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SIXTEEN HOUR SAFETY UPDATE

CONTINENTAL OIL COMPANY

LAKE CHARLES REFINERY

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SIXTEEN HOUR SAFETY UPDATE

OBJECTIVE

To update the employees training of the Lake Charles Refinery in matters relating to toxic chemicals, respiratory protection, fire fighting and first aid.

METHOD OF PRESENTATION

Lecture, discussion, question and answer, field exercises, films, slides, and written materials.

MATERIALS REQUIRED

Over-head projector, 16mm projector, screen, film.

SUBJECTS AND CLASS TIME

First Day

7:30 A.M. - 12:00 Noon

Toxic Chemicals, Respiratory Protection

12:30 p.m. - 4:00 p.m.

Fire Training

Second Day

7:30 a.m. - 4:00 p.m.

American Red Cross Multi-Media
First Aid Training

TOXIC CHEMICALS

Individuals working in the refining industry are exposed to many chemicals, some of which are toxic. Chemical exposure many times is simply because of the presence of the toxic materials in the products being handled. Knowledge of these materials certainly is one of the keys to minimizing the hazards presented by the exposures. In order to gain a more effective knowledge of the hazards, let's review some facts related to toxic chemicals.

A toxic substance is one that has the potential of injury to body systems through direct corrosive action, or by more subtle chemical reaction, disrupting biological processes. Of concern is the analysis and control of toxic substances are the health effects of single and repeated or chronic exposure, the effect of the substance on both the port of entry and to the body systems in general, the duration of exposure, and the mode of entry. Let's look at the types of toxicity.

(Slide #1) Local toxicity may be defined as the effect of a substance on the body area that has been directly exposed to the offending substance. Exposure may be through direct contact, inhalation, ingestion, or penetration. Of immediate interest is the duration of exposure. For any potential toxicant, the longer it is in contact with the exposure site, the greater will be the damage. Very often, the local effect of skin exposure will be a rash or reddening of the skin, progressing through peeling and ulceration of the skin, to destruction of the skin.

Systemic Toxicity is the effect of a substance on body tissues after absorption into the bloodstream. In most cases, absorption takes place through the skin, stomach or lungs. The hazards associated with systemic toxicity are insidious in nature in that symptomatic knowledge of exposure may not become manifest until some later time. As in the case with local toxicity, the longer the duration of exposure, the greater is the chance of toxic damage. Acute Toxicity is simply the bodily reaction to a single exposure of a toxicant. There may be absolutely no effect, there may be mild effects, or there may be severe effects, including death, depending on both the nature of the substance and the sensitivity of the subject to the toxic agent. Usually, the effects of acute toxicants are observable within 24 hours of exposure. Chronic Toxicity is the effect or effects observed over a "long" period of time (days to years) when body tissues are exposed repeatedly or over long duration. Again, the effects are insidious, and a chronically toxified subject may not observe symptoms until an advanced stage is reached and permanent damage is done. Usually, chronic toxicity occurs because the body cannot eliminate the poison involved.

It is important to remember that all of the symptoms mentioned may be manifested from exposure to a given compound. Therefore, it will be seen that knowledge of the toxicity of a given material is an absolute necessity in controlling the toxic hazards.

TYPES OF EXPOSURE

(Slide #2) Toxicants enter the body by exposure to the skin or eyes, by inhalation, by ingestion or by injection. The immediate and long term effects of a toxicant are directly related to the mode of entry. By far, the most common means of toxicant are directly related to the mode of entry.

One of the most common means of toxicant entry into the body system is by absorption through the skin. The points of entry are through the hair follicles, sweat glands, and open wounds. Rapid distribution of the substance then occurs through the lymphatic system and bloodstream. Toxic contamination can be increased significantly through two different mechanisms: 1) if the material is present on the clothing or in the shoes, the toxic concentration is localized and may produce severe effects; and 2) if the material is diluted with a substance that is rapidly absorbed into the circulatory or lymphatic systems, rapid and severe systemic effects may take place. Immediate first aid for exposure to a toxicant should include removal of the substance via flooding water for at least 15 minutes, removal and disposal of any contaminated clothing, and seeking immediate medical attention.

