Hi. Welcome to the Globally Harmonized System of Classification and Labeling of Chemicals, or GHS Training. This training is brought to you by the FDEP Safety Office under the direction of Safety Officer Jeff Loflin.

The presentation was developed by Jeff Waters, an Emergency Responder with the Office of Emergency Response and Jennifer Waltrip, Environmental Specialist with the Department’s Northwest District.

GHS is a building block for OSHA’s revised Hazard Communication Standard and is intended to align the US with global safety initiatives designed to better protect workers worldwide.

GHS will supply stakeholders with important first aid, protective measures, safe handling instructions, and more for chemicals used in manufacturing or as an end product.

The information is designed to be easily accessible and to better define the severity of the chemical through a hazard classification system.

The objectives for this training are to:

- Define GHS and explain how it impacts each of you.
- Describe the changes to the Hazard Communication Plan, which includes labels and safety data sheets, summarize the GHS approach to defining the severity at different hazards, and
- Identify where more in depth information can be found.

The main goal of this training is for you to understand the new label elements and safety data sheet format.

This will ensure that each of you have the information you need to better protect yourself from the chemical hazards in the workplace as the new labels and safety data sheet formats are rolled out over the next couple of years.

This training will not include detailed information on the hazards associated with all chemicals and/or mixtures you may come into contact with while working in the office or field. If you have any questions regarding specific chemicals and/or mixtures and their associated hazards, please direct them to your local safety officer.

The Globally Harmonized System of Classification and Labeling of Chemicals, or GHS for short, is a system for standardizing and harmonizing the classification and labeling of chemicals. It is a logical and comprehensive approach to:

- Defining health, physical and environmental hazards of chemicals;
- Creating classification processes that use available data on chemicals for comparison with a defined hazard criteria; and
- Clearly communicating hazard information, as well as protective measures, on labels and safety data sheets.

GHS is not a regulation or a standard. It provides countries and other organizations with the regulatory building blocks they need to develop or modify existing programs which already address the classification of hazards and transmittal of that information about those hazards and their protective measures.

Essentially, GHS creates a single hazard communication system that is able to clearly identify hazards which can be easily understood no matter where you are in the world. Clearly defining hazards will ensure the safe use of chemicals as they move through the product life cycle from "cradle to grave. “

For example, we may often see safety data sheets and labels from other countries which can include symbols and hazard statements that are unfamiliar to us. There could also be conflicting requirements from one country to the next concerning how a hazard is classified, leading to an incorrect assumption as to how safe or dangerous a chemical is. If countries around the world adopt GHS, these problems will be minimized, and chemicals crossing borders will have consistent information, thus improving communications globally. Currently, there are 67 countries who are in the process of implementing GHS.

In the US, who do you think our regulatory authority is? The Occupational Safety and Health Administration. OSHA

So why are we here?

Governor Jeb Bush signed an executive order which requires FDEP to review existing policies, procedures and practices concerning workplace safety and to voluntarily comply with portions of OSHA 29 CFR 1910, which includes the newly revised Hazard Communication Standard.

The executive order remains in effect until suspended by FL legislature. Thus, all FDEP employees are required to receive GHS training.

Why is the GHS needed? Many countries have a chemical hazard communication regulatory system in place. Many of these systems are similar in content and regulatory approach. However, differences can be significant and require numerous different classifications, labels, and safety data sheets for the same product to be marketed globally.

This leads to inconsistent protection for those potentially exposed to the chemicals, as well as creates extensive regulatory burdens on companies producing and using chemicals.

Even within a single country, regulatory requirements demand numerous classifications, labels, and safety data sheets when parts of the life cycle are covered by different regulatory authorities.

For example - In the USA, the Consumer Product Safety Commission, Dept. of Transportation, Environmental Protection Agency and Occupational Safety and Health Administration all have requirements for the classification and labeling of chemicals.

The History of GHS
Development of the system began in 1992 and was adopted by the United Nations in 2003. OSHA began the proposed rulemaking in 2006 and adopted the final rule in 2012.

It should also be noted that DOT has implemented GHS and EPA is expected to revise its own standards in the future to bring them into alignment. Sixty seven countries, including the European Union, are in the process of adopting or have already adopted GHS.

If you would like more information on GHS and its worldwide implementation, please go to the link listed at the bottom of the page. [http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html](http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html)

This table summarizes the phase-in dates required under the revised Hazard Communication Standard or HCS.

The important dates to note are that employers are required to train their employees on the new label elements and safety data sheet formats by December 1, 2013.

