U. S. Department of Labor
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:49PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 013 |
| Number Exposed | 11 | No. Instances | 2 | REC | |
| Std. Alleged Vio. | 1910.106(e)(6)(i) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| **Abatement Documentation Required** | **Date Abated** | **Date Verified** | |
| Yes | | | |

**MULTISTEP**

| Type | Days | Due Date | Track | Completed Code |
|---|---|---|---|---|
| | | | | |

| | |
|---|---|
| Substance Codes | |

AVD/Variable Information:

29 CFR 1910.106(e)(6)(i): Adequate precautions against the ignition of flammable vapors were not taken:

a) Tote Line (Line 3) - Employees used a Milwaukee Dual Temperature Heat Gun (rated at 570/1,000 °F and 1,400 Watts) to remove the placards and/or labeling on the metal plates on the outside of the 275-gallon and 330-gallon plastic totes. The heat gun was plugged into a damaged extension cord which shorted out and emitted sparks. An open five-gallon container of Dissolve II, a Class II Combustible Liquid with a flash point of 110 °F, was located and stored approximately 8-12 inches to the right of the damaged portion of the extension cord (i.e. where the spark was emitted).

**ABATEMENT NOTE: Instance (a) was Corrected During Inspection**

b) Tote Line (Line 3) - Employees used a Milwaukee Dual Temperature Heat Gun (rated at 570/1,000 °F and 1,400 Watts) to remove the placards and/or labeling on the metal plates on outside of the 275-gallon and 330-gallon plastic totes which contained flammable and combustible liquids such as, but not limited to acetone, alcohols, toluene, xylene and styrene. Smoke and small pieces of paper (which were still combusting) were emitted or thrown into the air while employees used the heat gun to remove the labels and/or placards. Due to conduction and convection, the metal plates where the labels and/or placards were attached to the outside of the totes became hot and reached temperatures above approximately 100 °F.

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | 5,000.00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | | | |
|---|---|---|---|---|---|
| Occupation | Label Remover | Employer | Indianapolis Drum Service | | |
| Duration | 5 months | Frequency | 8 hours/day | | |
| Employee Name | Willie Quinn | | | | |
| Address | 3514 North Terrace Avenue<br>Indianapolis, IN 46218 | | Phone | (317) 413-4375 | |

| Instance Description: | A. Hazard | B. Equipment | C. Location | D. Injury/Illness | E. Measurements |
|---|---|---|---|---|---|

| 4. Date/Time |
|---|
| (a) 8/26/10 2:35 pm<br>(b) 9/23/10 10:00 am |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: (a)-(b) In addition to the receiving and processing metal and plastic 55-gallon drums, the employer also receives and processes 275-gallon and 330-gallon plastic totes equipped with metal frames. All of the plastic totes are processed on the Tote Line (Line 3), which is located on the left side of the facility. The plastic totes arrive on the Tote Line with the plastic caps located on top of the totes screwed tightly in place and intact. The valves located on the bottom of each tote are also intact and in the closed position (i.e. valve handle parallel to the valve). All of the plastic totes that are processed on the Tote Line are cleaned, and either recycled/resold or sent to Line 2 to be prepped/cleaned for shredding. None of the plastic 275-gallon or 330-gallon totes that are processed on the Tote Line are segregated in any way (i.e. by chemical type or hazard, tote color or type, label classification, etc.). Employees interviewed said that they process (i.e. dump and/or empty) between 115 and 200 totes per day on the Tote Line.

Although the plastic totes are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the totes. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic totes in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of totes) to approximately one-inch (total height of all chemical remaining in tote). Although most of the totes contained one-inch or less of liquid, the CSHOs (Jason Reason and Laura Groom) observed multiple totes that contained more than one-inch of liquid (up to and including 2.5 to 3.0-inches of liquid). On August 31, 2010, the CSHO (Jason Reason) also observed the liquid inside of a 275-gallon plastic tote of YT-181 Methyl Tin Mercaptide vigorously moving and sloshing around while the tote was being unloaded and placed on the conveyor system.

Based on a standard 275-gallon and 330-gallon tote (approximately 46.0-inches and 54.0-inches high respectively), a plastic 275-gallon and 330-gallon tote would be approximately 2.17% and 1.85% full respectively if one-inch of chemical was located inside of the tote (NOTE: this percentage is based off of the total height of each of the totes). These plastic totes contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO observed during the inspection, found during the various days of air sampling at the facility, or while examining MSDSs.

Before the 275-gallon or 330-gallon plastic totes are recycled or shredded, they must be cleaned. Dock employees first manually pull and/or drag the totes from the conveyor system and onto a conveyor system. The conveyor system runs from the loading dock, through a hole in the East wall and ends on the left side of a elevated platform. While the totes are on the conveyor system and prior to them going through the hole in the East wall, dock employees unscrew and remove the plastic cap located on top of each of the totes. This elevated platform runs along most of the Tote Line and is constructed in an "U-shaped" pattern. The left and right sides of the elevated platform each measured approximately 368-inches (30.67-feet) long. The left side of the elevated platform was approximately 117.0-inches (9.75-feet) wide. The right side of the elevated platform was approximately 141.0-inches (11.75-feet) wide. The back side of the elevated platform measured approximately 396-inches (33.00-feet) long by 87.0-inches (7.25-feet) wide. The entire elevated platform was located approximately 55-inches (4.58-feet) above the floor.

When the totes reach the end of the conveyor system, employees manually drag and pull each of the totes off of the conveyor system and onto the elevated platform. Employees then use a Milwaukee Dual Temperature Heat Gun (Serial Number 731-784604) to loosen the adhesive located on the back of the placards and labeling. The heat gun was double insulated and was

rated at 570/1,000 °F, 1,400 Watts and 120 Volts. Employees use the Milwaukee Dual Temperature Heat Gun to remove labels and placards from the outside of totes which contain approximately one-inch or more of flammable or combustible liquids including, but not limited to toluene, xylene, methyl ethyl ketone (MEK), alcohols and acetone.

(a) While using the heat gun, employees manually pull and tear each placard and label off of the totes. If the labels cannot be removed using the heat gun, employees will use a rag to apply Dissolve II, a Class II Combustible Liquid, to the labels and placards on the totes. Dissolve II is a chemical stripper that is used to loosen and/or remove any adhesive located on the back of the labels or placards. After the labels and placards have been removed and/or treated with Dissolve II, employees push the totes to the far end of the left side of the elevated platform, which slightly tilts the totes downward towards the floor.

The Dissolve II is stored inside of a plastic five-gallon container which is located against the electrical installations located along the front edge of the elevated platform. The plastic five-gallon container of Dissolve II is kept open (i.e. no lid in place) at all times, even when not in use, while the Tote Line is running. When Tote Line employees' shift ends, the open plastic five-gallon container of Dissolve II is stored without a lid or cover on the elevated platform until employees return for their next shift. Most of the time, the Tote Line only operates Monday thru Thursday. Thus, the five-gallon container could be stored on the elevated platform overnight (approximately 12-16 hours) or up to three to four days (Thursday afternoon through Monday morning) with no lid or cover on top of the container.

The Milwaukee Dual Temperature Heat Gun is plugged into an extension cord which is subsequently plugged into an electrical outlet located directly above the front of the conveyor system. While the heat gun was being used, the extension cord was draped over the rollers on the conveyor system and on the floor of the elevated platform. Thus, the extension cord was repeatedly run over by totes as they came off of the conveyor system and repeatedly stepped on by employees while they were walking on the elevated platform. The extension cord was also exposed to the harsh environment of the Tote Line (large amounts of water used/spilled, corrosive chemicals processed/spilled, large amounts of heat and vibration, etc.).

The extension cord that the heat gun was plugged into was severely damaged. Specifically, the insulation of the extension cord located just beneath the cord's receptacle was completely cut, which allowed the ground wire to protrude out of the extension cord's insulation (Refer to Pictures IMG_0066, IMG_0068, IMG_0092 & IMG_0093). The insulation on the exposed ground wire of the extension cord was also damaged. The CSHOs observed what appeared to be frayed wires protruding from the ground wire. Besides the damaged insulation, the entire extension cord appeared to have lost its rigidity and was limp, bent and creased in several places. While employees are using the heat gun, the damaged portion of the extension cord comes within approximately 3-6 inches of the employee's leg(s) and/or lower body. While employees were using the heat gun, the CSHO also observed the damaged portion of the extension cord actually touch the employee's pant leg. Employees interviewed said that while working around the extension cord, they sometimes feel what may be small shocks or what feel like needles on their skin.

Employees interviewed said that the extension cord has shorted out and emitted a spark one to four times within the last three months. Employees interviewed also said that after the spark is emitted from the extension cord, the breaker is tripped and everything is shut down on the Tote Line. Employees interviewed also said that rather than replacing the extension cord, maintenance employees just reset the breaker and do not examine what caused the breaker to trip. It should be noted that the open five-gallon container of Dissolve II was located and stored approximately 8-12 inches to the right of the damaged portion of the extension cord (i.e. where the spark was emitted).

(b) Sometime in the middle of September of 2010, the employer changed the label removing process used on the Tote Line. The employee who removes the label off of the totes as they come off of the conveyor system is now only supposed to use a scraper and the heat gun to remove the labels. While the Dissolve II chemical stripper is still available for use, the employer discourages its use and prefers that employees remove all of the labels without using the Dissolve II. The labels located on the outside of the totes fall into three types: paper, vinyl or plastic. Both the employer and employees interviewed stated that the vinyl and plastic labels come off much easier than the paper labels (both with and without using Dissolve II).

On September 23, 2010, the CSHO observed employees using this new process to remove labels from the outside of the totes. Employees had little to no problems removing the vinyl or plastic labels without using Dissolve II. However, employees had difficultly in removing the paper labels without using Dissolve II. While observing employees removing the paper labels, the CSHO observed multiple instances where significant quantities of smoke were generated and emitted from the areas where the label was being removed (Refer to Videos MVI_0121 - MVI_0123). Smoke was generated because the label had contacted the heated surface(s) of the heat gun. In one instance, the CSHO observed an employee actually using the end of the heat gun to scrape the label off of the outside of a tote (Refer to Video MVI_0123). Smoke was also generated as a result of the heat gun being in close proximity to the label, which caused the label to burn (combust) and emit smoke. On September 23, 2010, the CSHO observed that the employee holds the heat gun within approximately 0.5-3.0 inches of the label which they are trying to remove (Refer to Videos MVI_0121 & MVI_0122).

On September 23, 2010, the CSHO also observed small pieces of paper and embers being thrown into the air while employees were using the heat gun to remove the labels and placards. Several of these small pieces of paper were still combusting (burning, charred, ashed, etc.) while they were in the air. The ceiling fans located above the Tote Line propagated these combusting (burning) pieces of paper in all directions throughout the area in and around where the heat gun was used. The CSHO observed that several of these burning pieces of paper and/or embers were blown directly in front of where the heat gun was used and towards the unprocessed totes on the conveyor system. Prior to being placed on the conveyor system, all of the caps located on top of the totes are removed. Thus, the burning pieces of paper and/or embers generated from the heat gun

could potentially be blown or land inside of totes which contain flammable or combustible liquids. These burning pieces of paper and/or embers could potentially ignite the flammable and/or combustible vapors and/or residues located inside of the totes.

Due to the conduction (heat gun touching the surface of the metal plate) and convection (close proximity of the heat gun to the label), the metal plate where the labels are attached to the outside of the totes also becomes very hot. Within 10-20 seconds after the employee removed the labels from the tote shown in MVI_0123 (taken on September 23, 2010), the CSHO measured the surface temperature of the portion of the metal plate that contacted the heat gun to be between approximately 135 °F and 142 °F. The CSHO measured the surface temperature of the portions of the metal plate in and around the contact area to be between approximately 108 °F and 113 °F. While observing the label removing process on September 23, 2010, the CSHO also observed some of the metal plates become red hot and/or deformed due to the prolonged contact with the heat gun. NOTE: All of the surface temperature measurements were taken on the outside of a tote which contained Cognis Texapon AOS 225 HA (flammability rating of 1.0).

b) Equipment: (a) Dissolve II, a Class II Combustible Liquid, (b) Flammable or Combustible Liquids including, but not limited to Toluene, Xylene, MEK, Alcohols and Acetone
c) Location: (a)-(b) Tote Line (Line 3)
d) Injury/Illness: 2nd and/or 3rd degree burns to entire body, death due to explosion from ignition of flammable/combustible vapors
e) Measurements: (a) Dissolve II (Flash Point - 110 °F, Boiling Point 310 °F)

| 21. Photo Number | Location on Video |
|---|---|
| (a) IMG_0066, IMG_0068 - IMG_0070, IMG_0092, IMG_0093 | (a) MVI_0079, MVI_0091<br>(a)-(b) MVI_0121 - MIV_0123 |

23. Employer Knowledge: (a)-(b) On May 19, 2010, the CSHO emailed Lewis Warren, Environmental and Regulatory Director, a Document Request Form that requested copies of all of the MSDSs for chemicals that had a health rating, flammability rating and/or reactivity rating above 3.0. On May 26, 2010, the CSHO returned to the facility to pick-up the MSDSs that the CSHO requested. Several of the MSDSs provided to the CSHO by Lewis Warren, Environmental and Regulatory Director, listed the chemicals as flammable or combustible. These MSDSs included but were not limited to the following: Six MSDSs for isopropyl alcohol (isopropanol), Three MSDSs for acetone, Two MSDSs for methanol, Four MSDSs for styrene, Two MSDSs for MEK/Ethyl Acetate, One MSDS for Ethyl Acetate, One MSDS for xylene and Six MSDSs for other flammables or combustibles. Most of these MSDSs stated to keep heat, sparks, flames and/or other sources of ignition away from these chemicals during use or storage.

(a) During a phone conversation on November 5, 2010, Lewis Warren, Environmental and Regulatory Director, stated that the extension cord for the heat gun had probably been there for a couple of months.

Neither Jerry Spegal, Tote Supervisor/Manager, nor Darrell Kinnaman, Maintenance Supervisor, knew how long the damaged extension cord had been plugged into the heat gun or used on the Tote Line. However, the damaged extension cord was in plain sight and the ground wire could easily be seen protruding from the extension cord, especially when standing in front of or on the elevated platform on the Tote Line.

On December 9, 2010, Ray Chapman, Plant Manager (Jerry's Supervisor), stated that he did not see the damaged electrical box or the extension cords, and he walks though the Tote Line everyday. Ray also stated that the heat gun has been used on the Tote Line for 3-4 months after the Tote Line started. Ray also stated that until recently, the heat gun was plugged into an extension cord. Ray also stated that he used to look at extension cords all the time, but the damaged the extension cord on the heat gun may have slipped through.

(b) On September 23, 2010, Lewis Warren, Environmental and Regulatory Director, stated that the process on the Tote Line changed, depending on the totes and how easy the labels could be removed from the totes. Lewis also stated that they still use Dissolve, but on a bunch of totes it is easier to remove the labels using the heat gun alone. While observing the process, Lewis also stated that he did notice smoke while employees were using the heat gun to remove the labels.

On September 23, 2010, the CSHO spoke with Jerry Spegal, Tote Supervisor/Manager. During this conversation, Jerry stated that the Dissolve is still up there (on the Tote Line), but it is not used as much. Jerry also stated that they now use the heat gun and scraper on paper labels without Dissolve so that it is not as hard on Hugh (Inman) taking the glue off. Jerry also stated that Hugh (Inman) now just gets the glue off and does not remove the label now. Jerry also stated that they have changed this process within the last month. Jerry also stated that this new system makes the flow go a little faster and that is why it was changed.

24. Comments (Employer, Employee, Closing Conference): (a) Some employees interviewed said that the cord that the heat gun is plugged into has been damaged for 3-4 months. These employees interviewed also said that the cord was broke and the

wire was sticking out. These employees interviewed also said that the cord sparked once and it tripped the breaker. These employees interviewed also said that maintenance just fixed the breaker and never looked at the cord. These employees interviewed also said that the totes are hot when they take the labels off. These employees interviewed also said that sometimes they feel needles or little shocks (from the cord), but they are not sure what it is.

Other employees interviewed said that they use the heat gun to remove the labels, and they have been talking about the cord for the longest time. These employees interviewed also said that the cord shorts the outlet out three to four times, and the cord has been damaged forever. These employees interviewed also said that the cord has sparked where it is connected to the gun in the past three months. Other employees interviewed said that the bucket of Dissolve sits there overnight when not in use without a lid. These employees interviewed also said that they had lids, but they were too big so Jerry (Spegal) got rid of them.

(b) Some employees interviewed said that they use a knife for the paper labels and the totes are hot when taking the labels off. These employees interviewed also said that before the change with the heat gun, there was no lid on the Dissolve container, but now the Dissolve is hardly used because of the heat gun changes.

25. Other Employer Information:

26. Classification:

| Serious | Knowledge | S or O | Repeat? | Willful? |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **5,000.00** | | |

U. S. Department of Labor
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:49PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 014(a) |
| Number Exposed | 72 | No. Instances | 1 | REC | |
| Std. Alleged Vio. | 1910.120(q)(1) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| Abatement Documentation Required | Date Abated | Date Verified | |
| Yes | | | |

| MULTISTEP | | | | |
|---|---|---|---|---|
| Type | Days | Due Date | Track | Completed Code |
| | | | | |

| | |
|---|---|
| Substance Codes | |

AVD/Variable Information:

29 CFR 1910.120(q)(1): Employers whose employees were engaged in emergency response no matter where it occurs except for employees engaged in operations specified in 29 CFR 1910.120(a)(1)(i) through (a)(1)(iv), did not develop and implement an emergency response plan to handle anticipated emergencies prior to commencement of emergency response operations:

Facility Wide - The employer's Emergency Response Plan (ERP) was not effectively implemented prior to commencing emergency response operations such as, but not limited to a spill/release of unidentified/unknown chemicals that occurred on or about the second week of August 2010 (August 9-13, 2010). In addition to not being effectively implemented, the employer's ERP also did not address the following elements:

- Personnel roles, lines of authority and level of training for all Hazardous Materials (HAZMAT) team members
- Emergency recognition and prevention
- Safe distances and places of refuge
- Evacuation routes and procedures
- Decontamination procedures
- Emergency medical treatment and first aid
- Critique of emergency response and follow-up
- Personal protective equipment (PPE) and emergency equipment to be used during a response or clean-up
-

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | 5,000.00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | | | |
|---|---|---|---|---|---|
| Occupation | Maintenance Director | Employer | Indianapolis Drum Service | | |
| Duration | 1 year | Frequency | 8 hours/day | | |
| Employee Name | Darrell Kinnaman | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |
| Occupation | Environmental and Regulatory Director | Employer | Indianapolis Drum Service | | |
| Duration | 2-3 years | Frequency | 8 hours/day | | |
| Employee Name | Lewis Warren | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |
| Occupation | Complex Administrator | Employer | Indianapolis Drum Service | | |
| Duration | 1 year | Frequency | 8 hours/day | | |
| Employee Name | Wes Ledbetter | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |

| Instance Description: | A. Hazard | B. Equipment | C. Location | D. Injury/Illness | E. Measurements |
|---|---|---|---|---|---|

| 4. Date/Time |
|---|
| 9/23/10 1:05 pm |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: Plastic drums of varying sizes (mainly 55-gallons) and plastic totes (275-gallons and 330-gallons) are unloaded from semi-trailers which are located outside of the facility directly across from the West wall. Each semi-trailer is not chemical or hazard specific in that each semi-trailer contains a combination of a variety of plastic drums or plastic totes. Although the plastic drums or plastic totes are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the drums and totes. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic drums and plastic totes in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of the drum and tote) to approximately one-inch (total height of all chemical remaining in drum and tote). Based on a standard 55-gallon drum (approximately 34.50-inches high), a plastic 55-gallon drum would be approximately 2.90% full if one-inch of chemical was located inside of the drum (NOTE: this percentage is based off of the total volume of the 55-gallon drum). Based on a standard 275-gallon and 330-gallon tote (approximately 46.0-inches and 54.0-inches high respectively), a plastic 275-gallon and 330-gallon tote would be approximately 2.17% and 1.85% full respectively if one-inch of chemical was located inside of the tote (NOTE: this percentage is based off of the total height of each of the totes). Employees interviewed said that they process (i.e. dump and/or empty) between 500 and 1,000 drums per day on the Plant 4 Line and between 350 and 400 drums per day on the Regrind Line. Employees interviewed also said that they process (i.e. dump and/or empty) between 115 and 200 totes per day on the Tote Line.

The plastic drums and plastic totes contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, corrosive, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, ammonium hydroxide, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO found during sampling or while examining MSDSs.

The employer has its own Hazardous Material (HAZMAT) team which consists of approximately six to fourteen members (employees). The HAZMAT team is required to mobilize and respond to emergencies such as, but not limited to

uncontrolled chemical releases/spills and fires. Specifically, the employer's Emergency Response Plan (ERP) states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The HAZMAT team has emergency equipment including, but not limited to vacuums, alarm systems, radios, sandbags and spill kits. No supplied air respirators (self-contained breathing apparatus (SCBA) or airline respirators) are available for emergency use or located anywhere inside of the facility.

Because the employer has a HAZMAT team onsite which is required to mobilize and respond to emergencies, the employer would fall under OSHA's HAZWOPER standard per 1910.120(a)(v). Thus, the employer would be required to follow the requirements listed under 1910.120(q), including the requirement to have a written Emergency Response Plan (ERP). Although the employer does have a written ERP, the employer's ERP did not meet all of the requirements listed under 1910.120(q)(2). Specifically, the ERP did not address the following elements: personnel roles, lines of authority and level of training for all HAZMAT team members; emergency recognition and prevention; safe distances and places of refuge; evacuation routes and procedures; decontamination procedures (who does what, where to go, what chemicals to use during decontamination, etc.); emergency medical treatment and first aid (who will do what, CPR trained/certified employees, etc.); critique of emergency response and follow-up (lessons learned, what worked and what did not, etc.); and the PPE and emergency equipment to be used during a response or clean-up. Refer to Exhibit Log Tab 19 for a copy of the employer's ERP.

Although the HAZMAT team is required to respond to emergency situations, none of the members of the HAZMAT team are trained to any identifiable level in emergency response or to the minimum levels described in 1910.120(q)(6). None of the members of the HAZMAT team are also provided with baseline physical examinations prior to assignment to the HAZMAT team, or additional medical examination at least once every twelve months. It should also be noted that employees are not provided effective Hazard Communication (HazCom) training, and several employees did not know what chemicals they worked with or around or the hazards (safety and/or health) associated with these chemicals.

Both the employer and employees interviewed stated that the following employees responded to the drum incident that occurred on or about the second week of August 2010 (August 9-13, 2010): Ariel Boone and Mark Ruiz. Both of these employees contained the spilled unidentified/unknown materials and chemicals that came out of the 55-gallon drum. Both of these employees also cleaned up the spilled unidentified/unknown materials and chemicals by shoveling them back into the 55-gallon drum and/or washing the materials and chemicals into the floor drains using a water hose. The employees who contained and cleaned-up the unidentified/unknown materials and chemicals that came out of the 55-gallon drum wore PPE such as, but not limited to safety glasses, hardhats, hearing protection (ear plugs) and rubber gloves. This PPE represents the PPE Tote Line employees are required to wear on a daily basis. Although these employees were containing and cleaning up unidentified/unknown materials and chemicals, neither of these employees were required to wear additional PPE such as, but not limited to respiratory protection, whole-body chemical protective suits (Tyvex), face shields, or sleeves.

No one was designated or trained to perform the duties of the On Scene Incident Commander for the response to this drum incident. Thus, no one person was in charge of the area in and around where the emergency response occurred or the containment and clean-up operations. None of the employees who were working in and around the area where the drum incident occurred were informed of the spill, or the containment and clean-up operations that were being performed. Also, none of the employees who were working in and around the area where the drum incident occurred were evacuated from the area at any point directly after the incident occurred or while the containment and clean-up operations were being performed.

Because these two employees (Ariel Boone and Mark Ruiz) contained and cleaned up the unidentified/unknown materials and chemicals which were spilled from the drum, they performed the duties of a HAZMAT team members. Specifically, these employees performed the duties of First Responders (Operations Level). However, neither of these two employees are on the employer's HAZMAT team, nor have they been provided any type or level of HAZWOPER training at any time before or after this response and clean-up occurred. It should be noted that no members of the employer's HAZMAT team have been provided any type or level of HAZWOPER training. Thus, no one from the facility is trained to perform any of the emergency response roles described in 1910.120(q)(5) and 1910.120(q)(6), or in the employer's ERP.

b) Equipment: Several chemicals which are moderately to highly toxic, flammable and/or reactive (See Line 20 for examples of these chemicals)
c) Location: Facility Wide
d) Injury/Illness: Death, cancer (lung, kidney, liver, brain, etc.), blindness, multi-organ damage and/or impairment, 2nd and/or 3rd degree burns to entire body, severe eye, skin and respiratory burns and irritation
e) Measurements: Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines had <u>skin designations</u> per ACGIH and/or OSHA. Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines could also produce <u>additive or synergistic effects</u> when exposures to these chemicals are combined

| 21. Photo Number | Location on Video |
|---|---|
| | |

23. Employer Knowledge: Indianapolis Drum Service developed an Emergency Response Plan (ERP) which was last revised on July 8, 2009. During a phone conversation on November 1, 2010, Lewis Warren, Environmental and Regulatory Director, stated that the ERP was implemented probably several years ago, but he did not know for sure how long the ERP has been implemented. Section I (General) of the ERP states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The Purpose (Section II) of the ERP is "the establishment of an effective organization and procedure to efficiently handle any situation that may arise due to fire, explosion or accidental spills." Section II (Purpose) also states that "this program is written to contain and control the situation before it spreads beyond the company's capability to handle it, and to alert the appropriate agencies in order to prevent a situation endangering company employees and the surrounding community." Although the ERP does list the position and location of each emergency exit (See Page 3 of the ERP), the ERP does not contain a detailed map of where each emergency exit is located or the emergency exit routes employees are supposed to follow to get to these emergency exits. The ERP also refers to a "Spill Emergency Response Report" and a "Spill Reporting Check List," but neither of these documents are contained in the ERP. During a phone coversation on November 1, 2010, Lewis Warren, Environmental and Regulatory Director, stated that the Spill Emergency Response Report was created internally and it has never had to be filled out yet. The ERP also contains a "Common Sense Clause" (Section III) which states that "if a situation arises where one or more of these steps would not fit the situation, use your best common sense judgement to help rectify the problem."

Section II (Purpose) of the ERP also states that "the Indianapolis Drum Service Emergency Response Team consists of the following people along with their duties as a team member: Lewis Warren, James Hanley, Wes Ledbetter, Eric Hight, Mark Brown, Darrell Kinnaman, Billy Gibson, John Garmon, George Royston, Ray Chapman and Vince Jackson." Although the ERP does list the duties that each of these team members could perform during an emergency situation, the ERP does not list the level of training that each team member has attained or what roles they are actually trained to perform during an emergency. Page 4 of the ERP states that the Emergency Response Team "contains the spill using containment material (i.e. quick dry, sandbags, etc.) and block spill from leaving plant or entering state waterways" and "cleans-up the spill using supplies including, but not limited to: straw, quick dry, sand bags, diaphragm pump, gas powered pump."

Under the heading of "**person(s) creating or first discovering spill**," the ERP states that this (these) person(s) "immediately notifies appropriate personnel of spill (immediate supervisor or member of Emergency Response Team - **(Lewis Warren, Ray Chapman, Darrell Kinnaman, Billy Gibson, John Garmon, Brian Barkdull, Jerry Spegal, Dennis Long, Vince Jackson and Wes Ledbetter)**; **AND** initially contains spill to the best of your ability (using oil dry, straw, shovels, squeegees, etc.) without endangering yourself." Brian Barkdull, Jerry Spegal or Dennis Long are not listed as members of the Emergency Response Team under Section II of the ERP, and the ERP never identifies what duties they are supposed to perform during an emergency situation (including a material spill). The "AND" in the above section of the ERP also implies that it is the employees' job to attempt to contain any material spill they create or discover, even though they are not a member of the Emergency Response Team or trained in HAZWOPER. (NOTE: All words that are bolded or capped in the quotes above match the exact formatting (i.e. use of bold and caps) contained in the employer's ERP)

On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum.