The local effects of toxicants contacting the eye are usually a more pressing problem. Very few substances can be said to be safe or harmless when in contact with the eyes. The sensitivity of the eye to chemicals is such that the local effects usually far out-weigh any systemic effects. Irritation, pain, impairment of vision, and even loss of vision may result. Therefore, the

eyes must always be protected. Remember that caustic substances can represent a more serious hazard than acidic substances. A protein barrier is not established on the mucous membrane of the eye when in contact with caustic substances, and the immediate effects may go unnoticed until advanced damage has occurred. Immediate first aid for eye exposure should include flushing with copious quantities of cool water for at least 15 minutes. Secure immediate medical attention -- do not remove the patient during the initial washing period -- send someone for a physician while assisting the subject of the exposure.

The absorption of toxic materials into the body via the lungs also represents a dangerous mode of entry. The internal surface area of the lung has been estimated to be greater than 100 square meters, thus offering a much greater absorption area, which allows for rapid absorption of toxicants into the bloodstream. The activity of the subject is directly related to the absorption of the poison: the more active the subject, the greater the respiration rate, and the faster the material is absorbed. Because lung exposure is not easily treated, it is imperative that the subject be kept as inactive as possible. Additionally, because of the different chemistries of the wide variety of toxicants, it is unwise for inexperienced persons to attempt first aid. Unless simple antidotes are present and knowledge of their use is available, no first aid beyond moving the subject from the contaminated area should be attempted. Seek immediate medical attention.

The least likely mode of accidental entry of toxicants into the body is by ingestion. Only minute amounts of toxic materials, in the form of dusts or other particles, can be ingested by swallowing air. The primary routes for ingestion are therefore either by purposeful or accidental consumption of a toxic material. Again, because of the diverse chemistries of toxicants, first aid should be administered only by competent, fully trained individuals. Often, product labels give first aid procedures for the chemical involved. Such procedures can be used if the toxicant is particularly virulent or destructive of tissues, or if the specific antidotes are at hand. In any case, immediate medical attention should be secured.

THE MEASUREMENT OF TOXICITY

There are a number of complex terms used in the measurement of toxicity. Most of the terms can be simplified to dose-related characteristics, as measured on test animals. Here are the terms of measurement.

(Slide #3) LD₅₀ (Lethal Dose, 50%) is the dosage that, when administered to animals, kills half of them. The LD₅₀ is usually expressed in mg of toxicant per kilogram of body mass, and the test route (oral, intravenous, etc.) is usually given.

LC₅₀ (Lethal Concentration, 50%) is that concentration of a toxicant in air or other suitable vehicle, which, when administered to test animals for a definite time period, kills 50% of them. The LC₅₀ is given in parts per million (ppm) for that time period.

TLV (Threshold Limit Value) is an estimate of the average safe toxicant concentration that can be tolerated on a repetitive basis, usually an eight hour period in a day-to-day basis.

TWA (Time Weighted Average) is a mathematical expression summing the products of toxicant concentrations and durations of exposure to those toxicants, and dividing by the total exposure time. In simple terms, the concentration of the various toxicants are multiplied by the duration of exposure to each individual toxicant, the results are added, and then divided by the time of exposure.

At this point in time, there are over 2,000,000 chemical compounds known; the toxicity of most of these is not known. Of the 6,000 compounds on the NIOSH carcinogen list, less than half of these have been thoroughly tested. How, then, does one assess the toxicity of a given substance? For a large number of commonly encountered compounds, a sufficient amount of investigative work has been conducted and published. Clear, well written source books are available for the more common types of toxicants encountered in industry. We have several of these reference books in our library and are on the mailing list of several organizations that do research and produce additional reference guides.