Also, until final implementation of the rule on June 1, 2016, there is a phase-in period during which employers are required to either be in compliance with the existing hazard communication standard, or the revised hazard communication standard, or both. That means over the next couple of years you may see labels and safety data sheets which comply with both standards. Employers are not required to maintain two different sets of labels and safety data sheets for compliance purposes.

There are three major changes to the hazard communication standard which we will discuss in more detail throughout the rest of this training.

First is hazard classification. There is now specific criteria provided for the classification of health and environmental hazards, physical hazards and mixtures.

The second change is to your labels. They are now required to include a signal word, pictogram, hazard statement, and precautionary statement.

The third change is to the safety data sheets, formerly known as materials safety data sheets. There is now a specific 16-section format that must be followed.

OSHA’s hazard communication standard, also known as HAZCOM or HCS, is based on the simple concept that employees both have a need and a right to know the hazards and identities of the chemicals they are exposed to when working.

HAZCOM requires employers to:

- Inform employees of chemical hazards in the workplace;
- Develop a written, site-specific hazard communication program;
- Label all chemical containers;
- Make SDS or safety data sheets available to all employees; and
- Train personnel in protective measures.

The written, hazard communication plan required by OSHA describes how the employer has complied with the Hazcom standard.
The plan should include a list of the chemicals that employees may come into contact with when carrying out their daily duties and must also describe how the requirements for labels, safety data sheets, and employee information and training, are going to be met.

When new chemicals are used or introduced at the work place, the plan must be updated to reflect the new potential hazards.

One issue ALL hazard communication regulations deal with is trying to convey scientific information to an audience that is primarily non-technical. This information may also need to be conveyed in a short-hand format as is the case when providing information that has to fit on a label.

GHS approaches this hurdle by utilizing the CLASSIFICATION process.

The GHS Classification process begins by identifying and reviewing relevant data about a specific chemical or mixture. This review may be combined with the opinions of subject matter experts to determine if the chemical or mixture should be classified as being hazardous according to definitions specified in OSHA’s regulations.

A chemical or mixture is classified as being a physical, health or environmental hazard.

To reiterate, the first step of GHS Classification is to determine if the specific chemical or mixture is hazardous based upon specific GHS criteria. A chemical or mixture is classified as being a physical, health or environmental hazard.

If a chemical or mixture is identified as being hazardous, it is then placed in a HAZARD CLASS.

HAZARD CLASS refers to the nature of the physical or health hazard.

For example, a chemical could be classified as being a health hazard and placed in the hazard class of carcinogenicity… Carcinogenicity means to cause cancer.

A hazard class can be further sub-divided in to HAZARD CATEGORIES which is a determination of the degree of hazard.

Placing a chemical into a hazard class, and where necessary, a hazard category, is the concept of classification—determining not only the hazard, but also the severity.

Let’s go ahead and look at some examples.
Let’s say we are working with Chemical “A”. And it has been determined to be hazardous based on GHS specific criteria.

Using the GHS criteria, chemical “A” is classified as a PHYSICAL HAZARD.

Chemical “A” will then be placed in one of the HAZARD CLASSES seen on the left side of the chart.

In this example chemical “A” is classified as being a physical hazard, with the hazard class FLAMMABLE LIQUIDS.

Chemical “A” may then be further categorized into numbers one through four as seen on the left side of the chart.

The right side of the chart shows the GHS specific criteria by which chemical “A” will be categorized.

Two additional notes:

The criteria listed actually define the severity of the hazard of any given chemical.

The severity of a chemical is numerically based, whereas Category 1 is the most severe. Let’s look at another example. This time we will use Chemical “X”.

Chemical “X” is determined to be hazardous based on GHS specific criteria.

Based on the criteria, chemical “X” is classified as a HEALTH HAZARD.

Chemical “X” is then placed in one of the HAZARD CLASSES seen on the left side of the chart.

Based on GHS criteria it is determined that chemical “X” falls in to the hazard class of REPRODUCTIVE TOXICITY.

Reproductive toxicity includes adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in offspring.

Substances and mixtures with reproductive and/or developmental effects are assigned to one of three hazard categories: 'known or presumed', ‘suspected’ or it may fall into the ’additional category’.
Category 1 has two subcategories, 1A which is for ‘Known effects’ and 1B which is for ‘Presumed effects’. The additional category, Effects on or Via Lactation, includes materials which cause concern for the health of breastfed children.

The subcategories and the additional category demonstrates how GHS makes distinctions between the information employed in the classification process.

Ok- Last example.

After classifying a substance as being an ENVIRONMENTAL HAZARD, the substance is then placed in to a HAZARD CLASS.