On August 31, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) asked Jerry if any reactions or anything unusual has happened prior to or while moving any of the 55-gallon drums underneath the troughs. Jerry Spegal, Tote Supervisor/Manager, stated that "nothing unusual has happened" and that the drums "normally do not leak, but they can leak sometimes." During this interview, Jerry also stated that the only non-hazardous chemicals are contained inside of the drums and that he did not the hazards of the chemicals contained inside of the drums.

On September 17, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and re-interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) again asked Jerry if any reactions or anything unusual has happened while moving any of the 55-gallon drums underneath the troughs. Jerry responded and said nothing unusual has happened while moving the drums. Upon hearing this, the CSHO (Jason Reason) asked Jerry if nothing unusual

has happened, why are several employees telling the CSHOs that a drum exploded a week before the CSHOs began looking at the Tote Line? Jerry answered by stating that they have had a drum leak before because the lid was not on tight enough. Jerry stated that a month ago (1st - 2nd week of August 2010), the lid came off of a drum when he tipped it back with the dolly. Jerry further stated that he guessed drums could build up a little pressure because drums, in general, can have pressure even when they are empty, but he thought that the word "exploded was dramatic." Jerry stated that the pressure contained and released from a drum would be "like a pop can." During this interview, Jerry also stated that he did not know exactly what chemicals were contained inside of the drum, but they were non-hazardous.

On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that the lid on the drum "popped" back towards him because he did not fasten it well enough. However, several employees interviewed who were working close to where the 55-gallon plastic drums are located said that the metal ring holding the lid on the drum that exploded was tightly fasten and Jerry (Spegal) tightened the bolt on the ring before moving the drum. During this discussion/interview, Jerry also stated that about one-quarter of the liquid came out of the drum and that the incident occurred in the area where the drums sit. It should be noted that most of the employees interviewed who observed or heard about the incident said that more than one-quarter of the liquid came out of the drum (See paragraphs below). Jerry also stated that not a lot of the liquid from inside of the drum got on his body or arms, and he washed himself off underneath the emergency eyewash/shower combination located on the back side of the Tote Line. Jerry also stated that Erick and Lewis asked him why he was all wet, so he told them what happened. Jerry also stated that he told Ray (Plant Manager) about what happened. Jerry also stated that he did not experience any injuries from the incident and he did not go to the doctor to get checked out. Jerry also stated that the chemicals that spilled out of the drum were cleaned up by Arjel and Mark. Jerry stated that Arjel and Mark used shovels to put the stuff back into the drum, and it took a couple of minutes to clean up the area where the drum spilled. It should be noted that although most of the employees interviewed said that Arjel and Mark cleaned up after the incident, these employees said that the chemicals and liquids that came out of the drum were cleaned up using a hose to wash/push the chemicals into the drain.

On September 23, 2010, Lewis Warren, Environmental and Regulatory Director, stated that no one told him about anything that concerned a drum incident that occurred on the Tote Line. However, employees interviewed said that they observed Lewis in the area directly after the August drum incident occurred. On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that after the stuff in the drum spilled and got on his arms, Lewis (Warren) and Eric (Hight) asked him why he was all wet. During this conversation, Lewis also stated that drums have slid off of carts and liquid can come out with a lot of force if the lid is not on properly.

On September 23, 2010, the CSHO also discussed the employer's ERP with Lewis Warren, Environmental and Regulatory Director. During this conversation, the CSHO asked Lewis what size spill would employees respond to and what was the limit of the employer's response team? Lewis responded by stating that the ERP kicks in for "big spills." When the CSHO asked what size spill would be considered too big to handle, Lewis stated that they do not have a cut-off limit for a spill and each spill would be evaluated on a "case-by-case basis." Lewis stated that they get bulk deliveries of bleach and caustic (sodium hydroxide) that come in tankers, and if a leak or spill occurred while they were transferring these tankers, they would not attempt to do anything to stop the leak or contain the spill because a "tank truck is beyond our scope of clean-up." After hearing this, the CSHO asked Lewis if a tank truck is the cut-off point for attempting to contain or stop a spill? Lewis stated that while they could not handle a tank truck, they do not have a set number and it all depends based on what they have. The CSHO then asked if they could handle a 55-gallon drums spilling? Lewis stated that if 100% of a 55-gallon drum spilled, then it would "probably not" be beyond their scope. The CSHO then asked what if it was an extremely toxic or hazardous chemical, or if ten drums spilled? Lewis stated that they could maybe handle those situations, but each one would have to examined on a case-by-case basis. Lewis stated that depending on the size of the spill, small spills (less than three gallons) would be washed down the drain and big spills (like a drum) would have to be reported before being cleaned-up.

During this same conversation, the CSHO asked Lewis if Indy Drum had its own HAZMAT team? Lewis stated that he did not know what a HAZMAT team was and he thought they did not have a HAZMAT team. The CSHO then asked if any employees are required as part of their job to respond to a spill or emergency? Lewis stated that "certain employees are required to respond to a spill." The CSHO then asked what duties or functions would these "certain employees" perform during a spill? Lewis stated that once an assessment of the spill was performed by the senior person, employees would attempt to contain the spill because "containment is the first priority." Lewis stated that employees would contain the spill using sandbags or with something to make the spill solid so they could vacuum it up. The CSHO then asked if employees would attempt to stop the spill? Lewis stated that if possible "employees would try to stop the source of the spill." When the CSHO asked how aggressively employees would attempt to stop the spill, Lewis stated that it would handled on a case-by-case basis. When the CSHO asked if employees working around the area where the spill occurred would be evacuated, Lewis stated that other employees would be evacuated if necessary. The CSHO then asked who were these "certain employees" that Lewis referred to earlier who would respond to a spill? Lewis stated that these "certain employees" included himself, Wes, Ray, Darrell, Billy, George, and the supervisors in the area." It should be noted that this list of employees does not match the list of employees referred to as the Emergency Response Team in the ERP. Lewis further stated that whether or not they "contain or eliminate may depend on the area, but 5-7 employees do 85% of the work."

During this same conversation, Lewis stated that no one, including the "certain employees" mentioned previously, has been provided HAZWOPER training, but all employees are provided PPE training. Lewis also stated that none of the "certain employees" have ever been sent to a doctor for medical evaluations prior to being assigned containment or elimination duties. Lewis also stated that it has been a while since they have practiced an emergency evacuation, but they usually do it once a year. Lewis also stated that there are no SCBAs located anywhere onsite.

24. Comments (Employer, Employee, Closing Conference): On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum. However, Jerry Spegal's explanation and employees' observations of how the liquid escaped the confinement of the drum and ended up on the floor vary widely.

One employee interviewed said that the drum that Jerry (Spegal) was moving was really full of liquid and the chemicals inside of the drum had actually formed layers similar to oil and water. This employee said that Jerry screwed a white lid down tight on top of the drum and then used a dolly to move it. This employee said that Jerry really sloshed the liquid inside of the drum around while moving it, and this sloshing probably mixed the layers of chemicals inside of the drum. This employee said that when Jerry was moving the drum on the dolly, the white lid swelled upward and looked like it was "pregnant." This employee said that they have seen drums swell up before after they are sealed, but the employer normally puts them off to the side and checks them. This employee said that after they saw the lid swell, Jerry got five steps and then they heard a "boom." This employee said the lid exploded, blew off of the drum and ended up about 6-7 feet away from the drum. This employee also said that the lid came close to hitting Jerry when it blew off the drum. This employee said the chemicals/liquids inside of the drum shout about 3-4 feet in the air, and all of the chemicals/liquids inside of the drum ended up on the floor and/or outside of the drum (i.e. the whole drum spilled). This employee also said that the chemicals inside of the drum were light colored. This employee also said that Jerry was covered in the chemicals/liquids that exploded and came out of the drum and he ran to the eyewash to was his head and eyes off.

Another employee interviewed said that although he did not see the "drum incident," Jerry Spegal and Arjel Boone told them about it. This employee said that Jerry (Spegal) told them that the top of the drum started swelling and when Jerry saw this he got out of the way. Jerry then told this employee that after he got out of the way, the top of the drum blew off and stuff from inside of the drum got all over him. Jerry also told this employee that the stuff from the drum could have got him in the face. This employee interviewed also said that Jerry had to change clothes after this "incident" because his clothes were soaked.

Other employees interviewed said that they observed the lid of the 55-gallon drum rise while Jerry Spegal was moving it. These employees said that the liquid inside of the drum exploded out of the drum and got all over Jerry (Spegal). These employees said that the lid on the drum popped off and between one-half and one-third of the liquid inside of the drum ended up outside of the drum. These employees also said that some of the liquid got on Jerry.

Some of the employees interviewed said that the most recent "drum incident" occurred because the drum was sealed with a plastic lid and not a steel lid. All of the drums are sealed with some type of lid which is secured to the top of the drum with a metal ring. The metal ring must be manually tightened by a screw or bolt to the desired tension. The plastic lid used to seal the drum that "exploded" does have less strength and greater flexibility as compared to that of a steel lid. Consequently, the amount of pressure and/or force required to deform a plastic lid is much less than the pressure and force required to deform a steel lid. However, regardless of the type of lid used to seal the drum, the lid will always be the weakest structural point of the drum (assuming there are no holes or tears in the drum walls). Thus, once the pressure inside of the drum exceeds the maximum containment pressure of the drum, the pressure will be relieved through the drum's weakest structural point.

25. Other Employer Information: The CSHO believes that the lid on top of the 55-gallon plastic drum became detached because it was not designed to dissipate or handle the increasing pressure inside of the drum. Based on employee interviews and the CSHOs' own observations and documentation, chemicals such as, but not limited to acids, caustics (bases), oxidizers, flammables/combustibles and carcinogens (confirmed and possible) are being mixed together inside of the 55-gallon plastic drums. When incompatible chemicals are mixed, by-products of this reaction can include heat (exothermic reaction). Any heat produced from exothermic reactions inside of the drums would begin to heat the air at and around the surface of the liquid. The air at and around the surface of the liquid would continue to increase in temperature, and would begin to rise (i.e. hot air rises) and be released into the atmosphere directly above the drum. When the drums are open underneath the troughs, any heat or pressure created by chemical reactions can be released into the surrounding atmosphere (i.e. volume of container is essentially constant). However, once the drums are sealed, any heat or pressure created by chemical reactions are confined to limited volume of the drum (i.e. volume of container is fixed).

Based on Gay-Lussac's Law, the pressure of a gas is directly proportional to the gas's temperature ($P_1/T_1 = P_2/T_2$).

In other words, if the temperature of a gas increases, then the pressure of a gas also increases. Based on Boyle's Law, the pressure of a gas is inversely proportional to the gas's volume ($P_1*V_1 = P_2*V_2$). In other words, if the volume that a gas occupies decreases, then the pressure of a gas will increase. Due to the exothermic reaction that most likely occurred inside of the 55-gallon drum, the temperature of the air located in the head space of the drum increased. When the drum was sealed with a lid, the volume that the gas inside of the drum could occupy decreased. The combination of these two factors (increase in temperature and decrease in volume) increased the pressure of the air trapped inside of the drum at a rate proportional to the temperature rise and inversely proportional to the decreased volume. The pressure of the air inside of drum continued to increase until it approached the containment pressure (i.e. breaking point) of the drum. This is what employees meant when they told the CSHO that the top of the drum and lid swelled and looked "pregnant." Once the containment pressure was exceeded, the built-up pressure inside of the drum was relieved through the drum's weakest structural point (the lid). The escaping pressure would have taken a large quantity of the liquid inside of the drum with it, which resembles Jerry Spegal's statement that the liquid came out of the drum like a "pop can that was shaken up and then opened."

Based on all of the information listed in this Worksheet, the CSHO believes that employees observed and were exposed to an exothermic reaction which increased the pressure (of the air) inside of the 55-gallon plastic drum. This increase in pressure ultimately resulted in the drum releasing the built-up pressure in the form of what resembled an explosion, which exposed employees to the unknown chemical mixture that was contained inside of the 55-gallon plastic drum.

26. Classification:

| Serious | Knowledge | S or O | Repeat? | Willful? |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **5,000.00** | | |

U. S. Department of Labo(
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:49PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 014(b) |
| Number Exposed | 72 | No. Instances | 1 | REC | |
| Std. Alleged Vio. | 1910.120(q)(10) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| **Abatement Documentation Required** | **Date Abated** | **Date Verified** | |
| Yes | | | |

| MULTISTEP | | | | |
|---|---|---|---|---|
| Type | Days | Due Date | Track | Completed Code |
| | | | | |

| | |
|---|---|
| Substance Codes | |

AVD/Variable Information:

29 CFR 1910.120(q)(10): Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or to be used by hazardous materials specialists, did not meet the requirements of 29 CFR 1910.120(g)(3) through (5):

Facility Wide - The employer's Personal Protective Equipment (PPE) Program for emergency response operations did not address all of the minimum elements listed in 29 CFR 1910.120(g)(5)(i)-(x). Specifically, the PPE Program did not address the following elements:

- PPE use and limitations of the equipment
- Work mission duration
- PPE maintenance and storage
- PPE decontamination and disposal
- PPE donning and doffing procedures
- PPE inspection procedures prior to, during and after use
- Evaluation of the effectiveness of the PPE Program
- Limitations during temperature extremes, heat stress and other appropriate medical considerations
-

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | .00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | | | |
|---|---|---|---|---|---|
| Occupation | Environmental and Regulatory Director | Employer | Indianapolis Drum Service | | |
| Duration | 2-3 years | Frequency | 8 hours/day | | |
| Employee Name | Lewis Warren | | | | |
| Address | 3619 East Terrace Avenue Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |
| Occupation | Complex Administrator | Employer | Indianapolis Drum Service | | |
| Duration | 1 year | Frequency | 8 hours/day | | |
| Employee Name | Wes Ledbetter | | | | |
| Address | 3619 East Terrace Avenue Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |
| Occupation | Maintenance Director | Employer | Indianapolis Drum Service | | |
| Duration | 1 year | Frequency | 8 hours/day | | |
| Employee Name | Darrell Kinnaman | | | | |
| Address | 3619 East Terrace Avenue Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |

| Instance Description: | A. Hazard | B. Equipment | C. Location | D. Injury/Illness | E. Measurements |
|---|---|---|---|---|---|

| 4. Date/Time |
|---|
| 11/1/10 3:05 pm |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: Plastic drums of varying sizes (mainly 55-gallons) and plastic totes (275-gallons and 330-gallons) are unloaded from semi-trailers which are located outside of the facility directly across from the West wall. Each semi-trailer is not chemical or hazard specific in that each semi-trailer contains a combination of a variety of plastic drums or plastic totes. Although the plastic drums or plastic totes are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the drums and totes. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic drums and plastic totes in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of the drum and tote) to approximately one-inch (total height of all chemical remaining in drum and tote). Based on a standard 55-gallon drum (approximately 34.50-inches high), a plastic 55-gallon drum would be approximately 2.90% full if one-inch of chemical was located inside of the drum (NOTE: this percentage is based off of the total volume of the 55-gallon drum). Based on a standard 275-gallon and 330-gallon tote (approximately 46.0-inches and 54.0-inches high respectively), a plastic 275-gallon and 330-gallon tote would be approximately 2.17% and 1.85% full respectively if one-inch of chemical was located inside of the tote (NOTE: this percentage is based off of the total height of each of the totes). Employees interviewed said that they process (i.e. dump and/or empty) between 500 and 1,000 drums per day on the Plant 4 Line and between 350 and 400 drums per day on the Regrind Line. Employees interviewed also said that they process (i.e. dump and/or empty) between 115 and 200 totes per day on the Tote Line.

The plastic drums and plastic totes contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, corrosive, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, ammonium hydroxide, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO found during sampling or while examining MSDSs.

The employer has its own Hazardous Material (HAZMAT) team which consists of approximately six to fourteen members (employees). The HAZMAT team is required to mobilize and respond to emergencies such as, but not limited to

uncontrolled chemical releases/spills and fires. Specifically, the employer's Emergency Response Plan (ERP) states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The HAZMAT team has emergency equipment including, but not limited to vacuums, alarm systems, radios, sandbags and spill kits. No supplied air respirators (self-contained breathing apparatus (SCBA) or airline respirators) are available for emergency use or located anywhere inside of the facility.

Because the employer has a HAZMAT team onsite which is required to mobilize and respond to emergencies, the employer would fall under OSHA's HAZWOPER standard per 1910.120(a)(v). Thus, the employer would be required to follow the requirements listed under 1910.120(q), including the requirement to have a written Emergency Response Plan (ERP). Although the employer does have a written ERP, the employer's ERP did not meet all of the requirements listed under 1910.120(q)(2). Specifically, the ERP did not address the following elements: personnel roles, lines of authority and level of training for all HAZMAT team members; emergency recognition and prevention; safe distances and places of refuge; evacuation routes and procedures; decontamination procedures (who does what, where to go, what chemicals to use during decontamination, etc.); emergency medical treatment and first aid (who will do what, CPR trained/certified employees, etc.); critique of emergency response and follow-up (lessons learned, what worked and what did not, etc.); and the PPE and emergency equipment to be used during a response or clean-up. Refer to Exhibit Log Tab 19 for a copy of the employer's ERP.

Although the HAZMAT team is required to respond to emergency situations, none of the members of the HAZMAT team are trained to any identifiable level in emergency response or to the minimum levels described in 1910.120(q)(6). None of the members of the HAZMAT team are also provided with baseline physical examinations prior to assignment to the HAZMAT team, or additional medical examination at least once every twelve months. It should also be noted that employees are not provided effective Hazard Communication (HazCom) training, and several employees did not know what chemicals they worked with or around or the hazards (safety and/or health) associated with these chemicals.

Both the employer and employees interviewed stated that the following employees responded to the drum incident that occurred on or about the second week of August 2010 (August 9-13, 2010): Arjel Boone and Mark Ruiz. Both of these employees contained the spilled unidentified/unknown materials and chemicals that came out of the 55-gallon drum. Both of these employees also cleaned up the spilled unidentified/unknown materials and chemicals by shoveling them back into the 55-gallon drum and/or washing the materials and chemicals into the floor drains using a water hose. The employees who contained and cleaned-up the unidentified/unknown materials and chemicals that came out of the 55-gallon drum wore PPE such as, but not limited to safety glasses, hardhats, hearing protection (ear plugs) and rubber gloves. This PPE represents the PPE Tote Line employees are required to wear on a daily basis. Although these employees were containing and cleaning up unidentified/unknown materials and chemicals, neither of these employees were required to wear additional PPE such as, but not limited to respiratory protection, whole-body chemical protective suits (Tyvex), face shields, or sleeves.

No one was designated or trained to perform the duties of the On Scene Incident Commander for the response to this drum incident. Thus, no one person was in charge of the area in and around where the emergency response occurred or the containment and clean-up operations. None of the employees who were working in and around the area where the drum incident occurred were informed of the spill, or the containment and clean-up operations that were being performed. Also, none of the employees who were working in and around the area where the drum incident occurred were evacuated from the area at any point directly after the incident occurred or while the containment and clean-up operations were being performed.

Because these two employees (Arjel Boone and Mark Ruiz) contained and cleaned up the unidentified/unknown materials and chemicals which were spilled from the drum, they performed the duties of a HAZMAT team members. Specifically, these employees performed the duties of First Responders (Operations Level). However, neither of these two employees are on the employer's HAZMAT team, nor have they been provided any type or level of HAZWOPER training at any time before or after this response and clean-up occurred. It should be noted that no members of the employer's HAZMAT team have been provided any type or level of HAZWOPER training. Thus, no one from the facility is trained to perform any of the emergency response roles described in 1910.120(q)(5) and 1910.120(q)(6), or in the employer's ERP.

1910.120(g)(10) states that chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or to be used by hazardous materials specialists, shall meet the requirements of paragraphs (g)(3) through (5) of this section. Thus, the employer is required to develop and implement a Personal Protective Equipment (PPE) Program per 1910.120(g)(5).

The employer did develop and implement a written PPE Program. However, the PPE Program essentially covered the elements of 1910.132 (PPE Hazard Assessment) and did not address all of the minimum elements listed in 1910.120(g)(5)(i)-(x). Specifically, the PPE Program did not address the following elements: PPE use and limitations of the equipment; work mission duration; PPE maintenance and storage; PPE decontamination and disposal; PPE donning and doffing procedures; PPE

inspection procedures prior to, during and after use; evaluation of the effectiveness of the PPE Program; and limitations during temperature extremes, heat stress and other medical considerations. Essentially, the employer's PPE Program only covers the basic aspects associated with PPE use and does not specifically address or mention emergency situations, spills or clean-up operations. It should also be noted that the PPE Program is not mentioned or listed anywhere in the employer's ERP.

b) Equipment: Several chemicals which are moderately to highly toxic, flammable and/or reactive (See Line 20 for examples of these chemicals)
c) Location: Facility Wide
d) Injury/Illness: Death, cancer (lung, kidney, liver, brain, etc.), blindness, multi-organ damage and/or impairment, 2nd and/or 3rd degree burns to entire body, severe eye, skin and respiratory burns and irritation
e) Measurements: Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines had **skin designations** per ACGIH and/or OSHA. Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines could also produce **additive or synergistic effects** when exposures to these chemicals are combined

| 21. Photo Number | Location on Video |
|---|---|
| | |

23. Employer Knowledge: Indianapolis Drum Service developed an Emergency Response Plan (ERP) which was last revised on July 8, 2009. Section I (General) of the ERP states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The Purpose (Section II) of the ERP is "the establishment of an effective organization and procedure to efficiently handle any situation that may arise due to fire, explosion or accidental spills." Section II (Purpose) also states that "this program is written to contain and control the situation before it spreads beyond the company's capability to handle it, and to alert the appropriate agencies in order to prevent a situation endangering company employees and the surrounding community." Although the ERP does list the position and location of each emergency exit (See Page 3 of the ERP), the ERP does not contain a detailed map of where each emergency exit is located or the emergency exit routes employees are supposed to follow to get to these emergency exits. The ERP also refers to a "Spill Emergency Response Report" and a "Spill Reporting Check List," but neither of these documents are contained in the ERP. The ERP also contains a "Common Sense Clause" (Section III) which states that "if a situation arises where one or more of these steps would not fit the situation, use your best common sense judgement to help rectify the problem."

Section II (Purpose) of the ERP also states that "the Indianapolis Drum Service Emergency Response Team consists of the following people along with their duties as a team member: Lewis Warren, James Hanley, Wes Ledbetter, Eric Hight, Mark Brown, Darrell Kinnaman, Billy Gibson, John Garmon, George Royston, Ray Chapman and Vince Jackson." Although the ERP does list the duties that each of these team members could perform during an emergency situation, the ERP does not list the level of training that each team member has attained or what roles they are actually trained to perform during an emergency. Page 4 of the ERP states that the Emergency Response Team "contains the spill using containment material (i.e. quick dry, sandbags, etc.) and block spill from leaving plant or entering state waterways" and "cleans-up the spill using supplies including, but not limited to: straw, quick dry, sand bags, diaphragm pump, gas powered pump."

Under the heading of "**person(s) creating or first discovering spill,**" the ERP states that this (these) person(s) "immediately notifies appropriate personnel of spill (immediate supervisor or member of Emergency Response Team - **(Lewis Warren, Ray Chapman, Darrell Kinnaman, Billy Gibson, John Garmon, Brian Barkdull, Jerry Spegal, Dennis Long, Vince Jackson and Wes Ledbetter); AND** initially contains spill to the best of your ability (using oil dry, straw, shovels, squeegees, etc.) without endangering yourself." Brian Barkdull, Jerry Spegal or Dennis Long are not listed as members of the Emergency Response Team under Section II of the ERP, and the ERP never identifies what duties they are supposed to perform during an emergency situation (including a material spill). The "AND" in the above section of the ERP also implies that it is the employees' job to attempt to contain any material spill they create or discover, even though they are not a member of the Emergency Response Team or trained in HAZWOPER. (NOTE: All words that are bolded or capped in the quotes above match the exact formatting (i.e. use of bold and caps) contained in the employer's ERP)

On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum.

On August 31, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) asked Jerry if any reactions or anything unusual has happened prior to or while moving any of the 55-gallon drums underneath the troughs. Jerry Spegal, Tote Supervisor/Manager, stated that "nothing unusual has happened" and that the drums "normally do not leak, but they can leak sometimes." During this interview, Jerry also stated that the only non-hazardous chemicals are contained inside of the drums and that he did not the hazards of the chemicals contained inside of the drums.

On September 17, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and re-interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) again asked Jerry if any reactions or anything unusual has happened while moving any of the 55-gallon drums underneath the troughs. Jerry responded and said nothing unusual has happened while moving the drums. Upon hearing this, the CSHO (Jason Reason) asked Jerry if nothing unusual has happened, why are several employees telling the CSHOs that a drum exploded a week before the CSHOs began looking at the Tote Line? Jerry answered by stating that they have had a drum leak before because the lid was not on tight enough. Jerry stated that a month ago (1st - 2nd week of August 2010), the lid came off of a drum when he tipped it back with the dolly. Jerry further stated that he guessed drums could build up a little pressure because drums, in general, can have pressure even when they are empty, but he thought that the word "exploded was dramatic." Jerry stated that the pressure contained and released from a drum would be "like a pop can." During this interview, Jerry also stated that he did not know exactly what chemicals were contained inside of the drum, but they were non-hazardous.

On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that the lid on the drum "popped" back towards him because he did not fasten it well enough. However, several employees interviewed who were working close to where the 55-gallon plastic drums are located said that the metal ring holding the lid on the drum that exploded was tightly fasten and Jerry (Spegal) tightened the bolt on the ring before moving the drum. During this discussion/interview, Jerry also stated that about one-quarter of the liquid came out of the drum and that the incident occurred in the area where the drums sit. It should be noted that most of the employees interviewed who observed or heard about the incident said that more than one-quarter of the liquid came out of the drum (See paragraphs below). Jerry also stated that not a lot of the liquid from inside of the drum got on his body or arms, and he washed himself off underneath the emergency eyewash/shower combination located on the back side of the Tote Line. Jerry also stated that Erick and Lewis asked him why he was all wet, so he told them what happened. Jerry also stated that he told Ray (Plant Manager) about what happened. Jerry also stated that he did not experience any injuries from the incident and he did not go to the doctor to get checked out. Jerry also stated that the chemicals that spilled out of the drum were cleaned up by Arjel and Mark. Jerry stated that Arjel and Mark used shovels to put the stuff back into the drum, and it took a couple of minutes to clean up the area where the drum spilled. It should be noted that although most of the employees interviewed said that Arjel and Mark cleaned up after the incident, these employees said that the chemicals and liquids that came out of the drum were cleaned up using a hose to wash/push the chemicals into the drain.

On September 23, 2010, Lewis Warren, Environmental and Regulatory Director, stated that no one told him about anything that concerned a drum incident that occurred on the Tote Line. However, employees interviewed said that they observed Lewis in the area directly after the August drum incident occurred. On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that after the stuff in the drum spilled and got on his arms, Lewis (Warren) and Eric (Hight) asked him why he was all wet. During this conversation, Lewis also stated that drums have slid off of carts and liquid can come out with a lot of force if the lid is not on properly.