HANDLING TOXIC CHEMICALS

As was stated earlier, the prime requisite for the control of toxic hazards is a knowledge of the compounds in use, including their physical properties, their toxicology, and any remedial measures that must be taken. Additionally, there are a number

of rules that can be used in the safe handling of toxic substances. Most of these rules are based on simple common sense. Here are the rules. (Slide #4) 1. Unless it is definitely known that a substance is not toxic, treat it as though it is. 2. Protect exposed areas of the skin, and the eyes when working with toxicants (wear gloves, goggles, face shields, etc). 3. Wear a respirator, gas mask, or self-contained breathing apparatus when appropriate. (We will follow this lesson with a review of breathing equipment.) 4. Change garments if they become contaminated with a toxic substance. 5. Don't eat or keep food or cigarettes in areas where toxic substances can come in contact with them. 6. Keep accurate records of any toxic substance used in the refinery so we may be prepared in the event of accidental exposure. 7. Train all personnel thoroughly.

(Slide #5) It is again stressed that good preventive safety in the handling, and use of toxic chemicals requires a sound knowledge of the chemistry, toxicology and physical properties of those chemicals. The application of care and common sense in their use is the second key to hygiene safety. The third key is the use of proper protective equipment and clothing. Only by rigid adherence to the rules for the use and handling of toxic chemicals can our refinery be kept a safe place in which to work.

How does this affect you, an employee of Continental Oil Lake Charles Refinery? Fortunately, for the most part, we do not have to be overly concerned with too many of the known toxic

substances. In refining, depending on our job classification, we are not likely to come in contact with but a few chemicals that fall under the toxic heading. For information update, let's review a few of the chemicals that are handled regularly in our operation.

ACID

Sulfuric acid is the most widely used acid in the Refinery. It is a colorless to cloudy, in pure state, liquid used in the Refinery processes. Spent or used acid is brownish in color. It is highly corrosive to most metals, particularly in strengths below 60%, with evolution of hydrogen, a highly flammable and explosive gas. Sulfuric acid itself is not flammable but may cause ignition by contact with combustible liquids and solids.

On contact with the skin or eyes, sulfuric acid produces severe burns. Swallowing may cause severe injury or death. Inhalation of concentrated vapor or mist from hot acid may be injurious to the lungs.

We have a standing rule that any time you work with acid, you are mandated to use the prescribed protective equipment. This equipment includes face shields and rubber gloves. This most often applies to operators. Mechanical personnel who must work on acid equipment, are required to wear full acid gear, this being a face shield, rubber gloves, rubber rainsuit and boots.

CAUSTIC

This material, both solid and in solution, has a markedly corrosive action upon all body tissue. The symptoms of irritation

from this material are evident immediately. Its corrosive action on tissue causes burns and frequently deep ulceration, with ultimate scarring. Prolonged contact with dilute solutions has a destructive effect upon tissue. Mists, vapors and dust of this compound causes small burns, and contact with eyes, either in the solid or solution form, rapidly causes severe damage to the delicate tissue. Ingestion either in the solid or solution form causes very serious damage to the mucous membranes or other tissue with which contact is made. Caustic will react with water or steam to produce heat and will attack all living tissue.

These are the basic characteristics of sulfuric acid and caustic. These are dangerous chemicals to handle but with the knowledge of what they are and how to handle them, these dangers are greatly minimized.

Another chemical that is demanding more concern today is hydrogen sulfide or more commonly known as H_2S . This concern is being brought to light due to the fact we are processing more and more crude, containing more and more sulphur, a prime source of H_2S .

Let's view the film, "Danger, H_2S ", this will act as an introduction to the topic H_2S .

Let's review some of the facts we should know in dealing with H_2S .

H_2S is one of the more toxic gases encountered in the industry today. It is extremely poisonous and highly flammable. In high concentrations, it is as fatal as hydrogen cyanide - the gas used in the gas chambers of our penal institutions. In the petroleum industry it is a curse because of its danger to humans and equipment alike.

The chemical symbol for the gas is H_2S . It is composed of two

hydrogen atoms and one sulphur atom. It is a clear, colorless gas which is slightly heavier than air. On a still day, the gas would have a tendency to remain close to the ground and in low areas. Explosion limits are 4.3% to 46% by volume. Due to the boiling point of this material it will be found in the atmosphere in the form of a gas. H_2S is soluble in water.