In this example the substance is considered to be ACUTE AND CHRONIC AQUATIC TOXICITY.

ACUTE aquatic toxicity means the intrinsic property of a material cause injury to an aquatic organism in a short-term exposure. Substances and mixtures of this hazard class are assigned to one of three toxicity categories on the basis of acute toxicity data.

CHRONIC aquatic toxicity means the potential or actual properties of a material to cause adverse effects to aquatic organisms during exposures that are determined in relation to the lifecycle of the organism. Substances and mixtures in this hazard class are assigned to one of four toxicity categories on the basis of acute data and environmental fate data and degradation/bioaccumulation.

Chronic Category IV is considered a "safety net" classification for use when the available data do not allow classification under the formal criteria, but there are some grounds for concern.

In short, the first step of GHS Classification is to determine if the specific chemical or mixture is hazardous based upon specific GHS criteria. A chemical or mixture is classified as being a physical, health or environmental hazard. The substance is then placed in to a hazard class; which, refers to the nature of the hazard. Hazard classes are broken down in to categories in order to further define the severity of a chemical. Categories are numerically based, whereas Category 1 being the most severe.

The Hazcom standard requires that information about chemical hazards be conveyed on labels using quick visual notations to alert the user, providing immediate recognition of the hazards.

Labels must also provide instructions on how to handle the chemical so that chemical users are informed about how to protect themselves. Labels help ensure proper storage of hazardous chemicals and can also be used to quickly locate first aid information in an emergency.
It is important to note that the OSHA pictograms do not replace the diamond-shaped labels that the U.S. Department of Transportation requires for the transport of chemicals, including chemical drums, chemical totes, tanks or other containers. Those labels must be on the external part of a shipped container and must meet the DOT requirements. An example of a DOT label and a revised OSHA label are portrayed in the picture on the slide.

The Hazcom standard requires chemical manufacturers, importers, or distributors to ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with the following information: product identifier; signal word; hazard statements; precautionary statements; pictograms; and the name, address and telephone number of the chemical manufacturer, importer, or other responsible party. Employers are responsible for maintaining the labels on the containers, including, but not limited to, tanks, totes, and drums. Not all labels will look the same. There is no specific layout required, but the hazard pictograms, signal word and hazard statements should be located together.

Now let’s quickly go over each of the required elements on the label.

**Number one on the label is the product identifier.** This can be, but is not limited to, the chemical name, code number or batch number. The only requirement is that the same product identifier must be on both the label and in Section 1 of the safety data sheets.

**Number 2 on the label corresponds with the Signal word.**

**Signal Words** are used to indicate the relative level of severity of the hazard and alert the reader to a potential hazard on the label. There are only two words used as signal words, “Danger” and “Warning.” Within a specific hazard class, “Danger” is used for the more severe hazards and “Warning” is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a “Danger” signal word and another warrants the signal word “Warning,” then only “Danger” should appear on the label.

**Number three on the label corresponds with the hazard statements.**

**Hazard Statements** describe the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. An example of a hazard statement would be “Fatal if swallowed” or “Extremely flammable liquid and vapor.” All of the applicable hazard statements must appear on the label. They may be combined where appropriate to reduce redundancies and improve readability. The hazard statements are specific to the hazard classification categories, and chemical users should always see the same statement for the same hazards no matter what the chemical is or who produces it.

**Number 4 on the label corresponds with the precautionary statements.**

**Precautionary statements are phrases which give advice about the correct handling of chemical substances and mixtures.**

There are four types of precautionary statements: Prevention that help minimize exposure, response which can be used in an emergency situation, storage, and disposal.
Examples include:
- Do not eat, drink or smoke when using this product;
- Keep container tightly closed;
- Wash with soap and water; and
- Store in a dry place.

When a chemical has been classified with a number of hazards and the precautionary statements are similar, the most stringent statements must be included on the label.

At the bottom of the label, **number 5** corresponds to the name, address and telephone number of the chemical manufacturer, importer, or other responsible party.

Last but not least of the label elements are pictograms. Pictograms are graphic symbols used to communicate specific information about the hazards of a chemical. The required pictograms consist of a red square frame set at a point with a black hazard symbol on a white background. They should be large enough to be clearly visible.

There are nine pictograms under the GHS to convey health, physical and environmental hazards. However, only eight of these pictograms are required by OSHA. The exception is the environmental pictogram, since environmental hazards do not fall under OSHA’s jurisdiction.

Now let’s go over each of the nine pictograms and their corresponding hazards.

