the number of germs on your hands, but they are not a substitute for washing with soap and water.
- **Take care in the kitchen** Carefully rinse fruits and vegetables, and cook oysters and other shellfish thoroughly before eating.
- **Do not prepare food while infected** People with Norovirus illness should not

Prevent the Spread of Norovirus, cont,

(Continued from page 6)

prepare food for others while they have symptoms and for at least 2 days after they recover from their illness.

- **Clean and disinfect contaminated surfaces** After throwing up or having diarrhea, immediately clean and disinfect contaminated surfaces using a bleach-based household cleaner as directed on the product label. If no such cleaning product is available, you can use a solution made with 5 tablespoons to 1.5 cups of household bleach per 1 gallon of water.

Wash laundry thoroughly Immediately remove and wash clothing or linens that may be contaminated with vomit or stool. Handle soiled items carefully—try not to shake them—to avoid spreading virus. If available, wear rubber or disposable gloves while handling soiled clothing or linens and wash your hands after handling. Wash soiled items with detergent at the maximum available cycle length and then machine dry.

SETTING OF NOROVIRUS OUTBREAKS
REPORTED THROUGH THE NATIONAL OUTBREAK
REPORTING SYSTEM (NORS), 2009-2012

| Exposure setting | Number of Outbreaks | Percentage of Outbreaks |
|--------------------------------|---------------------|-------------------------|
| Health care facility | 2189 | 62.7% |
| Restaurant or banquet facility | 771 | 22.1% |
| School or day-care facility | 214 | 6.1% |
| Private residence | 69 | 1.9% |
| Other/multiple settings | 251 | 7.2% |

Data on specific settings are restricted to outbreaks with a single exposure setting; for foodborne outbreaks, setting refers to the setting where implicated food was consumed.

Common Norovirus Outbreak Settings

Norovirus spreads quickly from person to person in enclosed places like nursing homes, daycare centers, schools, and cruise ships. It is also a major cause of outbreaks in restaurants and catered-meal settings if contaminated food is served.

Many Names, Same Symptoms

You may hear Norovirus illness called "food poisoning" or "stomach flu." Norovirus can cause foodborne illness, as can other germs and chemicals.

Norovirus illness is *not* related to the flu (influenza). Though

they may share some of the same symptoms, the flu is a respiratory illness caused by influenza virus.

For most people Norovirus illness is not serious and they get better in 1 to 3 days. But it can be serious in young children, the elderly, and people with other health conditions. It can lead to severe dehydration, hospitalization and even death.