On September 23, 2010, the CSHO also discussed the employer's ERP with Lewis Warren, Environmental and Regulatory Director. During this conversation, the CSHO asked Lewis what size spill would employees respond to and what was the limit of the employer's response team? Lewis responded by stating that the ERP kicks in for "big spills." When the CSHO asked what size spill would be considered too big to handle, Lewis stated that they do not have a cut-off limit for a spill and each spill would be evaluated on a "case-by-case basis." Lewis stated that they get bulk deliveries of bleach and caustic (sodium hydroxide) that come in tankers, and if a leak or spill occurred while they were transferring these tankers, they would not attempt to do anything to stop the leak or contain the spill because a "tank truck is beyond our scope of clean-up." After hearing this, the CSHO asked Lewis if a tank truck is the cut-off point for attempting to contain or stop a spill? Lewis stated that while they could not handle a tank truck, they do not have a set number and it all depends based on what they have. The CSHO then asked if they could handle a 55-gallon drums spilling? Lewis stated that if 100% of a 55-gallon drum spilled, then it would "probably not" be beyond their scope. The CSHO then asked what if it was an extremely toxic or hazardous chemical, or if ten drums spilled? Lewis stated that they could maybe handle those situations, but each one would have to examined on a case-by-case basis. Lewis stated that depending on the size of the spill, small spills (less than three gallons) would be washed down the drain and big spills (like a drum) would have to be reported before being cleaned-up.

During this same conversation, the CSHO asked Lewis if Indy Drum had its own HAZMAT team? Lewis stated that he did not know what a HAZMAT team was and he thought they did not have a HAZMAT team. The CSHO then asked if any employees are required as part of their job to respond to a spill or emergency? Lewis stated that "certain employees are required to respond to a spill." The CSHO then asked what duties or functions would these "certain employees" perform during

a spill? Lewis stated that once an assessment of the spill was performed by the senior person, employees would attempt to contain the spill because "containment is the first priority." Lewis stated that employees would contain the spill using sandbags or with something to make the spill solid so they could vacuum it up. The CSHO then asked if employees would attempt to stop the spill? Lewis stated that if possible "employees would try to stop the source of the spill." When the CSHO asked how aggressively employees would attempt to stop the spill, Lewis stated that it would handled on a case-by-case basis. When the CSHO asked if employees working around the area where the spill occurred would be evacuated, Lewis stated that other employees would be evacuated if necessary. The CSHO then asked who were these "certain employees" that Lewis referred to earlier who would respond to a spill? Lewis stated that these "certain employees" included himself, Wes, Ray, Darrell, Billy, George, and the supervisors in the area." It should be noted that this list of employees does not match the list of employees referred to as the Emergency Response Team in the ERP. Lewis further stated that whether or not they "contain or eliminate may depend on the area, but 5-7 employees do 85% of the work."

During this same conversation, Lewis stated that no one, including the "certain employees" mentioned previously, has been provided HAZWOPER training, but all employees are provided PPE training. Lewis also stated that none of the "certain employees" have ever been sent to a doctor for medical evaluations prior to being assigned containment or elimination duties. Lewis also stated that it has been a while since they have practiced an emergency evacuation, but they usually do it once a year. Lewis also stated that there are no SCBAs located anywhere onsite.

During a phone conversation on November 1, 2010, Lewis stated that they probably do not have a written out program for PPE. Lewis also stated that for any situation they just use their PPE Hazard Assessments and go from there.

24. Comments (Employer, **Employee**, Closing Conference): On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum. However, Jerry Spegal's explanation and employees' observations of how the liquid escaped the confinement of the drum and ended up on the floor vary widely.

One employee interviewed said that the drum that Jerry (Spegal) was moving was really full of liquid and the chemicals inside of the drum had actually formed layers similar to oil and water. This employee said that Jerry screwed a white lid down tight on top of the drum and then used a dolly to move it. This employee said that Jerry really sloshed the liquid inside of the drum around while moving it, and this sloshing probably mixed the layers of chemicals inside of the drum. This employee said that when Jerry was moving the drum on the dolly, the white lid swelled upward and looked like it was "pregnant." This employee said that they have seen drums swell up before after they are sealed, but the employer normally puts them off to the side and checks them. This employee said that after they saw the lid swell, Jerry got five steps and then they heard a "boom." This employee said the lid exploded, blew off of the drum and ended up about 6-7 feet away from the drum. This employee also said that the lid came close to hitting Jerry when it blew off the drum. This employee said the chemicals/liquids inside of the drum shout about 3-4 feet in the air, and all of the chemicals/liquids inside of the drum ended up on the floor and/or outside of the drum (i.e. the whole drum spilled). This employee also said that the chemicals inside of the drum were light colored. This employee also said that Jerry was covered in the chemicals/liquids that exploded and came out of the drum and he ran to the eyewash to was his head and eyes off.

Another employee interviewed said that although he did not see the "drum incident," Jerry Spegal and Arjel Boone told them about it. This employee said that Jerry (Spegal) told them that the top of the drum started swelling and when Jerry saw this he got out of the way. Jerry then told this employee that after he got out of the way, the top of the drum blew off and stuff from inside of the drum got all over him. Jerry also told this employee that the stuff from the drum could have got him in the face. This employee interviewed also said that Jerry had to change clothes after this "incident" because his clothes were soaked.

Other employees interviewed said that they observed the lid of the 55-gallon drum rise while Jerry Spegal was moving it. These employees said that the liquid inside of the drum exploded out of the drum and got all over Jerry (Spegal). These employees said that the lid on the drum popped off and between one-half and one-third of the liquid inside of the drum ended up outside of the drum. These employees also said that some of the liquid got on Jerry.

Some of the employees interviewed said that the most recent "drum incident" occurred because the drum was sealed with a plastic lid and not a steel lid. All of the drums are sealed with some type of lid which is secured to the top of the drum with a metal ring. The metal ring must be manually tightened by a screw or bolt to the desired tension. The plastic lid used to seal the drum that "exploded" does have less strength and greater flexibility as compared to that of a steel lid. Consequently, the amount of pressure and/or force required to deform a plastic lid is much less than the pressure and force required to deform a steel lid. However, regardless of the type of lid used to seal the drum, the lid will always be the weakest structural point of the drum (assuming there are no holes or tears in the drum walls). Thus, once the pressure inside of the drum exceeds the

maximum containment pressure of the drum, the pressure will be relieved through the drum's weakest structural point.

25. Other Employer Information: The CSHO believes that the lid on top of the 55-gallon plastic drum became detached because it was not designed to dissipate or handle the increasing pressure inside of the drum. Based on employee interviews and the CSHOs' own observations and documentation, chemicals such as, but not limited to acids, caustics (bases), oxidizers, flammables/combustibles and carcinogens (confirmed and possible) are being mixed together inside of the 55-gallon plastic drums. When incompatible chemicals are mixed, by-products of this reaction can include heat (exothermic reaction). Any heat produced from exothermic reactions inside of the drums would begin to heat the air at and around the surface of the liquid. The air at and around the surface of the liquid would continue to increase in temperature, and would begin to rise (i.e. hot air rises) and be released into the atmosphere directly above the drum. When the drums are open underneath the troughs, any heat or pressure created by chemical reactions can be released into the surrounding atmosphere (i.e. volume of container is essentially constant). However, once the drums are sealed, any heat or pressure created by chemical reactions are confined to limited volume of the drum (i.e. volume of container is fixed).

Based on Gay-Lussac's Law, the pressure of a gas is directly proportional to the gas's temperature ($P_1/T_1 = P_2/T_2$). In other words, if the temperature of a gas increases, then the pressure of a gas also increases. Based on Boyle's Law, the pressure of a gas is inversely proportional to the gas's volume ($P_1*V_1 = P_2*V_2$). In other words, if the volume that a gas occupies decreases, then the pressure of a gas will increase. Due to the exothermic reaction that most likely occurred inside of the 55-gallon drum, the temperature of the air located in the head space of the drum increased. When the drum was sealed with a lid, the volume that the gas inside of the drum could occupy decreased. The combination of these two factors (increase in temperature and decrease in volume) increased the pressure of the air trapped inside of the drum at a rate proportional to the temperature rise and inversely proportional to the decreased volume. The pressure of the air inside of drum continued to increase until it approached the containment pressure (i.e. breaking point) of the drum. This is what employees meant when they told the CSHO that the top of the drum and lid swelled and looked "pregnant." Once the containment pressure was exceeded, the built-up pressure inside of the drum was relieved through the drum's weakest structural point (the lid). The escaping pressure would have taken a large quantity of the liquid inside of the drum with it, which resembles Jerry Spegal's statement that the liquid came out of the drum like a "pop can that was shaken up and then opened."

Based on all of the information listed in this Worksheet, the CSHO believes that employees observed and were exposed to an exothermic reaction which increased the pressure (of the air) inside of the 55-gallon plastic drum. This increase in pressure ultimately resulted in the drum releasing the built-up pressure in the form of what resembled an explosion, which exposed employees to the unknown chemical mixture that was contained inside of the 55-gallon plastic drum.

26. Classification:

| Serious | Knowledge | S or O | Repeat? | Willful? |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **.00** | | |

U. S. Department of Labor
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:50PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 015(a) |
| Number Exposed | 3 | No. Instances | 1 | REC | |
| Std. Alleged Vio. | 1910.120(q)(3)(ii) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| **Abatement Documentation Required** | **Date Abated** | **Date Verified** | |
| Yes | | | |

| MULTISTEP | | | | |
|---|---|---|---|---|
| Type | Days | Due Date | Track | Completed Code |
| | | | | |

| | |
|---|---|
| Substance Codes | |

AVD/Variable Information:

29 CFR 1910.120(q)(3)(ii): The individual in charge of the ICS did not identify, to the extent possible, all hazardous substances or conditions present and did not address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies:

Tote Line (Line 3) - On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum which contained a variety of unidentified hazardous chemicals which were potentially moderately to highly toxic, corrosive, flammable and/or reactive. The employee had sealed and was in the process of moving the 55-gallon plastic drum, when the chemicals contained inside of the drum exploded and/or spilled out of the drum and onto the employee and the surrounding area. Prior to initiating clean-up operations, none of the employees who responded to the incident identified, to a feasible extent, the hazardous chemicals or substances that were once contained inside of the drum.

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | 5,000.00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | |
|---|---|---|---|
| Occupation | Valve Washer | Employer | Indianapolis Drum Service |

| | | | | | |
|---|---|---|---|---|---|
| Duration | 1 day | Frequency | 30-60 min/day | | |
| Employee Name | Arjel Boone | | | | |
| Address | 473 North Walcott Street<br>Apt. 3<br>Indianapolis, IN 46201 | | Phone | (317) 292-7832 | |
| Occupation | Tote Supervisor/Manager | Employer | Indianapolis Drum Service | | |
| Duration | 1 day | Frequency | 30-60 min/day | | |
| Employee Name | Jerry Spegal | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |

| Instance Description: | A. Hazard | B. Equipment | C. Location | D. Injury/Illness | E. Measurements |
|---|---|---|---|---|---|

| 4. Date/Time |
|---|
| ~8/9/10 ~1:00 pm<br>(Latest Date and Time<br>"Drum Incident" Occurred |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: Plastic drums of varying sizes (mainly 55-gallons) and plastic totes (275-gallons and 330-gallons) are unloaded from semi-trailers which are located outside of the facility directly across from the West wall. Each semi-trailer is not chemical or hazard specific in that each semi-trailer contains a combination of a variety of plastic drums or plastic totes. Although the plastic drums or plastic totes are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the drums and totes. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic drums and plastic totes in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of the drum and tote) to approximately one-inch (total height of all chemical remaining in drum and tote). Based on a standard 55-gallon drum (approximately 34.50-inches high), a plastic 55-gallon drum would be approximately 2.90% full if one-inch of chemical was located inside of the drum (NOTE: this percentage is based off of the total volume of the 55-gallon drum). Based on a standard 275-gallon and 330-gallon tote (approximately 46.0-inches and 54.0-inches high respectively), a plastic 275-gallon and 330-gallon tote would be approximately 2.17% and 1.85% full respectively if one-inch of chemical was located inside of the tote (NOTE: this percentage is based off of the total height of each of the totes). Employees interviewed said that they process (i.e. dump and/or empty) between 500 and 1,000 drums per day on the Plant 4 Line and between 350 and 400 drums per day on the Regrind Line. Employees interviewed also said that they process (i.e. dump and/or empty) between 115 and 200 totes per day on the Tote Line.

The plastic drums and plastic totes contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, corrosive, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, ammonium hydroxide, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO found during sampling or while examining MSDSs.

The employer has its own Hazardous Material (HAZMAT) team which consists of approximately six to fourteen members (employees). The HAZMAT team is required to mobilize and respond to emergencies such as, but not limited to uncontrolled chemical releases/spills and fires. Specifically, the employer's Emergency Response Plan (ERP) states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The HAZMAT team has emergency equipment including, but not limited to vacuums, alarm systems, radios, sandbags and spill kits. No supplied air respirators (self-contained breathing apparatus (SCBA) or airline respirators) are available for emergency use or located anywhere inside of the facility.

Because the employer has a HAZMAT team onsite which is required to mobilize and respond to emergencies, the employer would fall under OSHA's HAZWOPER standard per 1910.120(a)(v). Thus, the employer would be required to follow the requirements listed under 1910.120(q), including the requirement to have a written Emergency Response Plan (ERP). Although the employer does have a written ERP, the employer's ERP did not meet all of the requirements listed under 1910.120(q)(2). Refer to Citation 1, Item 14a for further information.

Although the HAZMAT team is required to respond to emergency situations, none of the members of the HAZMAT team are trained to any identifiable level in emergency response or to the minimum levels described in 1910.120(q)(6). None of the members of the HAZMAT team are also provided with baseline physical examinations prior to assignment to the HAZMAT team, or additional medical examination at least once every twelve months. It should also be noted that employees are not provided effective Hazard Communication (HazCom) training, and several employees did not know what chemicals they worked with or around or the hazards (safety and/or health) associated with these chemicals.

On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum. However, Jerry Spegal's explanation and employees' observations of how the liquid escaped the confinement of the drum and ended up on the floor vary widely.

Both the employer and employees interviewed stated that the following employees responded to the drum incident that occurred on or about the second week of August 2010 (August 9-13, 2010): Arjel Boone and Mark Ruiz. Both of these employees contained the spilled unidentified/unknown materials and chemicals that came out of the 55-gallon drum. Both of these employees also cleaned up the spilled unidentified/unknown materials and chemicals by shoveling them back into the 55-gallon drum and/or washing the materials and chemicals into the floor drains using a water hose. The employees who contained and cleaned-up the unidentified/unknown materials and chemicals that came out of the 55-gallon drum wore PPE such as, but not limited to safety glasses, hardhats, hearing protection (ear plugs) and rubber gloves. This PPE represents the PPE Tote Line employees are required to wear on a daily basis. Although these employees were containing and cleaning up unidentified/unknown materials and chemicals, neither of these employees were required to wear additional PPE such as, but not limited to respiratory protection, whole-body chemical protective suits (Tyvex), face shields, or sleeves.

No one was designated or trained to perform the duties of the On Scene Incident Commander for the response to this drum incident. Thus, no one person was in charge of the area in and around where the emergency response occurred or the containment and clean-up operations. None of the employees who were working in and around the area where the drum incident occurred were informed of the spill, or the containment and clean-up operations that were being performed. Also, none of the employees who were working in and around the area where the drum incident occurred were evacuated from the area at any point directly after the incident occurred or while the containment and clean-up operations were being performed.

Because these two employees (Arjel Boone and Mark Ruiz) contained and cleaned up the unidentified/unknown materials and chemicals which were spilled from the drum, they performed the duties of a HAZMAT team members. Specifically, these employees performed the duties of First Responders (Operations Level). However, neither of these two employees are on the employer's HAZMAT team, nor have they been provided any type or level of HAZWOPER training at any time before or after this response and clean-up occurred. It should be noted that no members of the employer's HAZMAT team have been provided any type or level of HAZWOPER training. Thus, no one from the facility is trained to perform any of the emergency response roles described in 1910.120(q)(5) and 1910.120(q)(6), or in the employer's ERP.

b) Equipment: Several chemicals which are moderately to highly toxic, corrosive, flammable and/or reactive (See Line 20 for examples of these chemicals)
c) Location: Facility Wide
d) Injury/Illness: Death, cancer (lung, kidney, liver, brain, etc.), blindness, multi-organ damage and/or impairment, 2nd and/or 3rd degree burns to entire body, severe eye, skin and respiratory burns and irritation
e) Measurements: Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines had **skin designations** per ACGIH and/or OSHA. Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines could also produce **additive or synergistic effects** when exposures to these chemicals are combined

| 21. Photo Number | Location on Video |
|---|---|
| | |

23. Employer Knowledge: Indianapolis Drum Service developed an Emergency Response Plan (ERP) which was last revised on July 8, 2009. Section I (General) of the ERP states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The Purpose (Section II) of the ERP is "the establishment of an effective organization and procedure to efficiently handle any situation that may arise due to fire, explosion or accidental spills." Section II (Purpose) also states that "this program is written to contain and control the situation before it spreads beyond the company's capability to handle it, and to alert the appropriate agencies in order to prevent a situation endangering company employees and the surrounding community." Although the ERP does list the position and location of each emergency exit (See Page 3 of the ERP), the ERP does not contain a detailed map of where each emergency exit is located or the emergency exit routes employees are supposed to follow to get to these emergency exits. The ERP also refers to a "Spill Emergency Response Report" and a "Spill Reporting Check List," but neither of these documents are contained in the ERP. The ERP also contains a "Common Sense Clause" (Section III) which states that "if a situation arises where one or more of these steps would not fit the situation, use your best common sense judgement to help rectify the problem."

Section II (Purpose) of the ERP also states that "the Indianapolis Drum Service Emergency Response Team consists of the following people along with their duties as a team member: Lewis Warren, James Hanley, Wes Ledbetter, Eric Hight, Mark Brown, Darrell Kinnaman, Billy Gibson, John Garmon, George Royston, Ray Chapman and Vince Jackson." Although the ERP does list the duties that each of these team members could perform during an emergency situation, the ERP does not list the level of training that each team member has attained or what roles they are actually trained to perform during an emergency. Page 4 of the ERP states that the Emergency Response Team "contains the spill using containment material (i.e. quick dry, sandbags, etc.) and block spill from leaving plant or entering state waterways" and "cleans-up the spill using supplies including, but not limited to: straw, quick dry, sand bags, diaphragm pump, gas powered pump."

Under the heading of "**person(s) creating or first discovering spill,**" the ERP states that this (these) person(s) "immediately notifies appropriate personnel of spill (immediate supervisor or member of Emergency Response Team - **(Lewis Warren, Ray Chapman, Darrell Kinnaman, Billy Gibson, John Garmon, Brian Barkdull, Jerry Spegal, Dennis Long, Vince Jackson and Wes Ledbetter); AND** initially contains spill to the best of your ability (using oil dry, straw, shovels, squeegees, etc.) without endangering yourself." Brian Barkdull, Jerry Spegal or Dennis Long are not listed as members of the Emergency Response Team under Section II of the ERP, and the ERP never identifies what duties they are supposed to perform during an emergency situation (including a material spill). The "AND" in the above section of the ERP also implies that it is the employees' job to attempt to contain any material spill they create or discover, even though they are not a member of the Emergency Response Team or trained in HAZWOPER. (NOTE: All words that are bolded or capped in the quotes above match the exact formatting (i.e. use of bold and caps) contained in the employer's ERP).

On August 31, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) asked Jerry if any reactions or anything unusual has happened prior to or while moving any of the 55-gallon drums underneath the troughs. Jerry Spegal, Tote Supervisor/Manager, stated that "nothing unusual has happened" and that the drums "normally do not leak, but they can leak sometimes." During this interview, Jerry also stated that the only non-hazardous chemicals are contained inside of the drums and that he did not the hazards of the chemicals contained inside of the drums.

On September 17, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and re-interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) again asked Jerry if any reactions or anything unusual has happened while moving any of the 55-gallon drums underneath the troughs. Jerry responded and said nothing unusual has happened while moving the drums. Upon hearing this, the CSHO (Jason Reason) asked Jerry if nothing unusual has happened, why are several employees telling the CSHOs that a drum exploded a week before the CSHOs began looking at the Tote Line? Jerry answered by stating that they have had a drum leak before because the lid was not on tight enough. Jerry stated that a month ago (1st - 2nd week of August 2010), the lid came off of a drum when he tipped it back with the dolly. Jerry further stated that he guessed drums could build up a little pressure because drums, in general, can have pressure even when they are empty, but he thought that the word "exploded was dramatic." Jerry stated that the pressure contained and released from a drum would be "like a pop can." During this interview, Jerry also stated that he did not know exactly what chemicals were contained inside of the drum, but they were non-hazardous.

On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that the lid on the drum "popped" back towards him because he did not fasten it well enough. However, several employees interviewed who were working close to where the 55-gallon plastic drums are located said that the metal ring holding the lid on the drum that exploded was tightly fasten and Jerry (Spegal) tightened the bolt on the ring before moving the drum. During this discussion/interview, Jerry also stated that about one-quarter of the liquid came out of the drum and that the incident occurred in the area where the drums sit. It should be noted that most of the employees interviewed who observed or heard about the incident said that more than one-quarter of the liquid came out of the drum (See paragraphs below). Jerry also stated that not a lot of the liquid from inside of the drum

got on his body or arms, and he washed himself off underneath the emergency eyewash/shower combination located on the back side of the Tote Line. Jerry also stated that Erick and Lewis asked him why he was all wet, so he told them what happened. Jerry also stated that he told Ray (Plant Manager) about what happened. Jerry also stated that he did not experience any injuries from the incident and he did not go to the doctor to get checked out. Jerry also stated that the chemicals that spilled out of the drum were cleaned up by Ariel and Mark. Jerry stated that Ariel and Mark used shovels to put the stuff back into the drum, and it took a couple of minutes to clean up the area where the drum spilled. It should be noted that although most of the employees interviewed said that Ariel and Mark cleaned up after the incident, these employees said that the chemicals and liquids that came out of the drum were cleaned up using a hose to wash/push the chemicals into the drain.

On September 23, 2010, Lewis Warren, Environmental and Regulatory Director, stated that no one told him about anything that concerned a drum incident that occurred on the Tote Line. However, employees interviewed said that they observed Lewis in the area directly after the August drum incident occurred. On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that after the stuff in the drum spilled and got on his arms, Lewis (Warren) and Eric (Hight) asked him why he was all wet. During this conversation, Lewis also stated that drums have slid off of carts and liquid can come out with a lot of force if the lid is not on properly. According to the ERP, Lewis is the only member of the HAZMAT team that is designated as an Incident Commander. Page 4 of the ERP states that "the Environmental and Regulatory Director is the person in charge of any spill clean up and directs the all aspects of the operation."

During this same conversation, Lewis stated that no one, including the "certain employees" mentioned previously, has been provided HAZWOPER training, but all employees are provided PPE training. Lewis also stated that none of the "certain employees" have ever been sent to a doctor for medical evaluations prior to being assigned containment or elimination duties. Lewis also stated that it has been a while since they have practiced an emergency evacuation, but they usually do it once a year. Lewis also stated that there are no SCBAs located anywhere onsite.

24. Comments (Employer, **Employee**, Closing Conference): One employee interviewed said that the drum that Jerry (Spegal) was moving was really full of liquid and the chemicals inside of the drum had actually formed layers similar to oil and water. This employee said that Jerry screwed a white lid down tight on top of the drum and then used a dolly to move it. This employee said that Jerry really sloshed the liquid inside of the drum around while moving it, and this sloshing probably mixed the layers of chemicals inside of the drum. This employee said that when Jerry was moving the drum on the dolly, the white lid swelled upward and looked like it was "pregnant." This employee said that they have seen drums swell up before after they are sealed, but the employer normally puts them off to the side and checks them. This employee said that after they saw the lid swell, Jerry got five steps and then they heard a "boom." This employee said the lid exploded, blew off of the drum and ended up about 6-7 feet away from the drum. This employee also said that the lid came close to hitting Jerry when it blew off the drum. This employee said the chemicals/liquids inside of the drum shout about 3-4 feet in the air, and all of the chemicals/liquids inside of the drum ended up on the floor and/or outside of the drum (i.e. the whole drum spilled). This employee also said that the chemicals inside of the drum were light colored. This employee also said that Jerry was covered in the chemicals/liquids that exploded and came out of the drum and he ran to the eyewash to was his head and eyes off.

Another employee interviewed said that although he did not see the "drum incident," Jerry Spegal and Arjel Boone told them about it. This employee said that Jerry (Spegal) told them that the top of the drum started swelling and when Jerry saw this he got out of the way. Jerry then told this employee that after he got out of the way, the top of the drum blew off and stuff from inside of the drum got all over him. Jerry also told this employee that the stuff from the drum could have got him in the face. This employee interviewed also said that Jerry had to change clothes after this "incident" because his clothes were soaked.

Other employees interviewed said that they observed the lid of the 55-gallon drum rise while Jerry Spegal was moving it. These employees said that the liquid inside of the drum exploded out of the drum and got all over Jerry (Spegal). These employees said that the lid on the drum popped off and between one-half and one-third of the liquid inside of the drum ended up outside of the drum. These employees also said that some of the liquid got on Jerry.

Some of the employees interviewed said that the most recent "drum incident" occurred because the drum was sealed with a plastic lid and not a steel lid. All of the drums are sealed with some type of lid which is secured to the top of the drum with a metal ring. The metal ring must be manually tightened by a screw or bolt to the desired tension. The plastic lid used to seal the drum that "exploded" does have less strength and greater flexibility as compared to that of a steel lid. Consequently, the amount of pressure and/or force required to deform a plastic lid is much less than the pressure and force required to deform a steel lid. However, regardless of the type of lid used to seal the drum, the lid will always be the weakest structural point of the drum (assuming there are no holes or tears in the drum walls). Thus, once the pressure inside of the drum exceeds the maximum containment pressure of the drum, the pressure will be relieved through the drum's weakest structural point.

25. Other Employer Information: The CSHO believes that the lid on top of the 55-gallon plastic drum became detached because it was not designed to dissipate or handle the increasing pressure inside of the drum. Based on employee interviews and the

CSHOs' own observations and documentation, chemicals such as, but not limited to acids, caustics (bases), oxidizers, flammables/combustibles and carcinogens (confirmed and possible) are being mixed together inside of the 55-gallon plastic drums. When incompatible chemicals are mixed, by-products of this reaction can include heat (exothermic reaction). Any heat produced from exothermic reactions inside of the drums would begin to heat the air at and around the surface of the liquid. The air at and around the surface of the liquid would continue to increase in temperature, and would begin to rise (i.e. hot air rises) and be released into the atmosphere directly above the drum. When the drums are open underneath the troughs, any heat or pressure created by chemical reactions can be released into the surrounding atmosphere (i.e. volume of container is essentially constant). However, once the drums are sealed, any heat or pressure created by chemical reactions are confined to limited volume of the drum (i.e. volume of container is fixed).

Based on Gay-Lussac's Law, the pressure of a gas is directly proportional to the gas's temperature ($P_1/T_1 = P_2/T_2$). In other words, if the temperature of a gas increases, then the pressure of a gas also increases. Based on Boyle's Law, the pressure of a gas is inversely proportional to the gas's volume ($P_1*V_1 = P_2*V_2$). In other words, if the volume that a gas occupies decreases, then the pressure of a gas will increase. Due to the exothermic reaction that most likely occurred inside of the 55-gallon drum, the temperature of the air located in the head space of the drum increased. When the drum was sealed with a lid, the volume that the gas inside of the drum could occupy decreased. The combination of these two factors (increase in temperature and decrease in volume) increased the pressure of the air trapped inside of the drum at a rate proportional to the temperature rise and inversely proportional to the decreased volume. The pressure of the air inside of drum continued to increase until it approached the containment pressure (i.e. breaking point) of the drum. This is what employees meant when they told the CSHO that the top of the drum and lid swelled and looked "pregnant." Once the containment pressure was exceeded, the built-up pressure inside of the drum was relieved through the drum's weakest structural point (the lid). The escaping pressure would have taken a large quantity of the liquid inside of the drum with it, which resembles Jerry Spegal's statement that the liquid came out of the drum like a "pop can that was shaken up and then opened."