H_2S occurs naturally in volcanic gases, in many mines and when sulfur containing organic matters decomposes without sufficient oxygen. The formation of oil underground is a good example of this type of decomposition.

In the refining industry H_2S is formed during the manufacture of many sulfur-containing compounds, usually as an undesirable by-product. The two main processes where H_2S is formed in a refinery are cracking processes and desulfurizing processes. In the cracking process, thermal or catalytic, as the sulfur containing molecules are being "cracked", sulfur and hydrogen are released and are free to join together and form H_2S . In the desulfurizing process, through the presence of catalyst, sulfur is liberated in the presence of H_2 and H_2S is formed.

As long as H_2S is confined within the processing equipment, there is no danger. It is only when the gas is released into the atmosphere that a potential hazard exists. In a refinery, there are several places where H_2S can be released into the atmosphere:

- (1) High concentrations of H_2S are found around oil wells, crude pumping stations and crude storage areas,
- (2) Since it is soluble in water, we can expect to find it around water draws,
- (3) In the sewer system with the plant, and
- (4) To some extent in the equipment itself when it is opened for inspection.

There is one other means of generating H_2S in a refinery and although it is not an everyday occurrence, it is being used more and more. This generation takes place during the chemical cleaning of process equipment, in particular the use of acids to remove scale in exchangers, towers and pipelines.

In order to generate H_2S in this manner, several steps are involved.

1. During the normal operation of the units, sulfur is brought into the equipment. This sulfur is not free sulfur but usually in the form of a sulfide. It may even be H_2S . In the equipment, through the process of corrosion, the sulfide attacks the metal parts of the equipment and a metal sulfide is formed, iron sulfide scale being the most common.

2. During the chemical cleaning, acid is usually used to remove the scale. Usually HCl is used for the acid, but any acid will give about the same results. The HCl acid attacks the metal sulfide and through a chemical reaction, the metal atoms and the Cl atoms combine to form a salt and the H_2 and S atoms join to form H_2S gas. This gas usually comes out of the open tank on the chemical cleaning wagon. That is why the chemical cleaning tanks are to be vented or tied into the flare system.

As stated earlier, H_2S is a deadly poisonous gas. The most important route of absorption of the gas into the body is through the lungs. This is evidenced by the fact that with proper fresh air equipment covering the face, a man can survive in an atmosphere containing fatal concentrations of H_2S . However, low concentrations, around 50 ppm, can cause local irritations of the sensitive tissues of the eyes and breathing passages.

Death in H_2S poisoning results from respiratory failure. The gas,

which attacks the central nervous system, causes one of two things. (1) It stimulates the respiratory center and causes the victim to breathe very rapidly. This overbreathing then causes the lungs to malfunction which leads to lack of oxygen in the blood stream. (2) Or, it can cause immediate paralysis of the respiratory center, even after a single breath. Ten ppm is the threshold limit - this is the maximum allowable concentration for a man to work in for an eight-hour day.

H₂S can be considered as a noncumulative poison. That is, a man can be repeatedly exposed to the gas at low concentrations without ill effects.

Tolerance to the gas does not develop. In the case of some diseases, once a man has had the disease, his body becomes immune. This is not the case with H₂S. In fact, it is the reverse. A man becomes quite sensitive to the gas after an exposure.

The very important first step in first aid treatment of an H₂S victim is to remove him to fresh air. Caution should be taken so that you do not put yourself in a position that you will be overcome by the gas. If the patient is not breathing start artificial respiration and get medical assistance.

In summary let's review some of the points made about H₂S.

1. Don't depend on your sense of smell to detect this gas.
2. Don't expect to see a visible cloud of this gas in the atmosphere.
3. Report an incident involving H₂S to your supervisor.
4. Wear fresh air equipment in questionable areas.
5. Stand upwind from the water draw when drawing water from equipment.