Source: CDC



*"No-
rovirus
spreads
quickly
from
person to
person in
enclosed
places ..."*

CDC

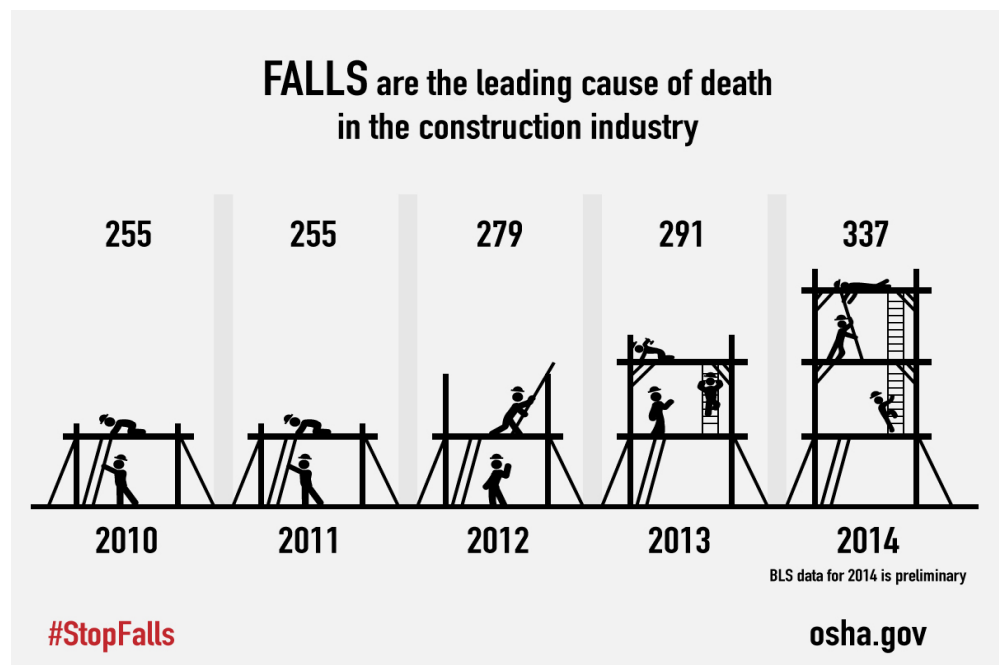
OSHA TOP 10 VIOLATIONS OF 2016



Fall protection once again topped the 2016 OSHA top 10 most violated standards.

Patrick Kapust, Deputy Director of OSHA's Directorate of Enforcement programs, announced the preliminary, most frequently violated standards for fiscal year (FY) 2016 at the National Safety Council Congress & Expo 2016 in Anaheim, California. He also noted that the top 10 most violated standards vary little from year to year.

1. Fall protection: 6,929 violations
2. Hazard communication: 5,677 violations
3. Scaffolding: 3,906 violations
4. Respiratory protection: 3,585 violations
5. Lockout/tagout: 3,414 violations
6. Powered industrial trucks: 2,860 violations
7. Ladders: 2,639 violations
8. Machine guarding: 2,451 violations
9. Electrical—wiring methods: 1,940 violations
10. Electrical—general requirements: 1,704 violations



As the construction industry continues to grow, falls continue to be the leading cause of death. Source: <http://www.bls.gov>.

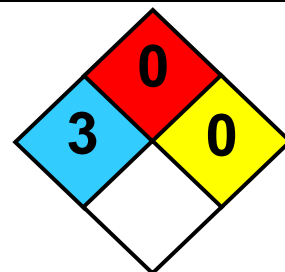
Chemical Spotlight: Mercury

Mercury is a naturally occurring metal in the environment, which can take several forms. Metallic mercury is a shiny, silver-white, odorless liquid. When heated, it turns to a colorless, odorless gas. Mercury can also combine with other elements to create organic mercury compounds, including methylmercury, which is used to produce chlorine gas and caustic soda. It is also used in many common products, including thermometers, dental fillings, batteries, and compact fluorescent light bulbs (CFLs). Breathing or ingesting high levels of mercury-contaminated air or water can cause brain and kidney damage and harm a developing fetus.

Mercury enters the environment from mining and manufacturing plant operations, from burning coal and waste, and from improper disposal of wastes, such as broken CFLs and other mercury-containing products.

If mercury is spilled/leaked:

- Evacuate the area and control the entrances.
- Remove all ignition sources.
- Cover the spill with a sulfur compound to prevent the substance from vaporizing.
- Collect the substance with a charcoal filter vacuum. DO NOT use a regular vacuum. Use a mercury spill clean-up kit.
- After cleanup, check that all mercury is gone by using a flashlight and zinc or copper flakes.
- Ventilate the spill or leak area and wash the area. DO NOT wash into a sewer.
- Contact your state environmental department or Environmental Protection Agency regional office to find out if mercury should be contained and disposed of as a hazardous waste.



“When heated, it (mercury) turns to a colorless, odorless gas.”