Based on all of the information listed in this Worksheet, the CSHO believes that employees observed and were exposed to an exothermic reaction which increased the pressure (of the air) inside of the 55-gallon plastic drum. This increase in pressure ultimately resulted in the drum releasing the built-up pressure in the form of what resembled an explosion, which exposed employees to the unknown chemical mixture that was contained inside of the 55-gallon plastic drum.

26. Classification:

| Serious | Knowledge | S or O | Repeat? | Willful? |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **5,000.00** | | |

U. S. Department of Labo
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:50PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 015(b) |
| Number Exposed | 3 | No. Instances | 1 | REC | |
| Std. Alleged Vio. | 1910.120(q)(3)(iv) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| Abatement Documentation Required | Date Abated | Date Verified | |
| Yes | | | |

| MULTISTEP | | | | |
|---|---|---|---|---|
| Type | Days | Due Date | Track | Completed Code |
| | | | | |

| | |
|---|---|
| Substance Codes | |

AVD/Variable Information:

29 CFR 1910.120(q)(3)(iv): Positive-pressure self-contained breathing apparatus was not worn by employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard, until such time that the individual in charge of the ICS determined through the use of air monitoring that a decreased level of respiratory protection would not result in hazardous exposures to employees:

Tote Line (Line 3) - On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum which contained a variety of unidentified hazardous chemicals which were potentially moderately to highly toxic, corrosive, flammable and/or reactive. The employee had sealed and was in the process of moving the 55-gallon plastic drum, when the chemicals contained inside of the drum exploded and/or spilled out of the drum and onto the employee and the surrounding area. Several chemicals which were processed on the Tote Line and emptied into the 55-gallon drums presented potential inhalation and/or skin absorption hazards. However, no air monitoring was performed and employees were not provided with or required to wear any respiratory protection prior to initiating clean-up operations.

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | .00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | | | |
|---|---|---|---|---|---|
| Occupation | Valve Washer | Employer | Indianapolis Drum Service | | |
| Duration | 1 day | Frequency | 30-60 min/day | | |
| Employee Name | Arjel Boone | | | | |
| Address | 473 North Walcott Street<br>Apt. 3<br>Indianapolis, IN 46201 | | Phone | (317) 292-7832 | |
| Occupation | Tote Supervisor/Manager | Employer | Indianapolis Drum Service | | |
| Duration | 1 day | Frequency | 30-60 min/day | | |
| Employee Name | Jerry Spegal | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |

| Instance Description: | A. Hazard | B. Equipment | C. Location | D. Injury/Illness | E. Measurements |
|---|---|---|---|---|---|

| 4. Date/Time |
|---|
| ~8/9/10 ~1:00 pm<br>(Latest Date and Time<br>"Drum Incident" Occurred |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: Plastic drums of varying sizes (mainly 55-gallons) and plastic totes (275-gallons and 330-gallons) are unloaded from semi-trailers which are located outside of the facility directly across from the West wall. Each semi-trailer is not chemical or hazard specific in that each semi-trailer contains a combination of a variety of plastic drums or plastic totes. Although the plastic drums or plastic totes are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the drums and totes. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic drums and plastic totes in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of the drum and tote) to approximately one-inch (total height of all chemical remaining in drum and tote). Based on a standard 55-gallon drum (approximately 34.50-inches high), a plastic 55-gallon drum would be approximately 2.90% full if one-inch of chemical was located inside of the drum (NOTE: this percentage is based off of the total volume of the 55-gallon drum). Based on a standard 275-gallon and 330-gallon tote (approximately 46.0-inches and 54.0-inches high respectively), a plastic 275-gallon and 330-gallon tote would be approximately 2.17% and 1.85% full respectively if one-inch of chemical was located inside of the tote (NOTE: this percentage is based off of the total height of each of the totes). Employees interviewed said that they process (i.e. dump and/or empty) between 500 and 1,000 drums per day on the Plant 4 Line and between 350 and 400 drums per day on the Regrind Line. Employees interviewed also said that they process (i.e. dump and/or empty) between 115 and 200 totes per day on the Tote Line.

The plastic drums and plastic totes contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, corrosive, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, ammonium hydroxide, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO found during sampling or while examining MSDSs.

The employer has its own Hazardous Material (HAZMAT) team which consists of approximately six to fourteen members (employees). The HAZMAT team is required to mobilize and respond to emergencies such as, but not limited to uncontrolled chemical releases/spills and fires. Specifically, the employer's Emergency Response Plan (ERP) states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The HAZMAT team has emergency equipment including, but not limited to vacuums, alarm systems, radios,

sandbags and spill kits. No supplied air respirators (self-contained breathing apparatus (SCBA) or airline respirators) are available for emergency use or located anywhere inside of the facility.

Because the employer has a HAZMAT team onsite which is required to mobilize and respond to emergencies, the employer would fall under OSHA's HAZWOPER standard per 1910.120(a)(v). Thus, the employer would be required to follow the requirements listed under 1910.120(q), including the requirement to have a written Emergency Response Plan (ERP). Although the employer does have a written ERP, the employer's ERP did not meet all of the requirements listed under 1910.120(q)(2). Refer to Citation 1, Item 14a for further information.

Although the HAZMAT team is required to respond to emergency situations, none of the members of the HAZMAT team are trained to any identifiable level in emergency response or to the minimum levels described in 1910.120(q)(6). None of the members of the HAZMAT team are also provided with baseline physical examinations prior to assignment to the HAZMAT team, or additional medical examination at least once every twelve months. It should also be noted that employees are not provided effective Hazard Communication (HazCom) training, and several employees did not know what chemicals they worked with or around or the hazards (safety and/or health) associated with these chemicals.

On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum. However, Jerry Spegal's explanation and employees' observations of how the liquid escaped the confinement of the drum and ended up on the floor vary widely.

Both the employer and employees interviewed stated that the following employees responded to the drum incident that occurred on or about the second week of August 2010 (August 9-13, 2010): Arjel Boone and Mark Ruiz. Both of these employees contained the spilled unidentified/unknown materials and chemicals that came out of the 55-gallon drum. Both of these employees also cleaned up the spilled unidentified/unknown materials and chemicals by shoveling them back into the 55-gallon drum and/or washing the materials and chemicals into the floor drains using a water hose. The employees who contained and cleaned-up the unidentified/unknown materials and chemicals that came out of the 55-gallon drum wore PPE such as, but not limited to safety glasses, hardhats, hearing protection (ear plugs) and rubber gloves. This PPE represents the PPE Tote Line employees are required to wear on a daily basis. Although these employees were containing and cleaning up unidentified/unknown materials and chemicals, neither of these employees were required to wear additional PPE such as, but not limited to respiratory protection, whole-body chemical protective suits (Tyvex), face shields, or sleeves.

No one was designated or trained to perform the duties of the On Scene Incident Commander for the response to this drum incident. Thus, no one person was in charge of the area in and around where the emergency response occurred or the containment and clean-up operations. None of the employees who were working in and around the area where the drum incident occurred were informed of the spill, or the containment and clean-up operations that were being performed. Also, none of the employees who were working in and around the area where the drum incident occurred were evacuated from the area at any point directly after the incident occurred or while the containment and clean-up operations were being performed.

Because these two employees (Arjel Boone and Mark Ruiz) contained and cleaned up the unidentified/unknown materials and chemicals which were spilled from the drum, they performed the duties of a HAZMAT team members. Specifically, these employees performed the duties of First Responders (Operations Level). However, neither of these two employees are on the employer's HAZMAT team, nor have they been provided any type or level of HAZWOPER training at any time before or after this response and clean-up occurred. It should be noted that no members of the employer's HAZMAT team have been provided any type or level of HAZWOPER training. Thus, no one from the facility is trained to perform any of the emergency response roles described in 1910.120(q)(5) and 1910.120(q)(6), or in the employer's ERP.

b) Equipment: Several chemicals which are moderately to highly toxic, corrosive, flammable and/or reactive (See Line 20 for examples of these chemicals)
c) Location: Facility Wide
d) Injury/Illness: Death, cancer (lung, kidney, liver, brain, etc.), blindness, multi-organ damage and/or impairment, 2nd and/or 3rd degree burns to entire body, severe eye, skin and respiratory burns and irritation
e) Measurements: Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines had **skin designations** per ACGIH and/or OSHA. Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines could also produce **additive or synergistic effects** when exposures to these chemicals are combined

| 21. Photo Number | Location on Video |
|---|---|

23. Employer Knowledge: Indianapolis Drum Service developed an Emergency Response Plan (ERP) which was last revised on July 8, 2009. Section I (General) of the ERP states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The Purpose (Section II) of the ERP is "the establishment of an effective organization and procedure to efficiently handle any situation that may arise due to fire, explosion or accidental spills." Section II (Purpose) also states that "this program is written to contain and control the situation before it spreads beyond the company's capability to handle it, and to alert the appropriate agencies in order to prevent a situation endangering company employees and the surrounding community." Although the ERP does list the position and location of each emergency exit (See Page 3 of the ERP), the ERP does not contain a detailed map of where each emergency exit is located or the emergency exit routes employees are supposed to follow to get to these emergency exits. The ERP also refers to a "Spill Emergency Response Report" and a "Spill Reporting Check List," but neither of these documents are contained in the ERP. The ERP also contains a "Common Sense Clause" (Section III) which states that "if a situation arises where one or more of these steps would not fit the situation, use your best common sense judgement to help rectify the problem."

Section II (Purpose) of the ERP also states that "the Indianapolis Drum Service Emergency Response Team consists of the following people along with their duties as a team member: Lewis Warren, James Hanley, Wes Ledbetter, Eric Hight, Mark Brown, Darrell Kinnaman, Billy Gibson, John Garmon, George Royston, Ray Chapman and Vince Jackson." Although the ERP does list the duties that each of these team members could perform during an emergency situation, the ERP does not list the level of training that each team member has attained or what roles they are actually trained to perform during an emergency. Page 4 of the ERP states that the Emergency Response Team "contains the spill using containment material (i.e. quick dry, sandbags, etc.) and block spill from leaving plant or entering state waterways" and "cleans-up the spill using supplies including, but not limited to: straw, quick dry, sand bags, diaphragm pump, gas powered pump."

Under the heading of "**person(s) creating or first discovering spill,**" the ERP states that this (these) person(s) "immediately notifies appropriate personnel of spill (immediate supervisor or member of Emergency Response Team - **(Lewis Warren, Ray Chapman, Darrell Kinnaman, Billy Gibson, John Garmon, Brian Barkdull, Jerry Spegal, Dennis Long, Vince Jackson and Wes Ledbetter); AND** initially contains spill to the best of your ability (using oil dry, straw, shovels, squeegees, etc.) without endangering yourself." Brian Barkdull, Jerry Spegal or Dennis Long are not listed as members of the Emergency Response Team under Section II of the ERP, and the ERP never identifies what duties they are supposed to perform during an emergency situation (including a material spill). The "AND" in the above section of the ERP also implies that it is the employees' job to attempt to contain any material spill they create or discover, even though they are not a member of the Emergency Response Team or trained in HAZWOPER. (NOTE: All words that are bolded or capped in the quotes above match the exact formatting (i.e. use of bold and caps) contained in the employer's ERP).

On August 31, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) asked Jerry if any reactions or anything unusual has happened prior to or while moving any of the 55-gallon drums underneath the troughs. Jerry Spegal, Tote Supervisor/Manager, stated that "nothing unusual has happened" and that the drums "normally do not leak, but they can leak sometimes." During this interview, Jerry also stated that the only non-hazardous chemicals are contained inside of the drums and that he did not the hazards of the chemicals contained inside of the drums.

On September 17, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and re-interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) again asked Jerry if any reactions or anything unusual has happened while moving any of the 55-gallon drums underneath the troughs. Jerry responded and said nothing unusual has happened while moving the drums. Upon hearing this, the CSHO (Jason Reason) asked Jerry if nothing unusual has happened, why are several employees telling the CSHOs that a drum exploded a week before the CSHOs began looking at the Tote Line? Jerry answered by stating that they have had a drum leak before because the lid was not on tight enough. Jerry stated that a month ago (1st - 2nd week of August 2010), the lid came off of a drum when he tipped it back with the dolly. Jerry further stated that he guessed drums could build up a little pressure because drums, in general, can have pressure even when they are empty, but he thought that the word "exploded was dramatic." Jerry stated that the pressure contained and released from a drum would be "like a pop can." During this interview, Jerry also stated that he did not know exactly what chemicals were contained inside of the drum, but they were non-hazardous.

On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that the lid on the drum "popped" back towards him because he did not fasten it well enough. However, several employees interviewed who were working close to where the 55-gallon plastic drums are located said that the metal ring holding the lid on the drum that exploded was tightly fasten and Jerry (Spegal) tightened the bolt on the ring before moving the drum. During this discussion/interview, Jerry also stated

that about one-quarter of the liquid came out of the drum and that the incident occurred in the area where the drums sit. It should be noted that most of the employees interviewed who observed or heard about the incident said that more than one-quarter of the liquid came out of the drum (See paragraphs below). Jerry also stated that not a lot of the liquid from inside of the drum got on his body or arms, and he washed himself off underneath the emergency eyewash/shower combination located on the back side of the Tote Line. Jerry also stated that Erick and Lewis asked him why he was all wet, so he told them what happened. Jerry also stated that he told Ray (Plant Manager) about what happened. Jerry also stated that he did not experience any injuries from the incident and he did not go to the doctor to get checked out. Jerry also stated that the chemicals that spilled out of the drum were cleaned up by Arjel and Mark. Jerry stated that Arjel and Mark used shovels to put the stuff back into the drum, and it took a couple of minutes to clean up the area where the drum spilled. It should be noted that although most of the employees interviewed said that Arjel and Mark cleaned up after the incident, these employees said that the chemicals and liquids that came out of the drum were cleaned up using a hose to wash/push the chemicals into the drain.

On September 23, 2010, Lewis Warren, Environmental and Regulatory Director, stated that no one told him about anything that concerned a drum incident that occurred on the Tote Line. However, employees interviewed said that they observed Lewis in the area directly after the August drum incident occurred. On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that after the stuff in the drum spilled and got on his arms, Lewis (Warren) and Eric (Hight) asked him why he was all wet. During this conversation, Lewis also stated that drums have slid off of carts and liquid can come out with a lot of force if the lid is not on properly. According to the ERP, Lewis is the only member of the HAZMAT team that is designated as an Incident Commander. Page 4 of the ERP states that "the Environmental and Regulatory Director is the person in charge of any spill clean up and directs the all aspects of the operation."

During this same conversation, Lewis stated that no one, including the "certain employees" mentioned previously, has been provided HAZWOPER training, but all employees are provided PPE training. Lewis also stated that none of the "certain employees" have ever been sent to a doctor for medical evaluations prior to being assigned containment or elimination duties. Lewis also stated that it has been a while since they have practiced an emergency evacuation, but they usually do it once a year. Lewis also stated that there are no SCBAs located anywhere onsite.

24. Comments (Employer, **Employee**, Closing Conference): One employee interviewed said that the drum that Jerry (Spegal) was moving was really full of liquid and the chemicals inside of the drum had actually formed layers similar to oil and water. This employee said that Jerry screwed a white lid down tight on top of the drum and then used a dolly to move it. This employee said that Jerry really sloshed the liquid inside of the drum around while moving it, and this sloshing probably mixed the layers of chemicals inside of the drum. This employee said that when Jerry was moving the drum on the dolly, the white lid swelled upward and looked like it was "pregnant." This employee said that they have seen drums swell up before after they are sealed, but the employer normally puts them off to the side and checks them. This employee said that after they saw the lid swell, Jerry got five steps and then they heard a "boom." This employee said the lid exploded, blew off of the drum and ended up about 6-7 feet away from the drum. This employee also said that the lid came close to hitting Jerry when it blew off the drum. This employee said the chemicals/liquids inside of the drum shout about 3-4 feet in the air, and all of the chemicals/liquids inside of the drum ended up on the floor and/or outside of the drum (i.e. the whole drum spilled). This employee also said that the chemicals inside of the drum were light colored. This employee also said that Jerry was covered in the chemicals/liquids that exploded and came out of the drum and he ran to the eyewash to was his head and eyes off.

Another employee interviewed said that although he did not see the "drum incident," Jerry Spegal and Arjel Boone told them about it. This employee said that Jerry (Spegal) told them that the top of the drum started swelling and when Jerry saw this he got out of the way. Jerry then told this employee that after he got out of the way, the top of the drum blew off and stuff from inside of the drum got all over him. Jerry also told this employee that the stuff from the drum could have got him in the face. This employee interviewed also said that Jerry had to change clothes after this "incident" because his clothes were soaked.

Other employees interviewed said that they observed the lid of the 55-gallon drum rise while Jerry Spegal was moving it. These employees said that the liquid inside of the drum exploded out of the drum and got all over Jerry (Spegal). These employees said that the lid on the drum popped off and between one-half and one-third of the liquid inside of the drum ended up outside of the drum. These employees also said that some of the liquid got on Jerry.

Some of the employees interviewed said that the most recent "drum incident" occurred because the drum was sealed with a plastic lid and not a steel lid. All of the drums are sealed with some type of lid which is secured to the top of the drum with a metal ring. The metal ring must be manually tightened by a screw or bolt to the desired tension. The plastic lid used to seal the drum that "exploded" does have less strength and greater flexibility as compared to that of a steel lid. Consequently, the amount of pressure and/or force required to deform a plastic lid is much less than the pressure and force required to deform a steel lid. However, regardless of the type of lid used to seal the drum, the lid will always be the weakest structural point of the drum (assuming there are no holes or tears in the drum walls). Thus, once the pressure inside of the drum exceeds the maximum containment pressure of the drum, the pressure will be relieved through the drum's weakest structural point.

25. Other Employer Information: The CSHO believes that the lid on top of the 55-gallon plastic drum became detached because it was not designed to dissipate or handle the increasing pressure inside of the drum. Based on employee interviews and the CSHOs' own observations and documentation, chemicals such as, but not limited to acids, caustics (bases), oxidizers, flammables/combustibles and carcinogens (confirmed and possible) are being mixed together inside of the 55-gallon plastic drums. When incompatible chemicals are mixed, by-products of this reaction can include heat (exothermic reaction). Any heat produced from exothermic reactions inside of the drums would begin to heat the air at and around the surface of the liquid. The air at and around the surface of the liquid would continue to increase in temperature, and would begin to rise (i.e. hot air rises) and be released into the atmosphere directly above the drum. When the drums are open underneath the troughs, any heat or pressure created by chemical reactions can be released into the surrounding atmosphere (i.e. volume of container is essentially constant). However, once the drums are sealed, any heat or pressure created by chemical reactions are confined to limited volume of the drum (i.e. volume of container is fixed).

Based on Gay-Lussac's Law, the pressure of a gas is directly proportional to the gas's temperature ($P_1/T_1 = P_2/T_2$). In other words, if the temperature of a gas increases, then the pressure of a gas also increases. Based on Boyle's Law, the pressure of a gas is inversely proportional to the gas's volume ($P_1*V_1 = P_2*V_2$). In other words, if the volume that a gas occupies decreases, then the pressure of a gas will increase. Due to the exothermic reaction that most likely occurred inside of the 55-gallon drum, the temperature of the air located in the head space of the drum increased. When the drum was sealed with a lid, the volume that the gas inside of the drum could occupy decreased. The combination of these two factors (increase in temperature and decrease in volume) increased the pressure of the air trapped inside of the drum at a rate proportional to the temperature rise and inversely proportional to the decreased volume. The pressure of the air inside of drum continued to increase until it approached the containment pressure (i.e. breaking point) of the drum. This is what employees meant when they told the CSHO that the top of the drum and lid swelled and looked "pregnant." Once the containment pressure was exceeded, the built-up pressure inside of the drum was relieved through the drum's weakest structural point (the lid). The escaping pressure would have taken a large quantity of the liquid inside of the drum with it, which resembles Jerry Spegal's statement that the liquid came out of the drum like a "pop can that was shaken up and then opened."

Based on all of the information listed in this Worksheet, the CSHO believes that employees observed and were exposed to an exothermic reaction which increased the pressure (of the air) inside of the 55-gallon plastic drum. This increase in pressure ultimately resulted in the drum releasing the built-up pressure in the form of what resembled an explosion, which exposed employees to the unknown chemical mixture that was contained inside of the 55-gallon plastic drum.

26. Classification:

| Serious | Knowledge | S or O | Repeat? | Willful? |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **.00** | | |

U. S. Department of Labo(
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:51PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 016 |
| Number Exposed | 72 | No. Instances | 1 | REC | |
| Std. Alleged Vio. | 1910.120(q)(6) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| Abatement Documentation Required | Date Abated | Date Verified | |
| Yes | | | |

| MULTISTEP | | | | |
|---|---|---|---|---|
| Type | Days | Due Date | Track | Completed Code |
| | | | | |

| | |
|---|---|
| Substance Codes | 1631 MERCURY, (VAPOR) (AS HG) |

AVD/Variable Information:

29 CFR 1910.120(q)(6): The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, were not conveyed to them through training before they were permitted to take part in actual emergency operations on an incident:

Facility Wide - The employer's Emergency Response Team (ERT), which consisted of approximately six to fourteen members (employees), was required to mobilize and respond to emergencies such as, but not limited to fires, explosions, material spills, or accidental releases of contaminates to the tributary waterway bordering the facility. Prior to being assigned duties on the ERT and/or responding to an emergency situation, members of the ERT were not provided training on the specific role(s) they would be required to perform during an emergency response (i.e. first responder, hazardous material technician, incident commander, etc.).

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | 5,000.00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | |
|---|---|---|---|
| Occupation | Environmental and Regulatory Director | Employer | Indianapolis Drum Service |

| | | | | | |
|---|---|---|---|---|---|
| Duration | 2-3 years | Frequency | 8 hours/day | | |
| Employee Name | Lewis Warren | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |
| Occupation | Complex Administrator | Employer | Indianapolis Drum Service | | |
| Duration | 1 year | Frequency | 8 hours/day | | |
| Employee Name | Wes Ledbetter | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |
| Occupation | Maintenance Director | Employer | Indianapolis Drum Service | | |
| Duration | 1 year | Frequency | 8 hours/day | | |
| Employee Name | Darrell Kinnaman | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | Phone | (317) 357-9853 | |

| Instance Description: | A. Hazard | B. Equipment | C. Location | D. Injury/Illness | E. Measurements |
|---|---|---|---|---|---|

| 4. Date/Time |
|---|
| 9/23/10 1:05 pm |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: Plastic drums of varying sizes (mainly 55-gallons) and plastic totes (275-gallons and 330-gallons) are unloaded from semi-trailers which are located outside of the facility directly across from the West wall. Each semi-trailer is not chemical or hazard specific in that each semi-trailer contains a combination of a variety of plastic drums or plastic totes. Although the plastic drums or plastic totes are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the drums and totes. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic drums and plastic totes in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of the drum and tote) to approximately one-inch (total height of all chemical remaining in drum and tote). Based on a standard 55-gallon drum (approximately 34.50-inches high), a plastic 55-gallon drum would be approximately 2.90% full if one-inch of chemical was located inside of the drum (NOTE: this percentage is based off of the total volume of the 55-gallon drum). Based on a standard 275-gallon and 330-gallon tote (approximately 46.0-inches and 54.0-inches high respectively), a plastic 275-gallon and 330-gallon tote would be approximately 2.17% and 1.85% full respectively if one-inch of chemical was located inside of the tote (NOTE: this percentage is based off of the total height of each of the totes). Employees interviewed said that they process (i.e. dump and/or empty) between 500 and 1,000 drums per day on the Plant 4 Line and between 350 and 400 drums per day on the Regrind Line. Employees interviewed also said that they process (i.e. dump and/or empty) between 115 and 200 totes per day on the Tote Line.

The plastic drums and plastic totes contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, corrosive, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, ammonium hydroxide, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO found during sampling or while examining MSDSs.

The employer has its own Hazardous Material (HAZMAT) team which consists of approximately six to fourteen members (employees). The HAZMAT team is required to mobilize and respond to emergencies such as, but not limited to uncontrolled chemical releases/spills and fires. Specifically, the employer's Emergency Response Plan (ERP) states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The HAZMAT team has emergency equipment including, but not limited to vacuums, alarm systems, radios,

sandbags and spill kits. No supplied air respirators (self-contained breathing apparatus (SCBA) or airline respirators) are available for emergency use or located anywhere inside of the facility.

Because the employer has a HAZMAT team onsite which is required to mobilize and respond to emergencies, the employer would fall under OSHA's HAZWOPER standard per 1910.120(a)(v). Thus, the employer would be required to follow the requirements listed under 1910.120(q), including the requirement to have a written Emergency Response Plan (ERP). Although the employer does have a written ERP, the employer's ERP did not meet all of the requirements listed under 1910.120(q)(2). Refer to Citation 1, Item 14a for further information.

**Although the HAZMAT team is required to respond to emergency situations, none of the members of the HAZMAT team are trained to any identifiable level in emergency response or to the minimum levels described in 1910.120(q)(6).** None of the members of the HAZMAT team are also provided with baseline physical examinations prior to assignment to the HAZMAT team, or additional medical examination at least once every twelve months. **It should also be noted that employees are not provided effective Hazard Communication (HazCom) training, and several employees did not know what chemicals they worked with or around or the hazards (safety and/or health) associated with these chemicals.**

Both the employer and employees interviewed stated that the following employees responded to the drum incident that occurred on or about the second week of August 2010 (August 9-13, 2010): Arjel Boone and Mark Ruiz. Both of these employees contained the spilled unidentified/unknown materials and chemicals that came out of the 55-gallon drum. Both of these employees also cleaned up the spilled unidentified/unknown materials and chemicals by shoveling them back into the 55-gallon drum and/or washing the materials and chemicals into the floor drains using a water hose. The employees who contained and cleaned-up the unidentified/unknown materials and chemicals that came out of the 55-gallon drum wore PPE such as, but not limited to safety glasses, hardhats, hearing protection (ear plugs) and rubber gloves. This PPE represents the PPE Tote Line employees are required to wear on a daily basis. Although these employees were containing and cleaning up unidentified/unknown materials and chemicals, neither of these employees were required to wear additional PPE such as, but not limited to respiratory protection, whole-body chemical protective suits (Tyvex), face shields, or sleeves.

No one was designated or trained to perform the duties of the On Scene Incident Commander for the response to this drum incident. Thus, no one person was in charge of the area in and around where the emergency response occurred or the containment and clean-up operations. None of the employees who were working in and around the area where the drum incident occurred were informed of the spill, or the containment and clean-up operations that were being performed. Also, none of the employees who were working in and around the area where the drum incident occurred were evacuated from the area at any point directly after the incident occurred or while the containment and clean-up operations were being performed.