6. Stay upwind from chemical cleaning truck when such operations are in progress.
7. Be on the alert for H_2S gas when working near sewers, water draws, vents, gauge hatches, etc., or in such operations as blinding, removing heads from towers, pulling exchanger bundles, removing relief valves, etc., are in progress.

The question that might be asked at this point might be: "How can we safely detect this gas?" I feel the answer would be application of your knowledge of H_2S , and a working knowledge of how to use the instruments available to you will enable you to work around H_2S safely. Along with this knowledge and the facts we just talked about, we will be ready to work with sour crude when the time comes.

I've prepared a summary sheet on the important facts concerning H_2S . This sheet will give you a ready review of the items we've discussed.

The next substance I would like to consider is benzene.

As most of you know, OSHA has published a new safety standard for occupational exposure to benzene. This new standard requires employers and employees to realign their thinking and handling procedure where benzene is concerned.

All paragraphs of this new standard do not apply to the Lake Charles Refinery since we do not handle benzene as a product. However, some paragraphs of the standard do apply because we have benzene entrained in a few of our hydrocarbon streams. The Lake Charles Refinery is concerned about benzene because the material is a natural part of the crude oil we process. We must comply to the standard just as though we produced benzene for sale.

To assure we are working toward a common understanding let's review

some information dealing with benzene. The following facts concern the benzene standard as set down by OSHA.

I. What is benzene?

- A. Benzene (C_6H_6) - a major organic intermediate and solvent derived from coal or petroleum. The simplest member of the aromatic series of hydrocarbons.
- B. Permissible exposure limit.
 - 1. Airborne, 1 part of benzene vapor per million parts of air (1ppm) as a time-weighted average (TWA) for an 8-hour workday with a ceiling concentration of 5ppm, as averaged over any 15 minute period.
 - 2. Dermal, eye contact and repeated skin contact with liquid benzene is prohibited.
- C. Appearance and odor - benzene is a clear, colorless liquid with a pleasant sweet odor. The odor of benzene does not provide adequate warning of its hazard.

II. Health Hazard Data

- A. Ways in which the benzene affects your health. Benzene can affect your health if you inhale it, or it comes in contact with your skin or eyes. Benzene may also be harmful if you swallow it.
- B. Effects of over exposure:
 - 1. Short-term (acute) overexposure: If you are over-exposed to high concentrations of benzene, you may feel breathless, irritable, euphoric (feeling of

well-being), or giddy. You may experience irritation in eyes, nose and respiratory tract. You may develop a headache, feel dizzy, nauseous, or experience unsteadiness in walking. Severe exposure may lead to convulsions.

2. Long-term (chronic) exposure: Repeated and prolonged exposure of benzene may cause headache, fatigue, shortness of breath, and serious blood disorders, including leukemia (abnormal increase in the number of leukocytes or white cells in the tissues and often in the blood).

III. Protective Clothing and Equipment

- A. Respirators: Respirators are required for those operations in which engineering controls or work practice controls are not available to reduce exposure to the permissible exposure limit. If respirators are worn, they must have a National Institute for Occupational Safety and Health (NIOSH) seal of approval.
- B. Protective Clothing: You must wear appropriate protective clothing (such as boots, gloves, sleeves, aprons, etc.) over any part of your body that could be repeatedly exposed to liquid benzene.
- C. Eye and Face Protection: You should wear splash-proof safety goggles if it is possible that benzene may get into your eyes. In addition, you should wear a face shield if your face could be splashed with benzene liquid.

IV. Emergency and First Aid Procedures

- A. Eye and face exposure: If benzene is splashed in your eyes, wash it out immediately with large amounts of water. Call a doctor as soon as possible.
- B. Skin exposure: If benzene is spilled on your clothing or skin, remove the contaminated clothing and wash the exposed skin with large amounts of soap and water immediately.
- C. Breathing: If you or any other person breathes in large amounts of benzene, get yourself or the exposed person to fresh air at once. Apply artificial respiration if breathing has stopped. Call a doctor as soon as possible.
- D. Swallowing: If benzene has been swallowed, do not induce vomiting because it will cause further harm. Call a doctor immediately.