You can see the pictogram which has the person with what looks like a starburst over their chest. This is the health hazard pictogram which is intended for chemicals or mixtures in one of the following hazard classes: carcinogen, mutagen, reproductive toxicity, target organ toxicity, respiratory sensitizer or aspiration toxicity.

The flame pictogram represents chemicals or mixtures that are in the flammables, pyrophorics, self-heating, emits flammable gas, self-reactive or organic peroxides hazard classes.

We have the exclamation mark pictogram which is for skin and eye irritants, skin sensitizer, acute toxicity, narcotic effects, respiratory tract irritant and hazardous to ozone layer.

The gas cylinder pictogram represents gases under pressure.

The exploding bomb pictogram is for explosives, self-reactive and organic peroxides and the corrosion pictogram is for skin, corrosion, burns and eye damage and corrosion to metal. You have the flame over a circle which is for oxidizer, the skull and cross bones are for acute toxicity and the environment pictogram for aquatic toxicity which again is not required by OSHA.

Let’s move onto the safety data sheets. The Hazcom standard requires that the chemical manufacturer, distributor, or importer provide Safety Data Sheets formerly Material Safety Data Sheets or Material Safety Data Sheets for each hazardous chemical to downstream users to communicate information on all associated hazards. They are used as sources of information about hazards and to obtain advice on safety precautions. They include information such as the
properties of each chemical; the physical, health, and environmental health hazards; protective
measures; and safety precautions for handling, storing, and transporting the chemical.
Many of you are probably familiar with looking at MSDS and knowing that no two are exactly
alike. Some are filled with information and others barely give you any information at all. You
also have to read the entire MSDS to find the information you are looking for.
This should no longer be a problem under the newly revised Hazcom standard.
The information contained in the SDS is largely the same as the MSDS, except now the SDSs are
required to be presented in a consistent user-friendly, 16-section format.
Here is a list of the minimum elements required to be in the SDS. We will briefly go over each
one in the following slides.

- **Section 1** of the safety data sheet is where you will find the identification of the
  substance or mixture and the supplier’s details including name, address and phone
  number. It should also include emergency contact information. The data listed under this
  section should match what is on the label.
- **Section 2** is where the hazards are identified. This section includes the GHS
  classification of the product, the precautionary statements and possibly pictograms, and
  any other hazards that may not be covered by GHS.
- **Section 3** contains the substance or mixture composition and information on ingredients.
  This can also include other common names, synonyms or unique identifiers.
- **Section 4** describes various first aid measures.
- **Section 5** includes how to extinguish a fire, any specific hazards resulting from
  combustion, and special protective equipment and precautions for fire fighters.
- **Section 6** contains information on what to do if there has been an accidental release,
  including methods for containment and clean up.
- **Section 7** has precautions for safe handling and storage.
- And **Section 8** lists exposure limits and appropriate engineering controls and PPE.
Sections 4, 5 and 6 are in red because these are very important for emergency response and
should all fall on the first page of the SDS. This is very important when you are trying to quickly
assess a situation. If you think back to some of the MSDS that you have seen, it may be difficult
to find this information quickly when there is no standardized format.

- **Section 9** describes various physical and chemical properties of the substance.
- **Section 10** outlines chemical stability, potential hazardous reactions, incompatible
  materials, etc.
- **Section 11** contains information on various toxicological effects.
- And **Section 12** contains ecological information.
- **Section 13** contains disposal considerations which includes safe handling procedures.
- **Section 14** has transportation information like the UN Number, DOT hazard class and
  packing group.
- **Section 15** outlines the safety, health and environmental regulation specific to the
  product; and
- **Section 16** is for other information, including the date of the SDS preparation and/or last
  revision.
Sections 12 through 15 are required to be on the SDS, but are regulated by agencies other than OSHA.

And that concludes our training. Thank you so much for listening and if you would like to find more information, please visit one of the websites listed.

www.osha.gov/dsg/hazcom/ghs.html
www.osha.gov/dsg/hazcom/global.html
www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html

Or you can contact your local safety officer. Have a great day!

Animations in this presentation were brought to you by Napo. Napo is produced by Via Storia and co-produced by a European Consortium consisting of AUVA (Austrian Workers’ Compensation Board – Austria), DGUV (Deutsche Gesetzliche Unfallversicherung – Germany), INAIL (Istituto Nazionale Infortuni sul Lavoro – Italy), HSE (UK), INRS (French National Research and Safety Institute – France), SUVA (Schweizerische Unfallversicherungsanstalt – Switzerland) and European Agency for Safety and Health at Work.