**Because these two employees (Ariel Boone and Mark Ruiz) contained and cleaned up the unidentified/unknown materials and chemicals which were spilled from the drum, they performed the duties of a HAZMAT team members. Specifically, these employees performed the duties of First Responders (Operations Level). However, neither of these two employees are on the employer's HAZMAT team, nor have they been provided any type or level of HAZWOPER training at any time before or after this response and clean-up occurred. It should be noted that no members of the employer's HAZMAT team have been provided any type or level of HAZWOPER training. Thus, no one from the facility is trained to perform any of the emergency response roles described in 1910.120(q)(5) and 1910.120(q)(6), or in the employer's ERP.**

b) Equipment: Several chemicals which are moderately to highly toxic, flammable and/or reactive (See Line 20 for examples of these chemicals)
c) Location: Facility Wide
d) Injury/Illness: Death, cancer (lung, kidney, liver, brain, etc.), blindness, multi-organ damage and/or impairment, 2nd and/or 3rd degree burns to entire body, severe eye, skin and respiratory burns and irritation
e) Measurements: Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines had **skin designations** per ACGIH and/or OSHA. Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines could also produce **additive or synergistic effects** when exposures to these chemicals are combined

| 21. Photo Number | Location on Video |
|---|---|
| | |

23. Employer Knowledge: Indianapolis Drum Service developed an Emergency Response Plan (ERP) which was last revised on July 8, 2009. Section I (General) of the ERP states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the

following Emergency Response to deal with any and all of these situations." The Purpose (Section II) of the ERP is "the establishment of an effective organization and procedure to efficiently handle any situation that may arise due to fire, explosion or accidental spills." Section II (Purpose) also states that "this program is written to contain and control the situation before it spreads beyond the company's capability to handle it, and to alert the appropriate agencies in order to prevent a situation endangering company employees and the surrounding community." Although the ERP does list the position and location of each emergency exit (See Page 3 of the ERP), the ERP does not contain a detailed map of where each emergency exit is located or the emergency exit routes employees are supposed to follow to get to these emergency exits. The ERP also refers to a "Spill Emergency Response Report" and a "Spill Reporting Check List," but neither of these documents are contained in the ERP. The ERP also contains a "Common Sense Clause" (Section III) which states that "if a situation arises where one or more of these steps would not fit the situation, use your best common sense judgement to help rectify the problem."

Section II (Purpose) of the ERP also states that "the Indianapolis Drum Service Emergency Response Team consists of the following people along with their duties as a team member: Lewis Warren, James Hanley, Wes Ledbetter, Eric Hight, Mark Brown, Darrell Kinnaman, Billy Gibson, John Garmon, George Royston, Ray Chapman and Vince Jackson." Although the ERP does list the duties that each of these team members could perform during an emergency situation, the ERP does not list the level of training that each team member has attained or what roles they are actually trained to perform during an emergency. Page 4 of the ERP states that the Emergency Response Team "contains the spill using containment material (i.e. quick dry, sandbags, etc.) and block spill from leaving plant or entering state waterways" and "cleans-up the spill using supplies including, but not limited to: straw, quick dry, sand bags, diaphragm pump, gas powered pump."

Under the heading of "**person(s) creating or first discovering spill,**" the ERP states that this (these) person(s) "immediately notifies appropriate personnel of spill (immediate supervisor or member of Emergency Response Team - **(Lewis Warren, Ray Chapman, Darrell Kinnaman, Billy Gibson, John Garmon, Brian Barkdull, Jerry Spegal, Dennis Long, Vince Jackson and Wes Ledbetter); AND** initially contains spill to the best of your ability (using oil dry, straw, shovels, squeegees, etc.) without endangering yourself." Brian Barkdull, Jerry Spegal or Dennis Long are not listed as members of the Emergency Response Team under Section II of the ERP, and the ERP never identifies what duties they are supposed to perform during an emergency situation (including a material spill). The "AND" in the above section of the ERP also implies that it is the employees' job to attempt to contain any material spill they create or discover, even though they are not a member of the Emergency Response Team or trained in HAZWOPER. (NOTE: All words that are bolded or capped in the quotes above match the exact formatting (i.e. use of bold and caps) contained in the employer's ERP)

On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum.

On August 31, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) asked Jerry if any reactions or anything unusual has happened prior to or while moving any of the 55-gallon drums underneath the troughs. Jerry Spegal, Tote Supervisor/Manager, stated that "nothing unusual has happened" and that the drums "normally do not leak, but they can leak sometimes." During this interview, Jerry also stated that the only non-hazardous chemicals are contained inside of the drums and that he did not the hazards of the chemicals contained inside of the drums.

On September 17, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and re-interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) again asked Jerry if any reactions or anything unusual has happened while moving any of the 55-gallon drums underneath the troughs. Jerry responded and said nothing unusual has happened while moving the drums. Upon hearing this, the CSHO (Jason Reason) asked Jerry if nothing unusual has happened, why are several employees telling the CSHOs that a drum exploded a week before the CSHOs began looking at the Tote Line? Jerry answered by stating that they have had a drum leak before because the lid was not on tight enough. Jerry stated that a month ago (1st - 2nd week of August 2010), the lid came off of a drum when he tipped it back with the dolly. Jerry further stated that he guessed drums could build up a little pressure because drums, in general, can have pressure even when they are empty, but he thought that the word "exploded was dramatic." Jerry stated that the pressure contained and released from a drum would be "like a pop can." During this interview, Jerry also stated that he did not know exactly what chemicals were contained inside of the drum, but they were non-hazardous.

On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that the lid on the drum "popped" back towards him because he did not fasten it well enough. However, several employees interviewed who were working close to where the 55-gallon plastic drums are located said that the metal ring holding the lid on the drum that exploded was tightly fasten and Jerry (Spegal) tightened the bolt on the ring before moving the drum. During this discussion/interview, Jerry also stated that about one-quarter of the liquid came out of the drum and that the incident occurred in the area where the drums sit. It should

be noted that most of the employees interviewed who observed or heard about the incident said that more than one-quarter of the liquid came out of the drum (See paragraphs below). Jerry also stated that not a lot of the liquid from inside of the drum got on his body or arms, and he washed himself off underneath the emergency eyewash/shower combination located on the back side of the Tote Line. Jerry also stated that Erick and Lewis asked him why he was all wet, so he told them what happened. Jerry also stated that he told Ray (Plant Manager) about what happened. Jerry also stated that he did not experience any injuries from the incident and he did not go to the doctor to get checked out. Jerry also stated that the chemicals that spilled out of the drum were cleaned up by Arjel and Mark. Jerry stated that Arjel and Mark used shovels to put the stuff back into the drum, and it took a couple of minutes to clean up the area where the drum spilled. It should be noted that although most of the employees interviewed said that Arjel and Mark cleaned up after the incident, these employees said that the chemicals and liquids that came out of the drum were cleaned up using a hose to wash/push the chemicals into the drain.

On September 23, 2010, Lewis Warren, Environmental and Regulatory Director, stated that no one told him about anything that concerned a drum incident that occurred on the Tote Line. However, employees interviewed said that they observed Lewis in the area directly after the August drum incident occurred. On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that after the stuff in the drum spilled and got on his arms, Lewis (Warren) and Eric (Hight) asked him why he was all wet. During this conversation, Lewis also stated that drums have slid off of carts and liquid can come out with a lot of force if the lid is not on properly.

On September 23, 2010, the CSHO also discussed the employer's ERP with Lewis Warren, Environmental and Regulatory Director. During this conversation, the CSHO asked Lewis what size spill would employees respond to and what was the limit of the employer's response team? Lewis responded by stating that the ERP kicks in for "big spills." When the CSHO asked what size spill would be considered too big to handle, Lewis stated that they do not have a cut-off limit for a spill and each spill would be evaluated on a "case-by-case basis." Lewis stated that they get bulk deliveries of bleach and caustic (sodium hydroxide) that come in tankers, and if a leak or spill occurred while they were transferring these tankers, they would not attempt to do anything to stop the leak or contain the spill because a "tank truck is beyond our scope of clean-up." After hearing this, the CSHO asked Lewis if a tank truck is the cut-off point for attempting to contain or stop a spill? Lewis stated that while they could not handle a tank truck, they do not have a set number and it all depends based on what they have. The CSHO then asked if they could handle a 55-gallon drums spilling? Lewis stated that if 100% of a 55-gallon drum spilled, then it would "probably not" be beyond their scope. The CSHO then asked what if it was an extremely toxic or hazardous chemical, or if ten drums spilled? Lewis stated that they could maybe handle those situations, but each one would have to examined on a case-by-case basis. Lewis stated that depending on the size of the spill, small spills (less than three gallons) would be washed down the drain and big spills (like a drum) would have to be reported before being cleaned-up.

During this same conversation, the CSHO asked Lewis if Indy Drum had its own HAZMAT team? Lewis stated that he did not know what a HAZMAT team was and he thought they did not have a HAZMAT team. The CSHO then asked if any employees are required as part of their job to respond to a spill or emergency? Lewis stated that "certain employees are required to respond to a spill." The CSHO then asked what duties or functions would these "certain employees" perform during a spill? Lewis stated that once an assessment of the spill was performed by the senior person, employees would attempt to contain the spill because "containment is the first priority." Lewis stated that employees would contain the spill using sandbags or with something to make the spill solid so they could vacuum it up. The CSHO then asked if employees would attempt to stop the spill? Lewis stated that if possible "employees would try to stop the source of the spill." When the CSHO asked how aggressively employees would attempt to stop the spill, Lewis stated that it would handled on a case-by-case basis. When the CSHO asked if employees working around the area where the spill occurred would be evacuated, Lewis stated that other employees would be evacuated if necessary. The CSHO then asked who were these "certain employees" that Lewis referred to earlier who would respond to a spill? Lewis stated that these "certain employees" included himself, Wes, Ray, Darrell, Billy, George, and the supervisors in the area." It should be noted that this list of employees does not match the list of employees referred to as the Emergency Response Team in the ERP. Lewis further stated that whether or not they "contain or eliminate may depend on the area, but 5-7 employees do 85% of the work." During a phone conversation on November 1, 2010, Lewis stated that the "certain employees" have been on the team for at least one year, and he has been on the team for several years.

During this same conversation, Lewis stated that no one, including the "certain employees" mentioned previously, has been provided HAZWOPER training, but all employees are provided PPE training. Lewis also stated that none of the "certain employees" have ever been sent to a doctor for medical evaluations prior to being assigned containment or elimination duties. Lewis also stated that it has been a while since they have practiced an emergency evacuation, but they usually do it once a year. Lewis also stated that there are no SCBAs located anywhere onsite.

24. Comments (Employer, **Employee**, Closing Conference): On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum. However, Jerry Spegal's explanation

and employees' observations of how the liquid escaped the confinement of the drum and ended up on the floor vary widely.

One employee interviewed said that the drum that Jerry (Spegal) was moving was really full of liquid and the chemicals inside of the drum had actually formed layers similar to oil and water. This employee said that Jerry screwed a white lid down tight on top of the drum and then used a dolly to move it. This employee said that Jerry really sloshed the liquid inside of the drum around while moving it, and this sloshing probably mixed the layers of chemicals inside of the drum. This employee said that when Jerry was moving the drum on the dolly, the white lid swelled upward and looked like it was "pregnant." This employee said that they have seen drums swell up before after they are sealed, but the employer normally puts them off to the side and checks them. This employee said that after they saw the lid swell, Jerry got five steps and then they heard a "boom." This employee said the lid exploded, blew off of the drum and ended up about 6-7 feet away from the drum. This employee also said that the lid came close to hitting Jerry when it blew off the drum. This employee said the chemicals/liquids inside of the drum shout about 3-4 feet in the air, and all of the chemicals/liquids inside of the drum ended up on the floor and/or outside of the drum (i.e. the whole drum spilled). This employee also said that the chemicals inside of the drum were light colored. This employee also said that Jerry was covered in the chemicals/liquids that exploded and came out of the drum and he ran to the eyewash to was his head and eyes off.

Another employee interviewed said that although he did not see the "drum incident," Jerry Spegal and Arjel Boone told them about it. This employee said that Jerry (Spegal) told them that the top of the drum started swelling and when Jerry saw this he got out of the way. Jerry then told this employee that after he got out of the way, the top of the drum blew off and stuff from inside of the drum got all over him. Jerry also told this employee that the stuff from the drum could have got him in the face. This employee interviewed also said that Jerry had to change clothes after this "incident" because his clothes were soaked.

Other employees interviewed said that they observed the lid of the 55-gallon drum rise while Jerry Spegal was moving it. These employees said that the liquid inside of the drum exploded out of the drum and got all over Jerry (Spegal). These employees said that the lid on the drum popped off and between one-half and one-third of the liquid inside of the drum ended up outside of the drum. These employees also said that some of the liquid got on Jerry.

Some of the employees interviewed said that the most recent "drum incident" occurred because the drum was sealed with a plastic lid and not a steel lid. All of the drums are sealed with some type of lid which is secured to the top of the drum with a metal ring. The metal ring must be manually tightened by a screw or bolt to the desired tension. The plastic lid used to seal the drum that "exploded" does have less strength and greater flexibility as compared to that of a steel lid. Consequently, the amount of pressure and/or force required to deform a plastic lid is much less than the pressure and force required to deform a steel lid. However, regardless of the type of lid used to seal the drum, the lid will always be the weakest structural point of the drum (assuming there are no holes or tears in the drum walls). Thus, once the pressure inside of the drum exceeds the maximum containment pressure of the drum, the pressure will be relieved through the drum's weakest structural point.

25. Other Employer Information: The CSHO believes that the lid on top of the 55-gallon plastic drum became detached because it was not designed to dissipate or handle the increasing pressure inside of the drum. Based on employee interviews and the CSHOs' own observations and documentation, chemicals such as, but not limited to acids, caustics (bases), oxidizers, flammables/combustibles and carcinogens (confirmed and possible) are being mixed together inside of the 55-gallon plastic drums. When incompatible chemicals are mixed, by-products of this reaction can include heat (exothermic reaction). Any heat produced from exothermic reactions inside of the drums would begin to heat the air at and around the surface of the liquid. The air at and around the surface of the liquid would continue to increase in temperature, and would begin to rise (i.e. hot air rises) and be released into the atmosphere directly above the drum. When the drums are open underneath the troughs, any heat or pressure created by chemical reactions can be released into the surrounding atmosphere (i.e. volume of container is essentially constant). However, once the drums are sealed, any heat or pressure created by chemical reactions are confined to limited volume of the drum (i.e. volume of container is fixed).

Based on Gay-Lussac's Law, the pressure of a gas is directly proportional to the gas's temperature ($P_1/T_1 = P_2/T_2$). In other words, if the temperature of a gas increases, then the pressure of a gas also increases. Based on Boyle's Law, the pressure of a gas is inversely proportional to the gas's volume ($P_1*V_1 = P_2*V_2$). In other words, if the volume that a gas occupies decreases, then the pressure of a gas will increase. Due to the exothermic reaction that most likely occurred inside of the 55-gallon drum, the temperature of the air located in the head space of the drum increased. When the drum was sealed with a lid, the volume that the gas inside of the drum could occupy decreased. The combination of these two factors (increase in temperature and decrease in volume) increased the pressure of the air trapped inside of the drum at a rate proportional to the temperature rise and inversely proportional to the decreased volume. The pressure of the air inside of drum continued to increase until it approached the containment pressure (i.e. breaking point) of the drum. This is what employees meant when they told the CSHO that the top of the drum and lid swelled and looked "pregnant." Once the containment pressure was exceeded, the built-up pressure inside of the drum was relieved through the drum's weakest structural point (the lid). The escaping pressure would have taken a large quantity of the liquid inside of the drum with it, which resembles Jerry Spegal's statement that the liquid

came out of the drum like a "pop can that was shaken up and then opened."

Based on all of the information listed in this Worksheet, the CSHO believes that employees observed and were exposed to an exothermic reaction which increased the pressure (of the air) inside of the 55-gallon plastic drum. This increase in pressure ultimately resulted in the drum releasing the built-up pressure in the form of what resembled an explosion, which exposed employees to the unknown chemical mixture that was contained inside of the 55-gallon plastic drum.

26. Classification:

| Serious | Knowledge | S or O | Repeat? | Willful? |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **5,000.00** | | |

U. S. Department of Labor
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:51PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 017 |
| Number Exposed | 72 | No. Instances | 1 | REC | |
| Std. Alleged Vio. | 1910.120(q)(9)(i) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| Abatement Documentation Required | Date Abated | Date Verified | |
| Yes | | | |

| MULTISTEP | | | | |
|---|---|---|---|---|
| Type | Days | Due Date | Track | Completed Code |
| | | | | |

| | |
|---|---|
| Substance Codes | |

AVD/Variable Information:

29 CFR 1910.120(q)(9)(i): Members of an organized and designated HAZMAT team and hazardous materials specialists did not receive a baseline physical examination and were not provided with medical surveillance as required in 29 CFR 1910.120(f):

Facility Wide - The employer's Emergency Response Team (ERT), which consisted of approximately six to fourteen members (employees), was required to mobilize and respond to emergencies such as, but not limited to fires, explosions, material spills, or accidental releases of contaminates to the tributary waterway bordering the facility. Prior to being assigned duties on the ERT and/or responding to an emergency situation, members of the ERT were not provided baseline physical examinations, as well as additional medical examinations once every twelve months.

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | 5,000.00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | | |
|---|---|---|---|---|
| Occupation | Complex Administrator | Employer | Indianapolis Drum Service | |
| Duration | 2-3 years | Frequency | 8 hours/day | |
| Employee Name | Wes Ledbetter | | | |

| | | | | | |
|---|---|---|---|---|---|
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | | Phone | (317) 357-9853 |
| Occupation | Environmental and Regulatory Director | Employer | Indianapolis Drum Service | | |
| Duration | 1 year | Frequency | 8 hours/day | | |
| Employee Name | Lewis Warren | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | | Phone | (317) 357-9853 |
| Occupation | Maintenance Director | Employer | Indianapolis Drum Service | | |
| Duration | 1 year | Frequency | 8 hours/day | | |
| Employee Name | Darrell Kinnaman | | | | |
| Address | 3619 East Terrace Avenue<br>Indianapolis, IN 46203 | | | Phone | (317) 357-9853 |

| Instance Description: | A. Hazard | B. Equipment | C. Location | D. Injury/Illness | E. Measurements |
|---|---|---|---|---|---|

| 4. Date/Time |
|---|
| 9/23/10 1:05 pm |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: Plastic drums of varying sizes (mainly 55-gallons) and plastic totes (275-gallons and 330-gallons) are unloaded from semi-trailers which are located outside of the facility directly across from the West wall. Each semi-trailer is not chemical or hazard specific in that each semi-trailer contains a combination of a variety of plastic drums or plastic totes. Although the plastic drums or plastic totes are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the drums and totes. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic drums and plastic totes in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of the drum and tote) to approximately one-inch (total height of all chemical remaining in drum and tote). Based on a standard 55-gallon drum (approximately 34.50-inches high), a plastic 55-gallon drum would be approximately 2.90% full if one-inch of chemical was located inside of the drum (NOTE: this percentage is based off of the total volume of the 55-gallon drum). Based on a standard 275-gallon and 330-gallon tote (approximately 46.0-inches and 54.0-inches high respectively), a plastic 275-gallon and 330-gallon tote would be approximately 2.17% and 1.85% full respectively if one-inch of chemical was located inside of the tote (NOTE: this percentage is based off of the total height of each of the totes). Employees interviewed said that they process (i.e. dump and/or empty) between 500 and 1,000 drums per day on the Plant 4 Line and between 350 and 400 drums per day on the Regrind Line. Employees interviewed also said that they process (i.e. dump and/or empty) between 115 and 200 totes per day on the Tote Line.

The plastic drums and plastic totes contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, corrosive, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, ammonium hydroxide, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO found during sampling or while examining MSDSs.

The employer has its own Hazardous Material (HAZMAT) team which consists of approximately six to fourteen members (employees). The HAZMAT team is required to mobilize and respond to emergencies such as, but not limited to uncontrolled chemical releases/spills and fires. Specifically, the employer's Emergency Response Plan (ERP) states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the following Emergency Response to deal with any and all of these situations." The HAZMAT team has emergency equipment including, but not limited to vacuums, alarm systems, radios, sandbags and spill kits. No supplied air respirators (self-contained breathing apparatus (SCBA) or airline respirators) are

available for emergency use or located anywhere inside of the facility.

Because the employer has a HAZMAT team onsite which is required to mobilize and respond to emergencies, the employer would fall under OSHA's HAZWOPER standard per 1910.120(a)(v). Thus, the employer would be required to follow the requirements listed under 1910.120(q), including the requirement to have a written Emergency Response Plan (ERP). Although the employer does have a written ERP, the employer's ERP did not meet all of the requirements listed under 1910.120(q)(2). Refer to Citation 1, Item 14a for further information.

Although the HAZMAT team is required to respond to emergency situations, none of the members of the HAZMAT team are trained to any identifiable level in emergency response or to the minimum levels described in 1910.120(q)(6). **None of the members of the HAZMAT team are also provided with baseline physical examinations prior to assignment to the HAZMAT team, or additional medical examination at least once every twelve months.** It should also be noted that employees are not provided effective Hazard Communication (HazCom) training, and several employees did not know what chemicals they worked with or around or the hazards (safety and/or health) associated with these chemicals.

Both the employer and employees interviewed stated that the following employees responded to the drum incident that occurred on or about the second week of August 2010 (August 9-13, 2010): Arjel Boone and Mark Ruiz. Both of these employees contained the spilled unidentified/unknown materials and chemicals that came out of the 55-gallon drum. Both of these employees also cleaned up the spilled unidentified/unknown materials and chemicals by shoveling them back into the 55-gallon drum and/or washing the materials and chemicals into the floor drains using a water hose. The employees who contained and cleaned-up the unidentified/unknown materials and chemicals that came out of the 55-gallon drum wore PPE such as, but not limited to safety glasses, hardhats, hearing protection (ear plugs) and rubber gloves. This PPE represents the PPE Tote Line employees are required to wear on a daily basis. Although these employees were containing and cleaning up unidentified/unknown materials and chemicals, neither of these employees were required to wear additional PPE such as, but not limited to respiratory protection, whole-body chemical protective suits (Tyvex), face shields, or sleeves.

No one was designated or trained to perform the duties of the On Scene Incident Commander for the response to this drum incident. Thus, no one person was in charge of the area in and around where the emergency response occurred or the containment and clean-up operations. None of the employees who were working in and around the area where the drum incident occurred were informed of the spill, or the containment and clean-up operations that were being performed. Also, none of the employees who were working in and around the area where the drum incident occurred were evacuated from the area at any point directly after the incident occurred or while the containment and clean-up operations were being performed.

Because these two employees (Arjel Boone and Mark Ruiz) contained and cleaned up the unidentified/unknown materials and chemicals which were spilled from the drum, they performed the duties of a HAZMAT team members. Specifically, these employees performed the duties of First Responders (Operations Level). However, neither of these two employees are on the employer's HAZMAT team, nor have they been provided any type or level of HAZWOPER training at any time before or after this response and clean-up occurred. It should be noted that no members of the employer's HAZMAT team have been provided any type or level of HAZWOPER training. Thus, no one from the facility is trained to perform any of the emergency response roles described in 1910.120(q)(5) and 1910.120(q)(6), or in the employer's ERP.

b) Equipment: Several chemicals which are moderately to highly toxic, flammable and/or reactive (See Line 20 for examples of these chemicals)
c) Location: Facility Wide
d) Injury/Illness: Death, cancer (lung, kidney, liver, brain, etc.), blindness, multi-organ damage and/or impairment, 2nd and/or 3rd degree burns to entire body, severe eye, skin and respiratory burns and irritation
e) Measurements: Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines had **skin designations** per ACGIH and/or OSHA. Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines could also produce **additive or synergistic effects** when exposures to these chemicals are combined

| 21. Photo Number | Location on Video |
|---|---|
| | |

23. Employer Knowledge: Indianapolis Drum Service developed an Emergency Response Plan (ERP) which was last revised on July 8, 2009. Section I (General) of the ERP states that "Indianapolis Drum Service is prepared to respond to any emergency situation, which may arise. Potential situations include but are not limited to fire, explosion, material spills, or accidental releases of contaminates to the tributary waterway bordering our property. Indianapolis Drum Service has developed the

following Emergency Response to deal with any and all of these situations." The Purpose (Section II) of the ERP is "the establishment of an effective organization and procedure to efficiently handle any situation that may arise due to fire, explosion or accidental spills." Section II (Purpose) also states that "this program is written to contain and control the situation before it spreads beyond the company's capability to handle it, and to alert the appropriate agencies in order to prevent a situation endangering company employees and the surrounding community." Although the ERP does list the position and location of each emergency exit (See Page 3 of the ERP), the ERP does not contain a detailed map of where each emergency exit is located or the emergency exit routes employees are supposed to follow to get to these emergency exits. The ERP also refers to a "Spill Emergency Response Report" and a "Spill Reporting Check List," but neither of these documents are contained in the ERP. The ERP also contains a "Common Sense Clause" (Section III) which states that "if a situation arises where one or more of these steps would not fit the situation, use your best common sense judgement to help rectify the problem."

Section II (Purpose) of the ERP also states that "the Indianapolis Drum Service Emergency Response Team consists of the following people along with their duties as a team member: Lewis Warren, James Hanley, Wes Ledbetter, Eric Hight, Mark Brown, Darrell Kinnaman, Billy Gibson, John Garmon, George Royston, Ray Chapman and Vince Jackson." Although the ERP does list the duties that each of these team members could perform during an emergency situation, the ERP does not list the level of training that each team member has attained or what roles they are actually trained to perform during an emergency. Page 4 of the ERP states that the Emergency Response Team "contains the spill using containment material (i.e. quick dry, sandbags, etc.) and block spill from leaving plant or entering state waterways" and "cleans-up the spill using supplies including, but not limited to: straw, quick dry, sand bags, diaphragm pump, gas powered pump."

Under the heading of "**person(s) creating or first discovering spill**," the ERP states that this (these) person(s) "immediately notifies appropriate personnel of spill (immediate supervisor or member of Emergency Response Team - **(Lewis Warren, Ray Chapman, Darrell Kinnaman, Billy Gibson, John Garmon, Brian Barkdull, Jerry Spegal, Dennis Long, Vince Jackson and Wes Ledbetter); AND** initially contains spill to the best of your ability (using oil dry, straw, shovels, squeegees, etc.) without endangering yourself." Brian Barkdull, Jerry Spegal or Dennis Long are not listed as members of the Emergency Response Team under Section II of the ERP, and the ERP never identifies what duties they are supposed to perform during an emergency situation (including a material spill). The "AND" in the above section of the ERP also implies that it is the employees' job to attempt to contain any material spill they create or discover, even though they are not a member of the Emergency Response Team or trained in HAZWOPER. (NOTE: All words that are bolded or capped in the quotes above match the exact formatting (i.e. use of bold and caps) contained in the employer's ERP)

On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum.

On August 31, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) asked Jerry if any reactions or anything unusual has happened prior to or while moving any of the 55-gallon drums underneath the troughs. Jerry Spegal, Tote Supervisor/Manager, stated that "nothing unusual has happened" and that the drums "normally do not leak, but they can leak sometimes." During this interview, Jerry also stated that the only non-hazardous chemicals are contained inside of the drums and that he did not the hazards of the chemicals contained inside of the drums.

On September 17, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and re-interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) again asked Jerry if any reactions or anything unusual has happened while moving any of the 55-gallon drums underneath the troughs. Jerry responded and said nothing unusual has happened while moving the drums. Upon hearing this, the CSHO (Jason Reason) asked Jerry if nothing unusual has happened, why are several employees telling the CSHOs that a drum exploded a week before the CSHOs began looking at the Tote Line? Jerry answered by stating that they have had a drum leak before because the lid was not on tight enough. Jerry stated that a month ago (1st - 2nd week of August 2010), the lid came off of a drum when he tipped it back with the dolly. Jerry further stated that he guessed drums could build up a little pressure because drums, in general, can have pressure even when they are empty, but he thought that the word "exploded was dramatic." Jerry stated that the pressure contained and released from a drum would be "like a pop can." During this interview, Jerry also stated that he did not know exactly what chemicals were contained inside of the drum, but they were non-hazardous.