V. Medical Requirements

If you are exposed to benzene above the permissible limit, your employer is required to provide within 30 days of the effective date of this standard, or within 30 days following placement in a job involving benzene exposure, medical surveillance consisting of a medical history and laboratory test.

VI. Observation of Monitoring

Your employer is required to perform measurements that are representative of your exposure to benzene and you are entitled to observe the monitoring procedure. You are

entitled to receive an explanation of the measurement procedure, and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you must also be provided with, and must wear the protective clothing and equipment.

VII. Access to Records

You are entitled to see the records of measurements of your exposure to benzene upon request to your employer. Your medical examination records can be furnished to your physician upon his request to your employer. A copy of the physician's written opinion following medical surveillance shall be supplied to you by your employer.

VIII. Precautions for Safe Use, Handling and Storage

Benzene liquid is highly flammable. It should be stored in tightly closed containers in a cool, well ventilated area. Benzene vapor may form explosive mixtures in air. All sources of ignition must be controlled. You should use nonsparking tools when opening or closing benzene containers. You must ground or bond metal benzene containers. Fire extinguishers, where provided, must be readily available and you should know where they are located and how to operate them. Smoking is prohibited in areas where benzene is used or stored.

As most of you old hands know, we've worked with benzene for a number of years. Why, now all of a sudden, the big push to place so many safe guards on it.

Why the issuance of new standard for benzene?

1. The Assistant Secretary finds that exposure to benzene poses a grave danger to humans.
 - a. Can cause bone marrow damage.
 - b. Can cause blood dyscrasia.
 - c. Moreover, accumulated studies strongly support the conclusion that benzene causes leukemia in humans.

What is the new standard?

1. OSHA limits employee exposure to benzene to one part benzene per million parts of air (1ppm), as an 8 hour time-weighted average concentration.
2. A ceiling level of 5ppm for any 15 minute period during the 8-hour day.
3. The standard requires the measurement of employee exposure, engineering controls, personal protective equipment and clothing, employee training, medical surveillance, work practices and record keeping.

How does all this affect me, an employee of Continental Oil, Lake Charles Refinery?

1. For the most part, we are in good shape as far as the standard is concerned. We do not have benzene in liquid form anywhere except in the lab, and this is presently being phased out.
2. Our contact with benzene comes through a few of our hydrocarbon

streams. The level of benzene in these streams is very low - as an example, (cite some stream concentrations).

What are some good personal hygiene requirements?

1. All food, beverages, tobacco products and unapplied cosmetics will be prohibited in areas where concentrations are greater than 1ppm.
2. Where eyes may be exposed to liquid benzene, goggles, or preferably face shields will be worn. Also, you should be aware of the location of your eye wash and safety shower facilities.
3. In regards to your hands or skin, you must wear Neoprene rubber gloves, or gloves that are impervious to benzene. If there is a chance of benzene splashing, you must wear rubber protective clothing to avoid skin contact. Impervious clothing (such as boots, gloves, sleeves, aprons, etc.) should be worn over any parts of the body that could be repeatedly exposed to benzene. If benzene is splashed into your eyes, he or she should wash it out immediately with large amounts of water. A doctor should be summoned as soon as possible.
4. If an employee experiences difficulty breathing, he or she should tell his supervisor immediately.
5. If benzene is spilled on clothing or skin, the contaminated clothing should be removed as soon as possible and the exposed skin should be washed with large amounts of water and soap immediately.
6. If you breathe in large amounts of benzene, you should be exposed to fresh air at once. Artificial respiration should be applied only if breathing has stopped. A doctor should be called as soon as possible.

7. If benzene is swallowed and the patient is conscious, vomiting should not be induced. A doctor should be called immediately.

Where can I expect to contact benzene?

1. Tests have been run to locate our problem areas. Suspected areas found are:

- a. Sample draws on some streams
- b. Leaking pump packings
- c. Leaking valves

What work practices could cause possible benzene exposure?