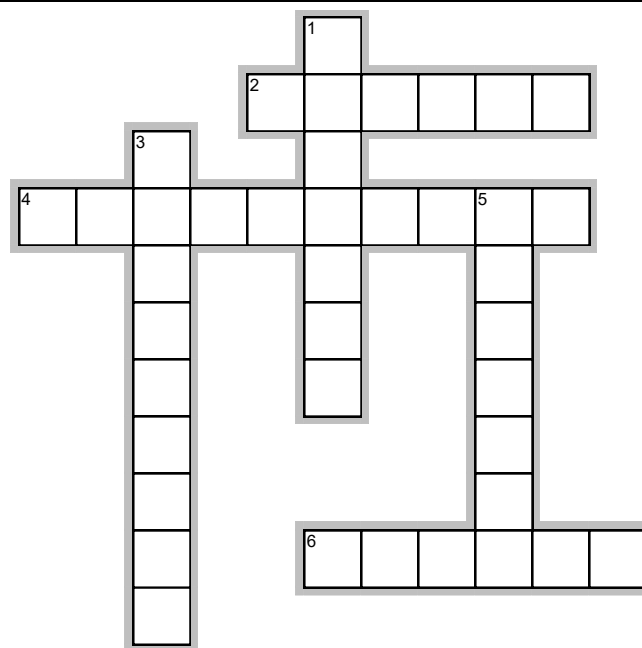


Fun Page

F U N P A G E

Across

2. Last name of EHS Associate featured in this edition.
4. Fall _____ once again topped the 2016 OSHA top 10 most violated standards.
6. Overindulging in food is not only unhealthy, but it can lead to _____.



EclipseCrossword.com

Down

1. _____ is used in thermometers, dental fillings, batteries, and compact fluorescent light bulbs (CFLs).
3. You may hear norovirus illness called "food _____."
5. At any given time, sunlight strikes most of the Earth at an _____ angle.

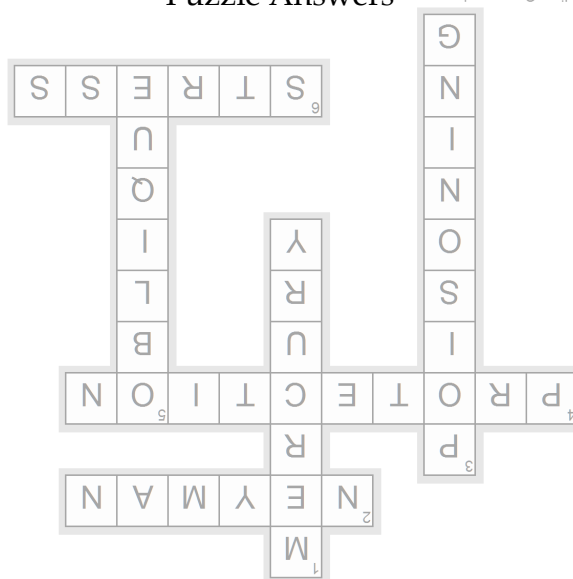
Funny Corner



"There are so many pressures around the holidays. Buying gifts... Decorating... Getting beheaded, stuffed and roasted..."

Puzzle Answers

EclipseCrossword.com



Environmental Health and Safety Staff

Victoria COOK (vmr6), Health Physics Specialist II
Gwendolyn COX-JOHNSON (gxc13), Department Assistant II
Anna DUBNISHEVA (agd), Safety Services Specialist II
Brad FYE (jxf308), Asbestos and Lead Specialist I
Charles GREATHOUSE (cxg118), Business Analyst II
Tyler JENKINS (tsj5), Student Safety Specialist
Brandon KIRK (bxk230), Manager of Plant and Construction Safety
Kumudu KULASEKERE (kck40), Health Physics Specialist II
Robert LATSCH (rnl2), Safety Services Specialist II
Tom L. MERK (tlm8), Assistant Director of Safety Services, CSO
Yelena NEYMAN (yxt13), Health Physics Specialist II
Joe NIKSTENAS (jen), Safety Specialist II, RRPT
Heidi PAGE (hep14), Assistant Director of Biosafety, BSO
Marc RUBIN (mdr6), Director of Safety Services
Dr. Mary Ellen SCOTT (mas35), Safety Services Specialist II
Dr. W. David SEDWICK (wds), Director of Radiation Safety, RSO
Felice THORNTON-PORTER (fst2), Assistant Director of Radiation Safety, ARSO
Kelci WILLIAMS (klw84), Department Assistant II



*Meet
Yelena Neyman*

*Health Physics
Specialist II*

368-4606
(yxt13)

*Contact
Yelena with
your questions
regarding
radiation
waste.*

All back issues of the EHS Newsletter can be found online at
case.edu/ehs. Click on the "Newsletter" link at the bottom of each page.

Environmental Health and Safety
Case Western Reserve University
(216) 368-2906/2907 FAX: (216) 368-2236
(email) cwruehs@gmail.com ([www](http://www.case.edu/ehs)) case.edu/ehs