On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that the lid on the drum "popped" back towards him because he did not fasten it well enough. However, several employees interviewed who were working close to where the 55-gallon plastic drums are located said that the metal ring holding the lid on the drum that exploded was tightly fasten and Jerry (Spegal) tightened the bolt on the ring before moving the drum. During this discussion/interview, Jerry also stated that about one-quarter of the liquid came out of the drum and that the incident occurred in the area where the drums sit. It should

be noted that most of the employees interviewed who observed or heard about the incident said that more than one-quarter of the liquid came out of the drum (See paragraphs below). Jerry also stated that not a lot of the liquid from inside of the drum got on his body or arms, and he washed himself off underneath the emergency eyewash/shower combination located on the back side of the Tote Line. Jerry also stated that Erick and Lewis asked him why he was all wet, so he told them what happened. Jerry also stated that he told Ray (Plant Manager) about what happened. Jerry also stated that he did not experience any injuries from the incident and he did not go to the doctor to get checked out. Jerry also stated that the chemicals that spilled out of the drum were cleaned up by Arjel and Mark. Jerry stated that Arjel and Mark used shovels to put the stuff back into the drum, and it took a couple of minutes to clean up the area where the drum spilled. It should be noted that although most of the employees interviewed said that Arjel and Mark cleaned up after the incident, these employees said that the chemicals and liquids that came out of the drum were cleaned up using a hose to wash/push the chemicals into the drain.

On September 23, 2010, Lewis Warren, Environmental and Regulatory Director, stated that no one told him about anything that concerned a drum incident that occurred on the Tote Line. However, employees interviewed said that they observed Lewis in the area directly after the August drum incident occurred. On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that after the stuff in the drum spilled and got on his arms, Lewis (Warren) and Eric (Hight) asked him why he was all wet. During this conversation, Lewis also stated that drums have slid off of carts and liquid can come out with a lot of force if the lid is not on properly.

On September 23, 2010, the CSHO also discussed the employer's ERP with Lewis Warren, Environmental and Regulatory Director. During this conversation, the CSHO asked Lewis what size spill would employees respond to and what was the limit of the employer's response team? Lewis responded by stating that the ERP kicks in for "big spills." When the CSHO asked what size spill would be considered too big to handle, Lewis stated that they do not have a cut-off limit for a spill and each spill would be evaluated on a "case-by-case basis." Lewis stated that they get bulk deliveries of bleach and caustic (sodium hydroxide) that come in tankers, and if a leak or spill occurred while they were transferring these tankers, they would not attempt to do anything to stop the leak or contain the spill because a "tank truck is beyond our scope of clean-up." After hearing this, the CSHO asked Lewis if a tank truck is the cut-off point for attempting to contain or stop a spill? Lewis stated that while they could not handle a tank truck, they do not have a set number and it all depends based on what they have. The CSHO then asked if they could handle a 55-gallon drums spilling? Lewis stated that if 100% of a 55-gallon drum spilled, then it would "probably not" be beyond their scope. The CSHO then asked what if it was an extremely toxic or hazardous chemical, or if ten drums spilled? Lewis stated that they could maybe handle those situations, but each one would have to examined on a case-by-case basis. Lewis stated that depending on the size of the spill, small spills (less than three gallons) would be washed down the drain and big spills (like a drum) would have to be reported before being cleaned-up.

During this same conversation, the CSHO asked Lewis if Indy Drum had its own HAZMAT team? Lewis stated that he did not know what a HAZMAT team was and he thought they did not have a HAZMAT team. The CSHO then asked if any employees are required as part of their job to respond to a spill or emergency? Lewis stated that "certain employees are required to respond to a spill." The CSHO then asked what duties or functions would these "certain employees" perform during a spill? Lewis stated that once an assessment of the spill was performed by the senior person, employees would attempt to contain the spill because "containment is the first priority." Lewis stated that employees would contain the spill using sandbags or with something to make the spill solid so they could vacuum it up. The CSHO then asked if employees would attempt to stop the spill? Lewis stated that if possible "employees would try to stop the source of the spill." When the CSHO asked how aggressively employees would attempt to stop the spill, Lewis stated that it would handled on a case-by-case basis. When the CSHO asked if employees working around the area where the spill occurred would be evacuated, Lewis stated that other employees would be evacuated if necessary. The CSHO then asked who were these "certain employees" that Lewis referred to earlier who would respond to a spill? Lewis stated that these "certain employees" included himself, Wes, Ray, Darrell, Billy, George, and the supervisors in the area." It should be noted that this list of employees does not match the list of employees referred to as the Emergency Response Team in the ERP. Lewis further stated that whether or not they "contain or eliminate may depend on the area, but 5-7 employees do 85% of the work." During a phone conversation on November 1, 2010, Lewis stated that the "certain employees" have been on the team for at least one year, and he has been on the team for several years.

During this same conversation, Lewis stated that no one, including the "certain employees" mentioned previously, has been provided HAZWOPER training, but all employees are provided PPE training. **Lewis also stated that none of the "certain employees" have ever been sent to a doctor for medical evaluations prior to being assigned containment or elimination duties.** Lewis also stated that it has been a while since they have practiced an emergency evacuation, but they usually do it once a year. Lewis also stated that there are no SCBAs located anywhere onsite.

24. Comments (Employer, **Employee**, Closing Conference): On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that

the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum. However, Jerry Spegal's explanation and employees' observations of how the liquid escaped the confinement of the drum and ended up on the floor vary widely.

One employee interviewed said that the drum that Jerry (Spegal) was moving was really full of liquid and the chemicals inside of the drum had actually formed layers similar to oil and water. This employee said that Jerry screwed a white lid down tight on top of the drum and then used a dolly to move it. This employee said that Jerry really sloshed the liquid inside of the drum around while moving it, and this sloshing probably mixed the layers of chemicals inside of the drum. This employee said that when Jerry was moving the drum on the dolly, the white lid swelled upward and looked like it was "pregnant." This employee said that they have seen drums swell up before after they are sealed, but the employer normally puts them off to the side and checks them. This employee said that after they saw the lid swell, Jerry got five steps and then they heard a "boom." This employee said the lid exploded, blew off of the drum and ended up about 6-7 feet away from the drum. This employee also said that the lid came close to hitting Jerry when it blew off the drum. This employee said the chemicals/liquids inside of the drum shout about 3-4 feet in the air, and all of the chemicals/liquids inside of the drum ended up on the floor and/or outside of the drum (i.e. the whole drum spilled). This employee also said that the chemicals inside of the drum were light colored. This employee also said that Jerry was covered in the chemicals/liquids that exploded and came out of the drum and he ran to the eyewash to was his head and eyes off.

Another employee interviewed said that although he did not see the "drum incident," Jerry Spegal and Arjel Boone told them about it. This employee said that Jerry (Spegal) told them that the top of the drum started swelling and when Jerry saw this he got out of the way. Jerry then told this employee that after he got out of the way, the top of the drum blew off and stuff from inside of the drum got all over him. Jerry also told this employee that the stuff from the drum could have got him in the face. This employee interviewed also said that Jerry had to change clothes after this "incident" because his clothes were soaked.

Other employees interviewed said that they observed the lid of the 55-gallon drum rise while Jerry Spegal was moving it. These employees said that the liquid inside of the drum exploded out of the drum and got all over Jerry (Spegal). These employees said that the lid on the drum popped off and between one-half and one-third of the liquid inside of the drum ended up outside of the drum. These employees also said that some of the liquid got on Jerry.

Some of the employees interviewed said that the most recent "drum incident" occurred because the drum was sealed with a plastic lid and not a steel lid. All of the drums are sealed with some type of lid which is secured to the top of the drum with a metal ring. The metal ring must be manually tightened by a screw or bolt to the desired tension. The plastic lid used to seal the drum that "exploded" does have less strength and greater flexibility as compared to that of a steel lid. Consequently, the amount of pressure and/or force required to deform a plastic lid is much less than the pressure and force required to deform a steel lid. However, regardless of the type of lid used to seal the drum, the lid will always be the weakest structural point of the drum (assuming there are no holes or tears in the drum walls). Thus, once the pressure inside of the drum exceeds the maximum containment pressure of the drum, the pressure will be relieved through the drum's weakest structural point.

25. Other Employer Information: The CSHO believes that the lid on top of the 55-gallon plastic drum became detached because it was not designed to dissipate or handle the increasing pressure inside of the drum. Based on employee interviews and the CSHOs' own observations and documentation, chemicals such as, but not limited to acids, caustics (bases), oxidizers, flammables/combustibles and carcinogens (confirmed and possible) are being mixed together inside of the 55-gallon plastic drums. When incompatible chemicals are mixed, by-products of this reaction can include heat (exothermic reaction). Any heat produced from exothermic reactions inside of the drums would begin to heat the air at and around the surface of the liquid. The air at and around the surface of the liquid would continue to increase in temperature, and would begin to rise (i.e. hot air rises) and be released into the atmosphere directly above the drum. When the drums are open underneath the troughs, any heat or pressure created by chemical reactions can be released into the surrounding atmosphere (i.e. volume of container is essentially constant). However, once the drums are sealed, any heat or pressure created by chemical reactions are confined to limited volume of the drum (i.e. volume of container is fixed).

Based on Gay-Lussac's Law, the pressure of a gas is directly proportional to the gas's temperature ($P_1/T_1 = P_2/T_2$). In other words, if the temperature of a gas increases, then the pressure of a gas also increases. Based on Boyle's Law, the pressure of a gas is inversely proportional to the gas's volume ($P_1*V_1 = P_2*V_2$). In other words, if the volume that a gas occupies decreases, then the pressure of a gas will increase. Due to the exothermic reaction that most likely occurred inside of the 55-gallon drum, the temperature of the air located in the head space of the drum increased. When the drum was sealed with a lid, the volume that the gas inside of the drum could occupy decreased. The combination of these two factors (increase in temperature and decrease in volume) increased the pressure of the air trapped inside of the drum at a rate proportional to the temperature rise and inversely proportional to the decreased volume. The pressure of the air inside of drum continued to increase until it approached the containment pressure (i.e. breaking point) of the drum. This is what employees meant when they told the CSHO that the top of the drum and lid swelled and looked "pregnant." Once the containment pressure was exceeded, the built-up pressure inside of the drum was relieved through the drum's weakest structural point (the lid). The escaping pressure

would have taken a large quantity of the liquid inside of the drum with it, which resembles Jerry Spegal's statement that the liquid came out of the drum like a "pop can that was shaken up and then opened."

Based on all of the information listed in this Worksheet, the CSHO believes that employees observed and were exposed to an exothermic reaction which increased the pressure (of the air) inside of the 55-gallon plastic drum. This increase in pressure ultimately resulted in the drum releasing the built-up pressure in the form of what resembled an explosion, which exposed employees to the unknown chemical mixture that was contained inside of the 55-gallon plastic drum.

| 26. Classification: | | | | |
|---|---|---|---|---|
| Serious | Knowledge | S or O | Repeat? | Willful? |
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **5,000.00** | | |

U. S. Department of Labo(
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:56PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 018 |
| Number Exposed | 35 | No. Instances | 2 | REC | C Complaint |
| Std. Alleged Vio. | 1910.134(d)(1)(iii) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| **Abatement Documentation Required** | **Date Abated** | **Date Verified** | |
| Yes | | | |

**MULTISTEP**

| Type | Days | Due Date | Track | Completed Code |
|---|---|---|---|---|
| | | | | |

| | | |
|---|---|---|
| Substance Codes | 0117 | ACRYLIC ACID |
| Substance Codes | 1430 | HYDROGEN CHLORIDE |
| Substance Codes | 2085 | PHOSPHORIC ACID |
| Substance Codes | 2260 | SODIUM HYDROXIDE |
| Substance Codes | A614 | AMMONIUM HYDROXIDE |

AVD/Variable Information:

29 CFR 1910.134(d)(1)(iii): The employer did not identify and evaluate the respiratory hazard(s) in the workplace with an evaluation which included a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer could not identify or reasonably estimate the employee exposure, the employer did not consider the atmosphere to be IDLH:

a) Regrind Line (Area) - Employees transferred and emptied 55-gallon plastic and metal drums that contained various quantities of hazardous and/or highly reactive chemicals into the Regrind Flush Tank which contained approximately 600-800 gallons of water. The chemicals which were emptied into the collection tank included, but were not limited to acids, caustics, oxidizers, flammables/combustibles, highly toxic single or multi organ/system substances and suspected or confirmed carcinogens. No procedures or systems were in place to segregate the chemicals or drums prior to them being emptied. Thus, various incompatible chemicals were allowed to combine and mix together which could potentially cause violent chemical reactions to occur, as well as potentially dangerous quantities of hazardous decomposition products to be generated and/or released. No personal monitoring was performed by the employer to determine employees' exposure to the various chemicals located inside of the drums, or the various hazardous decomposition products generated or emitted due to incompatible chemicals being combined. Engineering controls such as, but not limited to local exhaust ventilation (LEV) were also not installed on or near the areas where employees worked with or were potentially exposed to the chemicals or hazardous decomposition products. Employees were also not required to and did not wear respirators while working with or around the areas where they were potentially exposed to the chemicals or hazardous decomposition products.

b) Tote Line (Line 3) - Employees transferred and emptied 275-gallon and 330-gallon plastic totes that contained various quantities of hazardous and/or highly reactive chemicals into several open 55-gallon plastic drums which were located underneath the left side of the elevated platform. The chemicals which were emptied into the 55-gallon plastic drums included, but were not limited to acids, caustics, oxidizers, flammables/combustibles, highly toxic single or multi organ/system substances and suspected or confirmed carcinogens. No procedures or systems were in place to segregate the chemicals or totes prior to them being emptied. Thus, various incompatible chemicals were allowed to combine and mix together which could potentially cause violent chemical reactions to occur, as well as potentially dangerous quantities of hazardous decomposition products to be generated and/or released from each of the 55-gallon drums. No personal monitoring was performed by the employer to determine employees' exposure to the various chemicals located inside of the totes and drums, or the various hazardous decomposition products generated or emitted due to incompatible chemicals being combined inside of the drums. Engineering controls such as, but not limited to LEV were also not installed on or near the areas where employees worked with or were potentially exposed to the chemicals or hazardous decomposition products. Employees were also not required to and did not wear respirators while working with or around the areas where they were potentially exposed to the chemicals or hazardous decomposition products.

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 7,000.00 | 0 | 0 | 0 | 7,000.00 | 7,000.00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | | | |
|---|---|---|---|---|---|
| Occupation | Machine Operator | Employer | Indianapolis Drum Service | | |
| Duration | 3 years | Frequency | 8 hours/day | | |
| Employee Name | Kobe Rice | | | | |
| Address | 7373 Meridian Hill Court<br>Apt. B<br>Indianapolis, IN 46202 | | | Phone | (317) 681-4160 |
| Occupation | Valve Washer | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 8 hours/day | | |
| Employee Name | Arjel Boone | | | | |
| Address | 473 North Walcott Street<br>Apt. 3<br>Indianapolis, IN 46201 | | | Phone | (317) 292-7832 |
| Occupation | Machine Operator | Employer | Indianapolis Drum Service | | |
| Duration | 5 years | Frequency | 8 hours/day | | |
| Employee Name | Tony Smith | | | | |
| Address | 1155 Ewing Street<br>Indianapolis, IN 46203 | | | Phone | (317) 529-5921 |
| Occupation | Label Remover | Employer | Indianapolis Drum Service | | |
| Duration | 5 months | Frequency | 8 hours/day | | |
| Employee Name | Willie Quinn | | | | |
| Address | 3514 North Terrace Avenue<br>Indianapolis, IN 46218 | | | Phone | (317) 413-4375 |
| Occupation | Label/Adhesive Remover | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 8 hours/day | | |
| Employee Name | Hugh Inman | | | | |
| Address | 2933 Percheron Street<br>Indianapolis, IN 46227 | | | Phone | (317) 295-2334 |

| | | | | | |
|---|---|---|---|---|---|
| Occupation | Flusher | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 8 hours/day | | |
| Employee Name | Wayne Hudgins | | | | |
| Address | 1407 South Oxford Street<br>Indianapolis, IN 46203 | | Phone | (317) 787-2254 | |
| Occupation | Pressure Washer | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 8 hours/day | | |
| Employee Name | Wayne Turner | | | | |
| Address | 1218 State Avenue<br>Apt. 1<br>Indianapolis, IN 46203 | | Phone | | |

Instance Description: A. Hazard B. Equipment C. Location D. Injury/Illness E. Measurements

| 4. Date/Time |
|---|
| (a) 11/16/10 7:07 am |
| (b) 11/16/10 7:05 am |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: (a) Plastic drums of varying sizes (mainly 55-gallons) are unloaded from semi-trailers which are located outside of the facility directly across from the West wall. Each semi-trailer is not chemical or hazard specific in that each semi-trailer contains a combination of a variety of plastic drums. Although the plastic drums are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the drums. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic drums in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of plastic drum) to approximately one-inch (total height of all chemical remaining in drum). Based on a standard 55-gallon drum (approximately 34.50-inches high), a plastic 55-gallon drum would be approximately 2.90% full if one-inch of chemical was located inside of the drum (NOTE: this percentage is based off of the total volume of the 55-gallon drum). These plastic drums contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, corrosive, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, ammonium hydroxide, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO found during sampling or while examining MSDSs. **Although these drums contained chemicals which were moderately to highly toxic, corrosive, flammable and/or reactive, the employer never performed any air sampling to determine employees' exposure to these various chemicals. Local exhaust ventilation (LEV) was also not installed on or near the areas where employees worked with or were exposed to these chemicals. Employees were also not required to and did not wear respirators while working with or around the areas where these chemicals were used or processed.**

All of the plastic drums located inside of the semi-trailers arrive unopened with the bung caps screwed in place. Employees unload each of the plastic drums from the semi-trailers onto the dock platform several ways: 1. Physically pick the drum up and carry it, 2. Push, slide and/or rock the drum, 3. Put the drum onto its side and roll it, and/or 4. Grab the lip on top of the drum and sling/throw it. After employees unload the plastic drums from the semi-trailers, they place the drums on one of the chain conveyor systems. There are two chain conveyor systems that run from the loading docks to the inside of the facility. One of the these chain conveyor systems runs directly to the Plant 4 Line (Reconditioning/Recycling) and the other chain conveyor system runs directly to the Regrind Line (Shredding/Disposal). Both of these chain conveyor systems run parallel to each other and feed into the East wall of the facility. Employees use a pneumatic impact wrench to remove the bung caps from any plastic drums that are on the chain conveyor that runs to the Plant 4 Line. All of the bung caps are removed from the plastic drums prior to the drums reaching the Plant 4 Line (i.e. removed while the drums are still outside of the facility). All of the bung caps on the plastic drums that are on the chain conveyor that runs to the Regrind Line are removed by employees when the drums reach the termination point of the Regrind Line (i.e. inside of the facility).

(a) Both plastic and metal drums are received on the Regrind Line via a chain conveyor system that runs parallel to the ground, through an overhead door and ends at the end of the platform on the Regrind Line. The plastic and metal drums

on the Regrind Line arrive unopened (i.e. with their bung caps and covers in place and intact). All of the plastic and metal drums that are processed on the Regrind Line are cleaned and sent to one of the two drum shredders. None of the plastic or metal drums that are processed on the Regrind Line are segregated in any way (i.e. by chemical type or hazard, drum color or type, label classification, etc.). Employees interviewed said that they process (i.e. dump and/or empty) between 350 and 400 drums per day on the Regrind Line.

The Regrind Line contains a flush tank where all of the contents of the plastic and metal drums are emptied. The Regrind Flush Tank is approximately 292-inches (24.33-feet) long by 30-inches (2.5-feet) wide by 36-inches (3.0-feet) high (total volume of the tank is approximately 182.48 $ft^3$ or approximately 1,365-gallons). Employees access the Regrind Flush Tank through an elevated platform that surrounds the tank on all four sides and sets just above the top of the tank. This platform is approximately 363.0-inches (30.25-feet) long by 70.0-inches (5.83-feet) wide by 40.0-inches (3.33-feet) high. The top of the Regrind Flush Tank is covered with steel grating that allows the contents of the drums to flow into the tank. The steel grating located on top of the tank consisted of six grates and covers an area of approximately 56.97 $ft^2$ (approximately 293.0-inches long by approximately 28.0-inches wide). The steel grates located on top of the Regrind Flush Tank are covered with various chemical residues and have been deteriorated to the point where parts of the grates are missing (See Pictures IMG_0587 - IMG_0589). There are ten nozzles that protrude from the steel grating located on top of the Regrind Flush Tank. Once activated, all of these nozzles flush each of the drums out with a steam/water mixture that is heated to approximately 170 °F through a heating coil located inside of the Regrind Flush Tank. On November 5, 2010, Lewis Warren, Environmental and Regulatory Director stated that steam heated to approximately 300 °F is also used occasionally to clean the drums. Lewis also stated that the water inside of the Regrind Flush Tank is heated to 170 °F. Because there are only ten nozzles available, employees can only process ten drums at one time.

Before the plastic or metal drums are shredded, they must be cleaned. Employees first manually pull and/or drag the drums from the conveyor system (located to the left of the Regrind Flush Tank) and onto the platform. Employees then loosen and remove any plastic bung covers (if present) using a pry bar. Employees then use a pneumatic impact wrench to loosen and remove the bung caps from the top of the drums. All of the plastic bung covers and bung caps are collected by hand and disposed of in plastic containers located above the conveyor system. After the bung covers and bung caps have been removed, employees flip each drum over and empty any chemicals or residues into the Regrind Flush Tank. When emptying these drums, employees bend over and grab the bottom of each drum and position one of the drum's bung holes onto one of the nozzles protruding from underneath the steel grates. Employees continue to empty and position plastic and/or metal drums until each of the ten nozzles has a drum over it. Once all ten drums are emptied and placed over a nozzle, employees walk to the front of the elevated platform and turn on the steam/water mixture. The steam/water mixture is activated by an electrical push-button switch mounted to the left wall located just above the stairs leading to the elevated platform. After the steam/water mixture flushes/cleans the inside of each of the drums for approximately 10-15 seconds, employees remove the drums from the nozzles and place them on the right side of the platform where the inside of the drums are dried with a vacuum nozzle.

Employees empty/dump 55-gallon drums that contain corrosives such as, but not limited to hydrochloric acid, phosphoric acid, acetic acid, sulfuric acid, acrylic acid, sodium hypochlorite, caustic soda (sodium hydroxide), ammonium bifluoride, and ammonium hydroxide into the Regrind Flush Tank. Most of these corrosives are reagent grade (99-100%) and are moderate to strong acids ($pH \leq 2.0$) or moderate to strong bases ($pH \geq 12.5$). All of the drums that contain the chemicals listed above contain corrosive labels and/or placards. Employees also empty/dump 55-gallon drums that contain suspected or confirmed human carcinogens such as, but not limited to formaldehyde and trichloroethylene into the Regrind Flush Tank. Corrosives, carcinogens (suspected and confirmed), and many other chemicals are all mixed together inside of the Regrind Flush Tank. None of the chemicals or drums are segregated in any way prior to being emptied into the Regrind Flush Tank, and no precautions are taken to assure that incompatible chemicals do not mix together inside of the tank.

The Regrind Flush Tank is normally filled with between approximately 600-gallons to 800-gallons of water. All of the chemicals which are dumped into the tank mix and/or settle with the water inside of the tank. The Regrind Flush Tank is not equipped with an automatic water flush, and the contents of the Regrind Flush Tank drain by gravity into the facility's wastewater treatment system. On September 17, 2010, Lewis Warren, Environmental and Regulatory Director stated that the Regrind Flush Tank is completely dropped, drained and refilled with city (Indianapolis) water everyday prior to the shift starting. Tim Barkdull, Regrind Foreman (Supervisor), stated that he thinks the stuff from the drums stays inside of the Regrind Flush Tank all day until they drain and clean it out every night.

(b) In addition to the receiving and processing metal and plastic 55-gallon drums, the employer also receives and processes 275-gallon and 330-gallon plastic totes equipped with metal frames. All of the plastic totes are processed on the Tote Line (Line 3), which is located on the left side of the facility. The plastic totes arrive on the Tote Line with the plastic caps located on top of the totes screwed tightly in place and intact. The valves located on the bottom of each tote are also intact and in the closed position (i.e. valve handle parallel to the valve). All of the plastic totes that are processed on the Tote Line are cleaned, and either recycled/resold or sent to Line 2 to be prepped/cleaned for shredding. None of the plastic 275-gallon or 330-gallon totes that are processed on the Tote Line are segregated in any way (i.e. by chemical type or hazard, tote color or type, label classification, etc.). Employees interviewed said that they process (i.e. dump and/or empty) between 115 and 200 totes per day on the Tote Line.

Although the plastic totes are not full in terms of liquid or solid capacity, measurable quantities of chemical(s) are present in each of the totes. Specifically, chemical residue and/or liquid are located in the bottom and sides of the plastic totes

in quantities ranging from trace amounts (film, residue, liquid covering, etc. that coats the bottom and sides of totes) to approximately one-inch (total height of all chemical remaining in tote). Although most of the totes contained one-inch or less of liquid, the CSHOs (Jason Reason and Laura Groom) observed multiple totes that contained more than one-inch of liquid (up to and including 2.5 to 3.0-inches of liquid). On August 31, 2010, the CSHO (Jason Reason) also observed the liquid inside of a 275-gallon plastic tote of YT-181 Methyl Tin Mercaptide vigorously moving and sloshing around while the tote was being unloaded and placed on the conveyor system.

Based on a standard 275-gallon and 330-gallon tote (approximately 46.0-inches and 54.0-inches high respectively), a plastic 275-gallon and 330-gallon tote would be approximately 2.17% and 1.85% full respectively if one-inch of chemical was located inside of the tote (NOTE: this percentage is based off of the total height of each of the totes). These plastic totes contain chemicals (some reagent grade (99-100%)), and a large percentage of these chemicals are moderately to highly toxic, flammable and/or reactive. These chemicals include, but are not limited to acids (hydrochloric, nitric, phosphoric, sulfuric, hydrofluoric, acrylic), caustics (sodium and potassium hydroxide, ammonia, ammonium bifluoride, amine-containing compounds), oxidizers (hypochlorites, peroxides), flammables/combustibles (acetone, alcohols, styrene, diacetyl), highly toxic single or multi organ/system substances (isocyanates, diacetyl, acrylic acids, phosphine, ammonia, chlorine), and suspected or confirmed carcinogens (benzene, nickel, formaldehyde, trichloroethylene). It should be noted that the chemicals listed in the parentheses in the previous sentence are not meant to be a complete list, and are only meant to serve as examples of chemicals the CSHO observed during the inspection found during the various days of air sampling at the facility, or while examining MSDSs. **Although these totes contained chemicals which were moderately to highly toxic, corrosive, flammable and/or reactive, the employer never performed any air sampling to determine employees' exposure to these various chemicals. Local exhaust ventilation (LEV) was also not installed on or near the areas where employees worked with or were exposed to these chemicals. Employees were also not required to and did not wear respirators while working with or around the areas where these chemicals were used or processed.**

Before the 275-gallon or 330-gallon plastic totes are recycled or shredded, they must be cleaned. Dock employees first manually pull and/or drag the totes from the conveyor system and onto a conveyor system. The conveyor system runs from the loading dock, through a hole in the East wall and ends on the left side of a elevated platform. While the totes are on the conveyor system and prior to them going through the hole in the East wall, dock employees unscrew and remove the plastic cap located on top of each of the totes. This elevated platform runs along most of the Tote Line and is constructed in an "U-shaped" pattern. The left and right sides of the elevated platform each measured approximately 368-inches (30.67-feet) long. The left side of the elevated platform was approximately 117.0-inches (9.75-feet) wide. The right side of the elevated platform was approximately 141.0-inches (11.75-feet) wide. The back side of the elevated platform measured approximately 396-inches (33.00-feet) long by 87.0-inches (7.25-feet) wide. The entire elevated platform was located approximately 55-inches (4.58-feet) above the floor.