- 1. Tank truck transfer
- 2. Railroad car transfer
- 3. Barge and ship transfer
- 4. Pump maintenance
- 5. Maintenance on piping, valves and etc.
- 6. Tank cleaning
- 7. Washing and cleaning known areas for spills and leakage
- 8. Pump flushing and bleeding when bringing it out of service
- 9. Placing pumps back in service
- 10. Sampling methods:
 - a. Running
 - b. Catching
 - c. Testing
- 11. Laboratory procedures and handling

These work practices should be noted by everyone and precautions should be taken to avoid exposure when involved in performing any of these tasks.

For example:

1. In tank truck, railroad car, barge and ship transfer when there are no vapor recovery type systems implemented, safe respiratory practices must be used along with possible skin and eye protection.

2. When working on valves, piping and flanges, especially cracking them open, safe practices such as proper respiratory practices and skin and eye protection must be practiced.

3. Pump work also provides possible exposure. When dismantling pumps, always check for it to be safe and bled down properly before pulling it apart. Proper respiratory and body protection must also be practiced.

4. Sample will always provide exposure so use of respiratory and personal protection equipment is a must.

As you can see, there are many work practices that occur which can cause exposure or possible exposure. Engineering methods will be utilized in the areas where it is feasible to reduce possible exposure. The most important factor in implementing safe practices is the individual. Think before you act.

What is Conoco doing to protect you from benzene exposure?

1. Tech Services have conducted extensive tests to find every area where you could possibly be exposed to benzene.

2. Personal sampling equipment is being used to monitor individuals required to work in and around areas that are suspected hazard areas.

3. Signs are purchased and will be posted at danger areas to alert you that it is possible to come in contact with benzene.

4. Respirators are available to be used in areas found to have a high concentration of benzene. You will be shown and trained in the use of

these respirators if your job assignment requires you to work in one of these suspect areas.

5. Tech Services and Safety Division have combined forces to develop a record-keeping system that will both satisfy OSHA requirements and give you, the employee, first hand knowledge of just where you stand in relation to benzene exposure.

6. Medical Division has outlined a program of testing and examination that will insure early detection of any problem arising from contact with benzene.

What can you do to protect yourself from benzene exposure?

1. Stay alert.
2. Educate yourself on benzene.
3. In most cases, the simple use of the proper sampling method will afford you all the protection you will need.
4. If you must enter a posted area and that area calls for protective equipment, use it.
5. If you suspect you are exposed to benzene, report the incident to your supervisor so proper corrective action can be taken.
6. Take the opportunity to review respirators and what they can do for you.
7. Following this class, John will give you a review on the use of breathing equipment.

The next item of discussion will be phenols. Phenols do not offer too much of a problem for the Lake Charles Refinery. This is due to the fact phenols are not contacted in a pure state. Our experience with this substance comes through phenols being en-trained in some of the process streams found in the coker, the thermal unit and the tank farm areas. I'll go over some general information concerning phenols. As we go over this information remember the facts I am giving you are for phenols in a pure state and reflect the standards and conditions that should be met when handling the substance in this form. Our situation is such that common sense and minimum protection equipment is all that is necessary to eliminate harmful effects of the small amounts of phenols with which we are likely to come in contact.

General Information

Phenol is carbolic acid. Like any strong acid, it will cause damage to the skin. In addition, phenol can be rapidly absorbed where it affects the central nervous system. Shock, collapse and unconsciousness can occur unless prompt action is taken to remove any phenol contaminated clothing and to flush the phenol from the body. There have been cases reported in trade journals of death resulting from phenol exposure where proper corrective measures were not taken. Phenol has a characteristically sweet odor which becomes irritating to the respiratory system at levels above five parts per million, the threshold limit value for an 8-hour working day. Phenol has a flash point of 185°F. Phenol will burn if ignited, and if involved in a fire, it gives off toxic vapors. An important characteristic of phenol is its melting point, 105°F. Sample points or

drains may solidify and plug; when the plug breaks loose, a body could be splashed.