After the labels and placards have been removed or treated with Dissolve II (a chemical stripper that is a Class II Combustible Liquid), employees push the totes to the far end of the left side of the elevated platform, which slightly tilts the totes downward towards the floor (See Pictures IMG_0018 and IMG_0020 - IMG_0022). A railing that runs the entire length of the left side of the elevated platform prevents the totes from being pushed off of the platform and onto the floor. Prior to the totes being completely pushed against the railing, an employee bends down and opens the valve located on the bottom of the tote. The employee fully opens the valve on each of the totes, which allows any liquid contained inside of the tote to flow out of the tote. After the valve has been fully open, the employee pushes the tote against or near the railing located on the far left side of the elevated platform. It should be noted that the liquid is flowing out of the tote the entire time the employee is pushing the tote towards the railing. Once the valve was opened, the CSHO observed on multiple days (August 26 and August 31, 2010) that some of the liquid contained in several of the totes emptied onto the elevated platform's floor, which consisted of steel grating, and onto the concrete floor located beneath the platform (near a floor drain that ran parallel to the left side of the platform).

Once the totes are positioned against or near the platform, the liquid contained inside of the totes flows out of the totes and into a trough. There are six troughs that run the entire length of the left side of the platform, and all of these troughs are positioned side-by-side and partially overlapped each other. All six of these troughs were attached to the outside edge of the elevated platform and sat just below the steel railing (See Pictures IMG_0059 and IMG_0063). All of the troughs were constructed of steel and measured 34.50-inches long by 12.50-inches wide by 5.50-inches deep. All of the troughs were located approximately 54.50-inches above the Tote Line floor. All of the troughs descended and fed into a circular opening which had a diameter of approximately 4.50-inches. The circular part located on the bottom of each trough was approximately 5.0-inches long.

55-gallon plastic drums were placed underneath the circular openings on the bottom of each trough to catch the liquid that flowed out of the totes. All of these 55-gallon plastic drums were completely open on top (i.e. no lid or cover in place). Due to the fact that the trough farthest from the conveyor system was not in use, only five 55-gallon plastic drums could be filled at one time. There was approximately 10-inches of open space (on all sides) between the bottom of the circular opening of each trough and the top of each drum. Each of the five 55-gallon drums were also spaced approximately 20-inches apart.

Once the valve is opened on each tote, it can take a few to several minutes for the liquid to drain into the 55-gallon plastic drums located beneath the troughs. The liquid from each of the totes generally flows at a steady rate into the drum(s). While the valve on the totes is open, employees will push the totes down the platform to make room for additional totes that need to emptied/processed. While the totes are being moved down the platform, the liquid contained inside of these totes continues

to flow out of the valve and into multiple troughs. Depending on how far the totes are pushed down the platform, the liquid contained in the totes can potentially flow into all five troughs. Thus, the liquid contained inside of each of the totes can potentially be emptied into all five 55-gallon drums located beneath each trough.

Each of the 55-gallon plastic drums remain underneath the troughs until they are between 75% and 95% full (approximately between 41.25-gallons and 52.25-gallons). Once the drums reach this level, employees place either a steel or plastic lid on top of the drums. Employees then manually secure the lid to the drum by applying a metal ring to the top of the drum. The metal ring is secured to the lid and the top of the drum by tightening a screw or bolt. Once the lid is secured to the top of the drum (i.e. bolt/screw tightened all the way), employees manually push the drums onto a two-wheel hand truck (dolly). Employees then transfer the sealed drums to a skid where the drums are shrink-wrapped and picked up by an outside contractor. Lewis Warren, Environmental and Regulatory Director, stated that he guesses that they produce approximately 80 drums per quarter (approximately 27 drums per month). Employees interviewed said that they seal an average of 2-4 drums per week (approximately 8-16 drums per month).

(a) None of the chemicals or drums are segregated in any way (i.e. by chemical type or hazard, tote color or type, label classification, etc.) prior to being emptied into the Regrind Flush Tank, and no precautions are taken to assure that incompatible chemicals do not mix together inside of the tank. Thus, all of the chemicals that are emptied from the various 55-gallon plastic and metal drums are mixed together inside of the Regrind Flush Tank. Because no procedures or systems are in place to segregate the drums prior to them being emptied, incompatible chemicals are frequently combined and mixed together inside of the Regrind Flush Tank.

Several incompatible chemicals are mixed together inside of the Regrind Flush Tank. Incompatible chemicals that are being mixed together inside of the Regrind Flush Tank include, but are not limited to strong acids mixed with strong bases, strong acids mixed with chlorinated and other oxidizers, strong acids mixed with flammable/combustible chemicals, water-reactive chemicals mixed with large amounts of water and metal-reactive chemicals poured over and on top of the steel grating located on top of the tank. Chemicals that are not supposed to be exposed to steam or high temperatures are also cleaned and rinsed via a 170 °F steam/water mixture or 300 °F steam on the Regrind Line. Employees interviewed said the worst reactions have occurred when adding acids to caustics, or whenever emptying drums that contained ammonium hydroxide or strong solvents like trichloroethylene. Most of the employees interviewed could not tell the CSHOs what specific chemicals (i.e. by name) caused the worst reactions when mixed together because employees were not provided effective Hazard Communication training, and were not aware of the identity or hazards of the chemicals that they worked with on their various jobs.

Employees interviewed said that several chemical reactions have occurred within the last 6-12 months due to mixing chemicals together in the Regrind Flush Tank. Employees interviewed said that the strongest chemical reactions on the Regrind Line occur when working with ammonia based chemicals like ammonium hydroxide, as well as strong solvents like trichloroethylene. Employees interviewed said that they have seen smoke and fumes coming from the grates and tank before, but they have learned to just live with it. Employees interviewed also said that gas clouds have been emitted from the tank on the Regrind Line, which caused all of the employees in or on the Regrind Line to evacuate the area because they could not take the smell of the gas. On June 10, 2010, the CSHO (Jason Reason) also observed a chemical reaction occurring while an employee was emptying and processing 55-gallon plastic and metal drums on the Regrind Line. Refer to MVI_0586 for the digital recording of this reaction.

(b) None of the plastic 275-gallon or 330-gallon totes that are processed on the Tote Line are segregated in any way (i.e. by chemical type or hazard, tote color or type, label classification, etc.). Thus, all of the chemicals that emptied from the totes and into the 55-gallon plastic drums are mixed together. Because no procedures or systems are in place to segregate the totes prior to them being emptied, incompatible chemicals are frequently combined and mixed together inside of the drums.

Several incompatible chemicals are mixed together inside of the open 55-gallon drums located beneath the troughs. Incompatible chemicals that are being mixed together inside of the drums include, but are not limited to strong acids mixed with strong bases, strong acids mixed with chlorinated and other oxidizers and strong acids mixed with flammable/combustible chemicals. Employees interviewed said the worst reactions inside of the drums have occurred when mixing acids and caustics. Most of the employees interviewed could not tell the CSHOs what specific chemicals (i.e. by name) caused the worst reactions when mixed together because employees were not provided effective Hazard Communication training, and were not aware of the identity or hazards of the chemicals that they worked with on their various jobs.

Employees interviewed said that several reactions have occurred inside of the 55-gallon drums located beneath the troughs due to incompatible chemicals being mixed together, especially prior to the red card system being implemented. Employees interviewed also said that prior to the red card system, they mixed "every type of chemical known to man" together in the 55-gallon drums. Employees interviewed said that chemicals with every placard were mixed together, including corrosives and chemicals with a "orange O placard" (oxidizer DOT placard). Employees interviewed said that they witnessed several reactions occur inside of the 55-gallon drums when chemicals were mixed together including, but not limited to large quantities of smoke (white, yellow) emitted from inside of the drum, spattering, crackling and bubbling of liquid inside of the drum, and over-pressurization of the drum once it is sealed. There is a designated work area located along the East wall of the Tote Line (Line 3), which is located approximately 28.0-inches to left of the 55-gallon plastic drums. Employees not only work around and/or in close proximity to these drums while they are being filled, but employees also seal and move these drums when they are full.

(a)-(b) Several incompatible chemicals are being mixed together inside of the Plant 4 Collection Tank, Regrind Flush Tank, and the open 55-gallon plastic drums located on the Tote Line. The mixture of all of these incompatible chemicals has the potential to create extremely violent chemical reactions. Most of the drums and/or totes that are processed and emptied on the Plant 4, Regrind and Tote Lines contain corrosives, oxidizers, and/or flammables/combustibles. The majority of the corrosives processed on the Plant 4, Regrind and Tote Lines are either strong acids (pH $\leq$ 2.0) or strong bases (pH $\geq$ 12.5). When strong acids and strong bases are mixed together, violent exothermic reactions take place which can release vast quantities of heat and pressure. Employees interviewed said that they witnessed splattering, crackling and bubbling of liquid inside of the tanks (Plant 4 and Regrind Lines) and drums (Tote Line). Employees interviewed also said that they witnessed an over-pressurization of the 55-gallon drums once they were sealed (NOTE: Occurred on the Tote Line - See Line 24 on this Worksheet). All of these observations were most likely due to exothermic reactions occurring inside of the Plant 4 Collection Tank and Regrind Flush Tank, as well as the open 55-gallon plastic drums located on the Tote Line.

Several chemical reactions, including exothermic reactions, can also generate and release dangerous quantities of hazardous decomposition products. Most of the drums and totes that are labeled as oxidizers which are processed on the Plant 4, Regrind and Tote Lines contain chlorinated chemicals. When chlorinated oxidizers and strong acids are mixed together, dangerous quantities of chlorine can be generated and released. Besides chlorine, other decomposition products that could potentially be released as by-products of chemical reactions that occur inside of the tanks or drums include, but are not limited to carbon monoxide, ammonia, phosgene, phosphine, hydrogen, hydrogen chloride (hydrochloric acid), hydrogen fluoride (hydrofluoric acid), hydrogen cyanide, dimethylethylamine, isocyanates, monoethanolamine, hydrogen sulfide, and oxides of nitrogen and sulfur ($NO_x$ and $SO_x$). Employees interviewed said that they sometimes witnessed large quantities of smoke emitted from inside of the drums and tanks. This indicates that chemicals (most likely in gaseous form) were being released from the surface of the liquid located inside of the drums and tanks, and into the environment in and around the drums and tanks.

**Although these chemical reactions generated and released potentially dangerous quantities of hazardous decomposition products, the employer never performed any air sampling to determine employees' exposure to these various hazardous decomposition products. LEV was also not installed on or near the areas where employees worked with or were exposed to these hazardous decomposition products. Employees were also not required to and did not wear respirators while working with or around the areas where these hazardous decomposition products were generated or emitted.**

b) Equipment: **Incompatible Chemicals Mixed Together that have the Potential to Produce Violent Exothermic Reactions and to Produce Dangerous Quantities of Hazardous Decomposition Products**
c) Location: (a) Regrind Line (Area); (b) Tote Line (Line 3)
d) Injury/Illness: (a)-(b) Death, severe eye, skin and respiratory burns and irritation
e) Measurements: Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines had **skin designations** per ACGIH and/or OSHA. Several of the chemicals contained in the drums and totes processed on the Plant 4, Regrind and Tote Lines could also produce **additive or synergistic effects** when exposures to these chemicals are combined

| 21. Photo Number | Location on Video |
|---|---|
| (a) IMG_0533-IMG_0535, IMG_0577 - IMG_0580, IMG_0587 - IMG_0589<br>(b) IMG_0016 - IMG_0022, IMG_0060 - IMG_0063, IMG_0071, IMG_0072, IMG_0078 - IMG_0093, IMG_0120 | (a) MVI_0586 - Reaction that CSHO Observed on the Regrind Line<br>(b) MVI_0079, MVI_0084, MVI_0089, MVI_0090, MVI_0091, MVI_0092 |

23. Employer Knowledge: (a)-(b) **On June 10, 2010, Lewis Warren, Environmental and Regulatory Director, stated that the only sampling they have performed was for methylene chloride, when they used it, and that was about 20-25 years ago. Lewis also stated that NIOSH did sampling for air and noise, and one OSHA inspection had sampled in the past. Lewis also stated that they have not performed any air sampling for anything, except for NIOSH, in the last five years.**

On May 19, 2010, the CSHO emailed Lewis Warren, Environmental and Regulatory Director, a Document Request Form that requested copies of all of the MSDSs for chemicals that had a health rating, flammability rating and/or reactivity rating above 3.0. On May 26, 2010, the CSHO returned to the facility to pick-up the MSDSs that the CSHO requested. Several of the MSDSs provided to the CSHO by Lewis Warren, Environmental and Regulatory Director, listed the chemicals as corrosive and/or permanently damaging to the eyes and/or skin. These MSDSs included but were not limited to the following: Four MSDSs for hydrochloric or muriatic acid, Twenty-Six MSDSs for sodium hydroxide or caustic soda, Four MSDSs for acetic acid, Eight MSDSs for potassium hydroxide, One MSDSs for ammonium hydroxide, One MSDS for ammonia, Seven MSDSs for phosphoric acid, Eight MSDSs for sulfuric acid, Three MSDSs for acrylic acid, Four MSDSs for 2-butoxyethanol, and Twenty MSDSs for other "non-common chemicals." Of the 113 MSDSs received from Lewis which were numbered by the CSHO for sampling purposes, 72 (63.72%) of these MSDSs were listed corrosive and/or permanently damaging to the eyes and/or skin. Of the 113 MSDSs received from Lewis which were numbered by the CSHO for sampling purposes, 44 (38.94%) of these MSDSs also contained one or more chemicals that had a skin designation per ACGIH and/or OSHA.

Each of the MSDSs listed previously list chemicals that should be avoided in terms of contact or mixing. Most of the chemicals to avoid (i.e. incompatible chemicals) are listed in the Stability and Reactivity Section on each of the MSDSs. The MSDSs for the acids (hydrochloric, sulfuric, phosphoric, acetic and acrylic) stated the following chemicals are incompatible with acids and/or contact with acids should be avoided: metals (alkali metals), water, bases (caustics, alkalies), strong oxidizing agents, reducing agents and anhydrides (acetic anhydride), amines and alcohols. The MSDSs for the caustics (sodium hydroxide (caustic soda), potassium hydroxide, ammonia, ammonium hydroxide) stated the following chemicals are incompatible with caustics (bases) and/or contact with caustics (bases) should be avoided: acids (strong and weak), strong oxidizers (sodium hypochlorite), metals (reactive, aluminum, zinc), trichloroethylene, halogenated compounds, ammonia solutions and organic amines. The MSDSs for the "non common chemicals" (MSDS #152 - MSDS #172) stated the following chemicals are incompatible with these chemicals and/or contact with these chemicals should be avoided: acids (strong and weak), bases (strong and weak), strong oxidizers, active metals, reducers, combustible materials, chlorinated and fluroinated hydrocarbons and amines.

Several of the acidic MSDSs (Muriatic Acid 20 Deg - MSDS #174, Praylon Phosphoric Acid - MSDS #178,Galaxy Phosphoric Acid - MSDS #179, Hydrite Sulfuric Acid - MSDS #188, and Sulfuric Acid 66 Deg - MSDS #192) also contained statements such as, but not limited to the following: "contact with water may cause violent reaction with the evolution of heat," "may react violently with incompatible substances, releasing large amounts of heat," "be cautious in mixing with strong bases because high heat of reaction can generate steam," "contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide, potassium hydroxide, calcium hydroxide, cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors,""contact with water may cause violent reaction with evolution of heat." These statements can be found in the Stability and Reactivity Section on each of these MSDSs (Section 10 on most MSDSs).

Several of the caustic MSDSs (VSA-38 Sodium Hydroxide - MSDS #117, Univar Caustic Soda Liquid - MSDS #119, Texolite 1391SL - MSDS #121, Nalco PG9534 - MSDS #122, PPG Liquid Caustic Soda 50% - MSDS #123, DuPont Sodium Hydroxide 50% Solution - MSDS #126, Nalco Sodium Hydroxide - MSDS #127, Neutralizer 500 - MSDS #131, Primer 40 - MSDS #139, PARCO Cleaner 319 - MSDS #144, and Fremont 752 - MSDS #145) also contained statements such as, but not limited to the following: "mixing with water, acids or incompatible materials may cause splattering and the release of large amounts of heat," "reacts violently with acid," "contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors," "contact with organic materials and concentrated acids may cause violent reactions," "reaction with water produces heat," and "adding water to this product may cause localized overheating and splattering." These statements can be found in the Stability and Reactivity Section on each of these MSDSs (Section 10 on most MSDSs).

Several of the other MSDSs (p-Toluenesulfonic Acid - MSDS #2, Piperidine - MSDS #17, Fisher Scientific Acetic Anhydride - MSDS #35, LUPEROX DI - MSDS #87, 2-Ethyl-4-Methylimidazole S - MSDS #112) also contained statements such as, but not limited to the following: "DO NOT add water to the product; add product to water to avoid any exothermic reactions," "this material will react vigorously with oxidizing agents and strong acids," "reacts with water to generate acetic acid and much heat," "contact with foreign materials, such as, strong acids, alkalis, oxidizers, reducing agents, amines and accelerators/promoters may result in a violent decomposition reaction or in product degradation," and "strong exothermic reaction with acids." These statements can be found in the Stability and Reactivity Section on each of these MSDSs (Section 10 on most MSDSs).

Several of the MSDSs stated that the following hazardous decomposition products could be generated or released as a result of chemical reactions (Refer to Stability and Reactivity Section on each of these MSDSs (Section 10 on most MSDSs)):

- Ammonia - MSDSs #32, #93, #150, #151, #198, #208
- Carbon Monoxide - MSDSs #26, #35, #40, #41, #50, #51, #57-#59, #60, #66-#68, #70, #80, #81, #83, #86, #89, #90, #94, #95, #104, #107, #109, #118, #122, #127, #142, #143, #145-#148, #150, #152, #153, #155, #159, #160, #172, #177, #179, #183-#187, #194, #195, #202, #203, #208-#211, #213, #214, #218, #219
- Chlorine - MSDSs #91, #99, #100, #142, #154, #174
- Formaldehyde - MSDSs #30, #83
- Hydrogen (Gas) - MSDS #85, #86, #99. #117, #119, #121, #126, #132, #146-#148, #174, #188, #192
- Hydrogen Chloride - MSDSs #29, #44, #45, #46, #49, #52, #53, #68, #83, #91, #142, #161, #171, #174-#176, #201
- Hydrogen Cyanide - MSDSs #40, #50, #67, #70, #80
- Hydrogen Fluoride - MSDSs #48, #77, #93, #164
- Hydrogen Sulfide - MSDS #77, #153, #198
- Isocyanates - MSDS #40
- Phosphine - MSDSs #26, #34, #61, #62, #106, #159, #160
- Phosgene - MSDSs #49, #61, #62, #68, #142

The following statements were also made in various MSDSs: "decomposed by strong acid to release formaldehyde, liberates formaldehyde when acidified" (MSDS #30); "will decompose on contact with caustic materials liberating dimethylethylamine gas which is highly flammable" (MSDS #31); "thermal decomposition may evolve phosphine gas, oxides of phosphorus and various phosphoric acids" (MSDS #34); "contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions, and/or toxic vapors" (MSDS #47); "hydrogen fluoride will react with cyanide salts to generate poisonous hydrogen cyanide gas, will react with sulfides to

produce posionous hydrogen sulfide gas" (MSDS #77); "contact with metals can librate flammable hydrogen gas" (MSDS #85); "contact with foreign materials, such as, strong acids, alkalis, oxidizers, reducing agents, amines and accelerators/promoters may result in a violent decomposition reaction or in product degradation" (MSDS #87); "**DANGER! - STATEMENT OF HAZARDS**: Alkaline product containing sodium hypochlorite, reacts vigorously with reducing agents and acids possibly forming heat and toxic gas" (MSDS #91); "may react violently with strong acids producing chlorine gas, which is toxic" (MSDS #99); "reacts with hypochlorite or other halogen sources (chlorine, bromine, iodine, etc.) to form explosive compounds that are sensitive to pressure or increases in temperature" (MSDS #151); "acidification releases flammable toxic gases" (MSDS#153); and "Warning! Mixing with incompatible materials may produce sulfur dioxide, hydrogen sulfide, nitrous oxides, and ammonia vapors" (MSDS #198).

On November 16, 2010, Lewis Warren, Environmental and Regulatory Director, stated that there is no set schedule of what drums they get in. Lewis also stated that they do not separate by anything including category, label or chemical type. Lewis also stated that the most hazardous drums they get in would be corrosives, skin irritants and burns caused by corrosive material. Lewis also stated that he was not sure if any of the chemicals in the drums have additive or synergist effects.

(a) Tim Barkdull, Regrind Foreman (Supervisor), stated that several acids are processed on the Regrind Line, but they mostly process acrylic acid and that is the acid he is most familiar with. Tim also stated that the most common drums processed on the Regrind Line are caustics, and they get a lot of acetics (acetic acid) on the Regrind Line. Tim also stated that they process the following chemicals and quantities on the Regrind Line: hydrochloric acid - 1-2 drums per day, acetic acid - 25 drums per day, acrylic acid - 10 drums per day, sulfuric acid - 1-2 drums per day, caustics - 10 drums per day and formaldehyde - 5-10 drums per day. Tim also stated that they can possibly process or have processed the following chemicals: caustic soda, phosphoric acid, hydrogen peroxide, isopropyl alcohol, toluene, caustics, corrosives, flammables and acetic anhydride. Tim also stated that he did not recall or remember the names of chemicals like trichloroethylene, percholoethylene or ethanolamine, so he did not want to say yes or no as to whether or not those drums are run on the Regrind Line.

On September 23, 2010, the CSHO interviewed Tim Barkdull, Regrind Foreman (Supervisor), and asked him if hydrochloric acid drums are processed and emptied on the Regrind Line and Tim stated ed "yes." During this same interview, Tim also stated that he did not know if they run caustic soda and acid at the same time or near each other, but its possible. Tim further stated that they may run corrosives together, but if they do it is not planned. Tim further stated that there is no procedure or anything in place to prevent drums of any type from being mixed together.

(b) On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum.

On August 31, 2010, the CSHOs spoke with and interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) asked Jerry if any reactions or anything unusual has happened prior to or while moving any of the 55-gallon drums underneath the troughs. Jerry Spegal, Tote Supervisor/Manager, stated that "nothing unusual has happened" and that the drums "normally do not leak, but they can leak sometimes." During this interview, Jerry also stated that the only non-hazardous chemicals are contained inside of the drums and that he did not the hazards of the chemicals contained inside of the drums.

On September 17, 2010, the CSHOs (Jason Reason and Laura Groom) spoke with and re-interviewed Jerry Spegal, Tote Supervisor/Manager. During this interview, the CSHO (Jason Reason) again asked Jerry if any reactions or anything unusual has happened while moving any of the 55-gallon drums underneath the troughs. Jerry responded and said nothing unusual has happened while moving the drums. Upon hearing this, the CSHO (Jason Reason) asked Jerry if nothing unusual has happened, why are several employees telling the CSHOs that a drum exploded a week before the CSHOs began looking at the Tote Line? Jerry answered by stating that they have had a drum leak before because the lid was not on tight enough. Jerry stated that a month ago (1st - 2nd week of August 2010), the lid came off of a drum when he tipped it back with the dolly. Jerry further stated that he guessed drums could build up a little pressure because drums, in general, can have pressure even when they are empty, but he thought that the word "exploded was dramatic." Jerry stated that the pressure contained and released from a drum would be "like a pop can." During this interview, Jerry also stated that he did not know exactly what chemicals were contained inside of the drum, but they were non-hazardous.

On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that the lid on the drum "popped" back towards him because he did not fasten it well enough. However, several employees interviewed who were working close to where the 55-gallon plastic drums are located said that the metal ring holding the lid on the drum that exploded was tightly fasten and Jerry (Spegal) tightened the bolt on the ring before moving the drum. During this discussion/interview, Jerry also stated that about one-quarter of the liquid came out of the drum and that the incident occurred in the area where the drums sit. It should be noted that most of the employees interviewed who observed or heard about the incident said that more than one-quarter of the liquid came out of the drum (See paragraphs below). Jerry also stated that not a lot of the liquid from inside of the drum got on his body or arms, and he washed himself off underneath the emergency eyewash/shower combination located on the back side of the Tote Line. Jerry also stated that Erick and Lewis asked him why he was all wet, so he told them what happened. Jerry also stated that he told Ray (Plant Manager) about what happened. Jerry also stated that he did not experience any injuries

from the incident and he did not go to the doctor to get checked out. Jerry also stated that the chemicals that spilled out of the drum were cleaned up by Arjel and Mark. Jerry stated that Arjel and Mark used shovels to put the stuff back into the drum, and it took a couple of minutes to clean up the area where the drum spilled. It should be noted that although most of the employees interviewed said that Arjel and Mark cleaned up after the incident, these employees said that the chemicals and liquids that came out of the drum were cleaned up using a hose to wash/push the chemicals into the drain.

On September 17, 2010, Jerry Spegal, Tote Supervisor/Manager, also stated that employees did the same thing as now before the red card system was put in place. Jerry also stated that they dumped the chemicals from the totes into the wastewater treatment system, and they never dumped corrosives into the 55-gallon drums. Upon hearing this, the CSHO (Laura Groom) asked Jerry how could he say that when the dock employees remove the labels from the totes prior to them being emptied? Jerry responded by stating that "it is possible to mix corrosives in the drums because the labels can be removed from the totes by Bruce (Wadlington), and Willie (Quinn) would not know what chemical was in the tote because there was no label (on the tote)."

On September 17, 2010, Lewis Warren, Environmental and Regulatory Director, stated that "everything (from inside of the totes) was dumped into the 55-gallon drums before the red cards, but they were not supposed to (be dumped into the drums)." When the CSHO (Laura Groom) asked if the red tags were started after IOSHA showed up, Lewis stated that "yes, but the concept was always there and they are always trying to improve." When the CSHO asked Lewis if any chemicals, including corrosives, that were contained inside of the totes were dumped or mixed together inside of the 55-gallon drums, Lewis stated that employees may have dumped corrosives into the same drum. Wes Ledbetter, Complex Administrator, then stated that this "did happen, but employees changed the process and dumped (these chemicals) into the drums." Wes also stated that "the labeling was removed by Bruce (Wadlington), so employees did not know what was in the totes." When the CSHO asked Lewis and Wes if employees were disciplined for mixing all of the chemicals from the totes into the drums, Lewis stated that "employees were not disciplined for mixing chemicals in the drums in the past, but going forward they will be disciplined (for this practice)."

24. Comments (Employer, **Employee**, Closing Conference): Summaries of the reactions that occurred on the Plant 4, Regrind and Tote Lines documented during employee interviews can be found in the various paragraphs listed in the next section of this worksheet (Line 25). Other information gathered during employee interviews is included in Line 20 of this worksheet.

(a)-(b) **Several employees interviewed said that the employer has never performed any air sampling for any of the chemicals they work with or are exposed to.** Several employees interviewed also said that they do not know what chemicals they are working with or around, or the hazards associated with the chemicals they work with. Only three of the fourteen employees interviewed (approximately 21%) knew what a MSDS was or what information was contained on a MSDS, but none of the employees interviewed knew where the MSDSs were kept. Some employees interviewed said that they were told that they could not get MSDSs for the stuff coming in because the employer said that they do not store it and the containers are empty. These employees interviewed also said that they can only get MSDSs for the stuff they store and the employer tells them this every year at the safety meeting. These employees interviewed also said that they do not ask for a MSDS because they feel like it will not do any good.