Phenol, in pure state, is primarily used as a solvent for the refining of lubricating oils.

Phenol has good warning properties due to its characteristic odor and irritation to the skin and mucous membranes. It is generally handled in closed systems. Leaks or sudden breaks with spillage of liquid phenol and/or release of phenol vapors can result in skin exposure.

Specific Precautions for Phenol

The toxic nature of phenol must be emphasized in our training. Skin exposure to any concentration of phenol should be avoided, as it can cause severe burns and can be rapidly absorbed into the system.

Proper protective equipment should be worn. Minimum requirements for our degree of exposure should be coveralls, gloves, safety glasses and protective or barrier cream.

Employees who work in areas of possible phenol exposure should be instructed and encouraged to maintain scrupulous personal cleanliness at work. Personal protective equipment should be clean and in working order at all times.

Phenol is rapidly absorbed through skin and can cause severe burns. Some things to observe are:

(Slide #6)

1. Avoid getting phenol in eyes, on skin, on clothing.
2. Avoid breathing vapors.
3. Do not take internally.
4. Except in the case of very minor burns, get medical attention.

Like our benzene program, Tech Services and Safety have a program in which they conduct personnel monitoring to insure we keep tabs on where and how much phenol any one is exposed to.

The last chemical I would like to briefly mention is phosgene. Our primary concern here is the fact this is a product induced upon us by our neighbor to the south, Olin. At unannounced times, due to a malfunction in operations, Olin will release a cloud of phosgene that is carried into sections of our refinery causing a period of discomfort. For this reason we should know a little about phosgene. Again, as we talk about phosgene remember the items stated relate to phosgene in a pure state and do not reflect the concentrations we are exposed to in our refinery.

Phosgene

Phosgene is a colorless gas at ordinary temperatures and pressures. In commerce it is a liquified gas under pressure and/or refrigeration and is classified by the U. S. Department of Transportation as a Class A poison.

Fatal injury may result from breathing the gas, and its irritating effects on the lungs may be delayed in onset.

In the presence of moisture, phosgene decomposes to form hydrochloric acid and carbon monoxide. This action takes place within the body, when the gas reaches the bronchioles and the alveoli of the lungs. There is very little irritant effect upon the respiratory tract, and the warning properties of the gas are therefore very slight. The liberation of hydrochloric acid in the lung tissues results in the development of pulmonary edema, which may be followed by bronchopneumonia, and occasionally lung abscess. Concentrations of 3 to 5 ppm of phosgene in air cause irritation

of the eyes and throat, with coughing; 25 ppm is dangerous for exposure lasting 30 to 60 minutes, and 50 ppm is rapidly fatal after even short exposure.

There may be no immediate warning that dangerous concentrations of the gas are being breathed. After a latent period of two to 24 hours that the patient complains of burning in the throat and chest, shortness of breath and increasing dyspnea. There may be moist rales in the chest. Where the exposure has been severe, the development of pulmonary edema may be so rapid that the patient dies within 36 hours after exposure. In cases where the exposure has been less, pneumonia may develop several days after the occurrence of the accident. In patients who recover, no permanent residual disability is thought to occur.

The possibility of phosgene coming into our plant in harmful concentrations is very remote. We have a working agreement with Olin, to give early warning of a release, and a written plan for handling the problem if and when we get any exposure. All of our control rooms have respirator protection equipment in them to handle any release of toxic substance, whether it be from our neighbor or our own refinery.

These are just a few of the toxic substances that we are concerned with. I've mentioned these because they are the ones we are most likely to come in contact with. Let me assure you that the concentration levels we have of all these substances are far below any level that is harmful to work in and around. From time to time each of you may be asked to wear a sampling pump to monitor some chemical. This monitoring is done so we can maintain the satisfaction that our concentration levels stay at levels that are acceptable to all health standards.

Common sense and a basic knowledge of what we are exposed to will protect us in any given situation. It is up to each of us to apply these two principles and follow them to keep us safe from toxic substances.

Do any of you have questions?

For the next time period you will be given a refresher course in respiratory protection equipment.