25. Other Employer Information: Reactions that have occurred on the Plant 4 Line, Regrind Line (Area) and/or Tote Line (Line 3) include, but are not limited to the following:

(a) On June 10, 2010, the CSHO (Jason Reason) observed a chemical reaction occurring while an employee was emptying and processing 55-gallon plastic and metal drums on the Regrind Line. This reaction was also recorded by the CSHO using the movie feature on his digital camera (Refer to MVI_0586 for the digital recording of this reaction). All of the 55-gallon plastic drums that the employee processed were not empty and contained some liquid and/or solid residue. Liquid can be seen coming from the drums on the CSHO's movie when the drums are tipped over and emptied into the Regrind Flush Tank. The employee first emptied and placed five 55-gallon plastic drums which contained Eastman Glacial Acetic Acid onto the five nozzles located near the back of the tank/platform. The employee then emptied and placed a steel 55-gallon drum which contained Miller Creslube 100-N onto the sixth nozzle located in the middle of the tank/platform. The employee then emptied and placed a plastic 55-gallon drum which contained Dow Chemical Monoethanolamine on the seventh nozzle located in the middle to front of the tank/platform. When the Dow Chemical Monoethanolamine was initially added to the Regrind Flush Tank, the CSHO observed whitish smoke and/or fumes emitted from above the steel grate located to the right of the seventh nozzle (Refer to MVI_0586 - Three minutes twenty-eight seconds (3:28) into video). After the 55-gallon drum of Dow Chemical Monoethanolamine was completely emptied and set on top of the seventh nozzle, white smoke and/or fumes were emitted above and on all sides of the eighth and ninth nozzles (Refer to MVI_0586 - Three minutes thrity-four seconds (3:34) into video). At this time, no drums were placed on top of the eighth or ninth nozzles and the amount of white smoke and/or fumes generated and the reaction speed vastly increased. Approximately 14 seconds after the CSHO first observed the white smoke and/or fumes being emitted from the Regrind Flush Tank, the employee emptied and placed a 55-gallon plastic drum which contained Cognis Deriphat 160C onto the eighth nozzle located neat the front of the tank/platform. Vast amounts of white smoke and/or fumes continued to be emitted from the Regrind Flush Tank, but the amount of white smoke and/or fumes generated and the reaction speed vastly increased after the employee added the 55-gallon drum of Cognis Deriphat 160C to the tank (Refer to MVI_0586 - Three minutes fifty seconds (3:50) into video). Approximately 43 seconds after adding the 55-gallon drum of Cognis Deriphat

160C to the tank, the employee emptied and placed two 55-gallon plastic drums which contained Eastman Glacial Acetic Acid onto the final two (ninth and tenth) nozzles located near the front of the tank/platform. As these last two drums were emptied into the Regrind Flush Tank, white smoke and/or fumes continued to be emitted from the tank. It should be noted that all of the white smoke and/or fumes that were emitted from the Regrind Flush Tank were blown directly into the employee's breathing zone by a ceiling fan which was mounted on the wall near the front of the elevated platform. It should also be noted that prior to, during or after the reaction occurred, the employee followed the procedure listed previously, did not do anything out of the ordinary and was not corrected or spoken to by the management official that accompanied the CSHO (Wes Ledbetter, Complex Administrator).

The seven 55-gallon plastic drums of Eastman Glacial Acetic Acid contained 100% acetic acid, a weak acid with a pH of 2.4. The 55-gallon steel drum of Miller Creslube 100-N contained 95% mineral oil. The 55-gallon plastic drum of Dow Chemical Monoethanolamine contained 99% monoethanolamine, a strong base with a pH of 12.6. The 55-gallon plastic drum of Cognis Deriphat 160C contained 31% sodium lauriminodipropionate. As stated previously, the CSHO first noticed the white smoke and/or fumes when the drum of monothanolamine was emptied into the Regrind Flush Tank. According to the MSDSs, monothanolamine is incompatible with strong acids and may potentially react violently with various halogenated organic solvents, resulting in temperature and pressure increases. The MSDSs also state that monothanolamine should not be exposed to elevated temperatures or moisture. However, the monothanolamine that was added to the Regrind Flush Tank was exposed to water (hot and ambient), as well as heated steam.

The white smoke and/or fumes emitted from the Regrind Flush Tank were not steam and were emitted as the result of a chemical reaction. Due to the fact that the CSHO (Jason Reason) was on the platform while this reaction was occurring, the CSHO was directly exposed to the products of this chemical reaction (without a respirator). On previous inspections, the CSHO has been exposed to steam and unlike steam, the white fumes and/or smoke emitted from the tank severely irritated the CSHO's mucous membranes (especially the eyes and nose) and respiratory system. The white smoke and/or fumes also had an ammonia-like odor and severely burned and irritated the CSHO's throat. As a result of being exposed to this white smoke and/or fumes, the CSHO (Jason Reason) experienced severe eye, nasal and respiratory irritation that lasted multiple days after the CSHO was removed from the exposure. It should be also be noted that on September 23, 2010, Tim Barkdull, Regrind Foreman (Supervisor), stated that there should never be any smoke, even when the steam is turned on, coming from the tank or while the Regrind Line is running. During this conversation/interview, Tim also stated that he has never seen any smoke coming from the tank where the drums are dumped on the Regrind Line and if any smoke was coming out of the tank it would be considered "out of the ordinary."

Although steam is used on the Regrind Line to clean and flush the drums, the steam was not turned on while the employee was emptying and placing the drums on the nozzles. In fact, the employee can be seen pushing the button to turn the steam on in the CSHO's video (Refer to MVI_0586 - Four minutes forty-six seconds (4:46) into video). The amount of white smoke and/or fumes generated from the Regrind Flush Tank also actually increased when the steam was turned on (Refer to MVI_0586 - Four minutes fifty-one seconds (4:51) into video). Thus, the heat emitted from the steam actually caused the reaction to not only continue, but also to increase in terms of the amount of reaction products generated and the speed at which they were generated into the ambient environment.

Based on all of this information, the CSHO believes that the CSHO witnessed and was exposed to a chemical reaction caused by mixing incompatible chemicals into the Regrind Flush Tank on June 10, 2010. Based on the documents (MSDSs, articles, TLV documentation, etc.), as well as the CSHO's observations, symptoms experienced during exposure and expertise/knowledge, the CSHO believes that the white smoke and/or fumes emitted as a by-product of the chemical reaction were either ammonia or monoethanolamine. The odor thresholds for ammonia and monoethanolamine are 5.0 ppm and 2.0 ppm - 25.0 ppm respectively. Both ammonia and monoethanolamine have TLV-STELs that address the acute effects associated with these chemicals. The 2010 TLV-STELs for ammonia and monoethanolamine are 35.0 ppm and 6.0 ppm respectively. The TLV Basis for the ammonia TLVs are eye damage and upper respiratory tract irritation. The TLV Basis for the monoethanolamine TLVs are eye and skin irritation. Based on the corresponding symptoms associated with the odor thresholds and the TLVs Basis and Documentation, the CSHO believes the white smoke and/or fumes emitted from the Regrind Flush Tank were most likely monoethanolamine rather than ammonia. It should be noted that monoethanolamine has poor warning properties due to the fact that the odor threshold (2.0-25.0 ppm) includes and exceeds the TLV and TLV-STEL (1-8 times the TLV, 1-4 times the TLV-STEL). Although the CSHO was not able to perform air monitoring during this chemical reaction, the CSHO believes both he and the employee were exposed to monoehtanolamine above the TLV-STEL. This belief is based on all of the information listed in this and previous paragraphs.

(b) On or about the second week of August 2010 (August 9-13, 2010), an incident occurred while an employee was moving a 55-gallon plastic drum from underneath one of the troughs. Jerry Spegal, Tote Supervisor/Manager, had sealed and was in the process of moving a 55-gallon plastic drum located underneath one of the troughs when the liquid inside of the drum ended up on the floor. All of the employees who work on or near the Tote Line that the CSHO spoke with and/or interviewed confirmed that liquid was spilled out of the drum. However, Jerry Spegal's explanation and employees' observations of how the liquid escaped the confinement of the drum and ended up on the floor vary widely.

One employee interviewed said that the drum that Jerry (Spegal) was moving was really full of liquid and the chemicals inside of the drum had actually formed layers similar to oil and water. This employee said that Jerry screwed a white lid down tight on top of the drum and then used a dolly to move it. This employee said that Jerry really sloushed the liquid inside

of the drum around while moving it, and this sloushing probably mixed the layers of chemicals inside of the drum. This employee said that when Jerry was moving the drum on the dolly, the white lid swelled upward and looked like it was "pregnant." This employee said that they have seen drums swell up before after they are sealed, but the employer normally puts them off to the side and checks them. This employee said that after they saw the lid swell, Jerry got five steps and then they heard a "boom." This employee said the lid exploded, blew off of the drum and ended up about 6-7 feet away from the drum. This employee also said that the lid came close to hitting Jerry when it blew off the drum. This employee said the chemicals/liquids inside of the drum shout about 3-4 feet in the air, and all of the chemicals/liquids inside of the drum ended up on the floor and/or outside of the drum (i.e. the whole drum spilled). This employee also said that the chemicals inside of the drum were light colored. This employee also said that Jerry was covered in the chemicals/liquids that exploded and came out of the drum and he ran to the eyewash to was his head and eyes off.

Another employee interviewed said that although he did not see the "drum incident," Jerry Spegal and Arjel Boone told them about it. This employee said that Jerry (Spegal) told them that the top of the drum started swelling and when Jerry saw this he got out of the way. Jerry then told this employee that after he got out of the way, the top of the drum blew off and stuff from inside of the drum got all over him. Jerry also told this employee that the stuff from the drum could have got him in the face. This employee interviewed also said that Jerry had to change clothes after this "incident" because his clothes were soaked.

Other employees interviewed said that they observed the lid of the 55-gallon drum rise while Jerry Spegal was moving it. These employees said that the liquid inside of the drum exploded out of the drum and got all over Jerry (Spegal). These employees said that the lid on the drum popped off and between one-half and one-third of the liquid inside of the drum ended up outside of the drum. These employees also said that some of the liquid got on Jerry.

Some of the employees interviewed said that the most recent "drum incident" occurred because the drum was sealed with a plastic lid and not a steel lid. All of the drums are sealed with some type of lid which is secured to the top of the drum with a metal ring. The metal ring must be manually tightened by a screw or bolt to the desired tension. The plastic lid used to seal the drum that "exploded" does have less strength and greater flexibility as compared to that of a steel lid. Consequently, the amount of pressure and/or force required to deform a plastic lid is much less than the pressure and force required to deform a steel lid. However, regardless of the type of lid used to seal the drum, the lid will always be the weakest structural point of the drum (assuming there are no holes or tears in the drum walls). Thus, once the pressure inside of the drum exceeds the maximum containment pressure of the drum, the pressure will be relieved through the drum's weakest structural point.

The CSHO believes that the lid on top of the 55-gallon plastic drum became detached because it was not designed to dissipate or handle the increasing pressure inside of the drum. Based on employee interviews and the CSHOs' own observations and documentation, chemicals such as, but not limited to acids, caustics (bases), oxidizers, flammables/combustibles and carcinogens (confirmed and possible) are being mixed together inside of the 55-gallon plastic drums. When incompatible chemicals are mixed, by-products of this reaction can include heat (exothermic reaction). Any heat produced from exothermic reactions inside of the drums would begin to heat the air at and around the surface of the liquid. The air at and around the surface of the liquid would continue to increase in temperature, and would begin to rise (i.e. hot air rises) and be released into the atmosphere directly above the drum. When the drums are open underneath the troughs, any heat or pressure created by chemical reactions can be released into the surrounding atmosphere (i.e. volume of container is essentially constant). However, once the drums are sealed, any heat or pressure created by chemical reactions are confined to limited volume of the drum (i.e. volume of container is fixed).

Based on Gay-Lussac's Law, the pressure of a gas is directly proportional to the gas's temperature ($P_1/T_1 = P_2/T_2$). In other words, if the temperature of a gas increases, then the pressure of a gas also increases. Based on Boyle's Law, the pressure of a gas is inversely proportional to the gas's volume ($P_1*V_1 = P_2*V_2$). In other words, if the volume that a gas occupies decreases, then the pressure of a gas will increase. Due to the exothermic reaction that most likely occurred inside of the 55-gallon drum, the temperature of the air located in the head space of the drum increased. When the drum was sealed with a lid, the volume that the gas inside of the drum could occupy decreased. The combination of these two factors (increase in temperature and decrease in volume) increased the pressure of the air trapped inside of the drum at a rate proportional to the temperature rise and inversely proportional to the decreased volume. The pressure of the air inside of drum continued to increase until it approached the containment pressure (i.e. breaking point) of the drum. This is what employees meant when they told the CSHO that the top of the drum and lid swelled and looked "pregnant." Once the containment pressure was exceeded, the built-up pressure inside of the drum was relieved through the drum's weakest structural point (the lid). The escaping pressure would have taken a large quantity of the liquid inside of the drum with it, which resembles Jerry Spegal's statement that the liquid came out of the drum like a "pop can that was shaken up and then opened."

Based on all of the information listed above, the CSHO believes that employees observed and were exposed to an exothermic reaction which increased the pressure (of the air) inside of the 55-gallon plastic drum. This increase in pressure ultimately resulted in the drum releasing the built-up pressure in the form of what resembled an explosion, which exposed employees to the unknown chemical mixture that was contained inside of the 55-gallon plastic drum.

| 26. Classification: | | | | |
|---|---|---|---|---|
| Serious | Knowledge | S or O | Repeat? | Willful? |

| | | | | |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **7,000.00** | | |

U. S. Department of Labo(
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:56PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 019(a) |
| Number Exposed | 72 | No. Instances | 2 | REC | |
| Std. Alleged Vio. | 1910.141(g)(2) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| **Abatement Documentation Required** | **Date Abated** | **Date Verified** | |
| Yes | | | |

| MULTISTEP | | | | |
|---|---|---|---|---|
| Type | Days | Due Date | Track | Completed Code |
| | | | | |

| | | |
|---|---|---|
| Substance Codes | 1430 | HYDROGEN CHLORIDE |
| Substance Codes | 1860 | NITRIC ACID |
| Substance Codes | 2310 | SULFURIC ACID |
| Substance Codes | 2460 | TOLUENE - SKIN |

AVD/Variable Information:

29 CFR 1910.141(g)(2): Employees were permitted to consume food or beverage in area(s) exposed to toxic materials:

a) Break Room - On July 15, 2010, wipe samples were conducted on the surface of the tabletop located directly in front of the Quastar Microwave, the surfaces of two tabletops where employees eat and drink, and the surface of the refrigerator located underneath the freezer door. The amounts of hydrochloric acid found on these wipe samples ranged from 25.1 $\mu$g to 270 $\mu$g, approximately 10.0 to 82.8 times the limit of quantification (LOQ) of 2.5 $\mu$g. The amounts of nitric acid found on these wipe samples ranged from 46.0 $\mu$g to 70.3 $\mu$g, approximately 9.2 to 14.1 times the LOQ of 5.0 $\mu$g. The amounts of sulfuric acid found on these wipe samples ranged from 10.6 $\mu$g to 20.5 $\mu$g, approximately 2.1 to 4.1 times the LOQ of 5.0 $\mu$g.

b) Break Room - On July 15, 2010, wipe samples were conducted on the surface of the tabletop located between two of the microwaves, the surface of a tabletop where employees eat and drink, the surface of the refrigerator located underneath the freezer door, and the surface of the first Mountain Dew button located on the Pepsi vending machine. The amounts of toluene found on these wipe samples ranged from 23.5 $\mu$g to 38.0 $\mu$g, approximately 1.6 to 2.5 times the LOQ of 15 $\mu$g.

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | 5,000.00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | | | |
|---|---|---|---|---|---|
| Occupation | Label Remover | Employer | Indianapolis Drum Service | | |
| Duration | 5 months | Frequency | 30-60 min/day | | |
| Employee Name | Willie Quinn | | | | |
| Address | 3514 North Terrace Avenue<br>Indianapolis, IN 46218 | | Phone | (317) 413-4375 | |
| Occupation | Label/Adhesive Remover | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 30-60 min/day | | |
| Employee Name | Hugh Inman | | | | |
| Address | 2933 Percheron Street<br>Indianapolis, IN 46227 | | Phone | (317) 295-2334 | |
| Occupation | Flusher | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 30-60 min/day | | |
| Employee Name | Wayne Hudgins | | | | |
| Address | 1407 South Oxford Street<br>Indianapolis, IN 46203 | | Phone | (317) 787-2254 | |
| Occupation | Pressure Washer | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 30-60 min/day | | |
| Employee Name | Wayne Turner | | | | |
| Address | 1218 State Avenue<br>Apt. 1<br>Indianapolis, IN 46203 | | Phone | | |

Instance Description: A. Hazard B. Equipment C. Location D. Injury/Illness E. Measurements

| 4. Date/Time |
|---|
| (a)-(b) 8/9/10 10:30 am |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: (a)-(b) On July 15, 2010, the CSHOs (Jason Reason and Laura Groom) performed wipe sampling on several of the surfaces located inside of the Break Room. Due to the variety of chemicals used, emptied, and/or processed throughout the facility, the CSHOs could not identify specific chemicals which could be present on the various surfaces in the Break Room. Thus, the CSHOs did not perform wipe sampling to determine if a specific chemical was present on a surface. Rather, the CSHOs performed wipe sampling to determine if multiple chemicals were present on a surface. After discussing this issue with the laboratory (Analytics Corporation), the CSHO (Jason Reason) decided to perform three different types of wipe sampling to detect three different classes of chemicals (solvents, metals and acids). In all, the CSHOs took twelve wipe samples to determine if the surfaces where employees were eating and/or drinking were as free as practicable from accumulations of any identifiable hazardous chemicals. While performing each wipe sample, the CSHOs used a wipe sampling template from the OSHA Technical Manual that limited the wipe sample area to the required 100 $cm^2$. The CSHOs also wore nitrile gloves while performing each wipe sample. To prevent any cross-contamination from occurring between wipe samples, the CSHOs used a new wipe sampling template for each wipe sample, as well as changed gloves in between wipe samples (i.e. wore a new pair of gloves for each wipe sample).

The CSHO (Laura Groom) took four wipe samples to determine if any metals (particulates, dusts, etc.) were present on surfaces where employees were eating or drinking in the Break Room. All four of these wipe samples were taken with Ghost Wipes and were analyzed for the chemicals contained in the laboratory's "Toxic Metal Profile." These four wipe samples were taken on the following surfaces in the Break Room: surface of tabletop located directly in front of the Quastar Microwave (Wipe-1); surfaces of two tabletops where employees eat and drink (Wipe-2 & Wipe-3); and the outside surface of the freezer handle (Wipe-4). No detectable concentrations or quantities of metals were found on any of the four wipe samples (i.e. all metals analyzed on each of the four of the wipe samples was below the limit of detection (LOD)).

The CSHO (Jason Reason) also took four wipe samples to determine if any acids were present on surfaces where employees were eating or drinking in the Break Room. All four of these wipe samples were taken with the back-up pads located inside of MCEF cassettes and were analyzed for the chemicals contained in the laboratory's "Acid Profile." Per the laboratory's instructions, all of the back-up pads were wetted with deionized water prior to taking each wipe sample and the CSHO sent an unopened MCEF cassette to the laboratory to serve as a blank. These four wipe samples were taken on the following surfaces in the Break Room: surface of tabletop located directly in front of the Quastar Microwave (Wipe-5); surfaces of two tabletops where employees eat and drink (Wipe-6 & Wipe-7); and the surface of the refrigerator located underneath the freezer door (Wipe-8). Detectable concentrations or quantities of hydrochloric acid and nitric acid were found on all four of the wipe samples. Detectable concentrations or quantities of sulfuric acid were found on two of the wipe samples (Wipe-5 and Wipe-8). Refer to the table below for the specific quantities of hydrochloric acid, nitric acid and sulfuric acid found on these wipe samples. Although detectable quantities of hydrochloric acid and sulfuric acid were found on the blank, all of the hydrochloric acid and sulfuric acid quantities found on the wipe samples were 1.6 to 10.5 times higher than the quantities found on the blank.

The CSHOs (Jason Reason and Laura Groom) also took four wipe samples to determine if any solvents were present on surfaces where employees were eating or drinking in the Break Room. All four of these wipe samples were taken with the back-up pads which were once located inside of 3M charcoal badges. The back-up pads were removed by the laboratory and sent directly to the CSHO in a plastic bag. The back-up pads were only removed from the plastic bag just prior to performing the wipe sampling and were only exposed to the ambient atmosphere for approximately 20-30 seconds (includes opening bag, wipe sampling and placing back-up pads inside of vile). These four wipe samples were taken on the following surfaces in the Break Room: surface of tabletop located between two microwaves (Wipe-9); surface of tabletop where employees eat and drink (Wipe-10); surface of refrigerator located underneath the freezer door (Wipe-11); and surface of first Mountain Dew button located on the Pepsi vending machine (Wipe-12). Detectable concentrations or quantities of toluene were found on three of the four wipe samples (Wipe-9, Wipe-11 and Wipe-12). Refer to the table below for the specific quantities of toluene found on these wipe samples.

| Substance | Sample Number | Quantity Found on Wipe Sample | Limit of Detection (LOD) | How Much Over LOD |
|---|---|---|---|---|
| Hydrochloric Acid | Wipe-5 | 207 µg | 2.5 µg | 82.8 |
| Nitric Acid | Wipe-5 | 70.3 µg | 5 µg | 14.1 |
| Sulfuric Acid | Wipe-5 | 20.5 µg | 5 µg | 4.1 |
| Hydrochloric Acid | Wipe-6 | 25.1 µg | 2.5 µg | 10.0 |
| Nitric Acid | Wipe-6 | 54.4 µg | 5 µg | 10.9 |
| Hydrochloric Acid | Wipe-7 | 28.1 µg | 2.5 µg | 11.2 |
| Nitric Acid | Wipe-7 | 60.6 µg | 5 µg | 12.1 |
| Hydrochloric Acid | Wipe-8 | 31.2 µg | 2.5 µg | 12.5 |
| Nitric Acid | Wipe-8 | 46.0 µg | 5 µg | 9.2 |
| Sulfuric Acid | Wipe-8 | 10.6 µg | 5 µg | 2.1 |
| Toluene | Wipe-9 | 23.5 µg | 15 µg | 1.6 |
| Toluene | Wipe-11 | 38.0 µg | 15 µg | 2.5 |
| Toluene | Wipe-12 | 27.7 µg | 15 µg | 1.8 |

Employees eat and drink in the Break Room everyday during their lunch break. Employees also purchase food and drink items from the vending machines located in the Break Room during their lunch break and other breaks. Employees are not required to wash their hands before entering the Break Room or prior to eating or drinking. Prior to or while eating and drinking, employees also touch all of the areas and surfaces where the CSHOs performed the wipe sampling. Thus, the concentrations of hydrochloric acid, nitric acid, sulfuric acid and toluene found on the surfaces in the Break Room present an ingestion hazard.

Section XIV (*Citing Improper Personal Hygiene Practices*) of the Field Operations Manual (FOM) states that "a citation under 1910.141(g)(2) and (4) shall be issued where there is reasonable probability that, in areas where employees consume food or beverages (including drinking fountains), a significant quantity of a toxic material may be ingested and subsequently absorbed." Section XIV of the FOM further states that "for citations under 1910(g)(2) and (4), wipe sampling results shall be taken to establish the potential for a serious hazard."

Based on the CSHOs' wipe samples, employees are exposed to small amounts of hydrochloric acid, nitric acid, sulfuric acid and toluene while eating and drinking in the Break Room. Because employees are exposed to these chemicals everyday, the potential exists for employees to experience chronic effects due to ingesting small amounts of these chemicals every time they eat and/or drink in the Break Room (sometimes multiple times per day). Repeated ingestion of small amounts of toluene on a daily basis could potentially lead to hepatic effects (jaundice, liver failure, etc.), gastrointestinal (GI) effects (vomiting, abdominal pain, nausea, etc.) and central nervous system (CNS) effects (light-headedness, confusion, dizziness, blurred vision, etc.). Repeated ingestion of small amounts of hydrochloric acid, nitric acid and/or sulfuric acid on a daily basis could potentially lead to severe burns and/or irritation to the respiratory tract, as well as GI effects (burns to the lining of the stomach, diarrhea, vomiting, nausea, etc.). The effects of ingesting hydrochloric acid, nitric acid and/or sulfuric acid together within short durations could potentially cause the health effects from ingesting these acids to become additive, which would vastly increase any potential injuries.

b) Equipment: Detectable Quantities of Toluene, Hydrochloric Acid, Nitric Acid and Sulfuric Acid Found on Several Wipe Samples
c) Location: Break Room
d) Injury/Illness: Jaundice, liver failure, vomiting, abdominal pain, nausea, burns to the lining of the stomach, diarrhea, light-headedness, confusion, dizziness, blurred vision, severe burns and/or irritation to the respiratory tract
e) Measurements: **Refer to OSHA Air Sampling Reports 435618137 (Wipes 1-4), 435618152 (Wipes 5-8) and 435618145 (Wipes 9-12) for Wipe Sampling Information and Results**

| 21. Photo Number | Location on Video |
|---|---|
| | |

23. Employer Knowledge: (a)-(b) On May 19, 2010, the CSHO emailed Lewis Warren, Environmental and Regulatory Director, a Document Request Form that requested copies of all of the MSDSs for chemicals that had a health rating, flammability rating and/or reactivity rating above 3.0. On May 26, 2010, the CSHO returned to the facility to pick-up the MSDSs that the CSHO requested. Several of the MSDSs provided to the CSHO by Lewis Warren, Environmental and Regulatory Director, listed the chemicals as corrosive and/or permanently damaging to the eyes and/or skin. These MSDSs included but were not limited to the following: **Four MSDSs for hydrochloric or muriatic acid**, Twenty-Six MSDSs for sodium hydroxide or caustic soda, Four MSDSs for acetic acid, Eight MSDSs for potassium hydroxide, One MSDSs for ammonium hydroxide, One MSDS for ammonia, Seven MSDSs for phosphoric acid, **Eight MSDSs for sulfuric acid**, Three MSDSs for acrylic acid, Four MSDSs for 2-butoxyethanol, Nine MSDSs for oxidizers, **One MSDS for nitric acid, Three MSDSs for toluene** and Twenty MSDSs for other "non-common chemicals." Of the 113 MSDSs received from Lewis which were numbered by the CSHO for sampling purposes, 72 (63.72%) of these MSDSs were listed corrosive and/or permanently damaging to the eyes and/or skin. Of the 113 MSDSs received from Lewis which were numbered by the CSHO for sampling purposes, 44 (38.94%) of these MSDSs also contained one or more chemicals that had a skin designation per ACGIH and/or OSHA. It should also be noted that several of the MSDSs provided to the CSHO by Lewis contained hand written notes, underlining, and other marks. This indicates that someone from the employer has gone through and read these MSDSs.

Tim Barkdull, Regrind Foreman (Supervisor), stated that several acids are processed on the Regrind Line, but they mostly process acrylic acid and that is the acid he is most familiar with. Tim also stated that the most common drums processed on the Regrind Line are caustics, and they get a lot of acetics (acetic acid) on the Regrind Line. Tim also stated that they process the following chemicals and quantities on the Regrind Line: hydrochloric acid - 1-2 drums per day, acetic acid - 25 drums per day, acrylic acid - 10 drums per day, sulfuric acid - 1-2 drums per day, caustics - 10 drums per day and

formaldehyde - 5-10 drums per day. Tim also stated that they can possibly process or have processed the following chemicals: caustic soda, phosphoric acid, hydrogen peroxide, isopropyl alcohol, toluene, caustics, corrosives, flammables and acetic anhydride. The CSHO also asked Tim if hydrochloric acid drums are processed and emptied on the Regrind Line and Tim stated "yes."

On July 15, 2010, Lewis Warren, Environmental and Regulatory Director, and Wes Ledbetter, Complex Administrator, stated that the Break Room is cleaned everyday, and Joe (Barkdull) would know the only chemicals used to clean the Break Room. The CSHO then told Lewis and Wes that Joe (Barkdull) said that he only uses Foaming Germicidal Cleaner and Pine-Sol to clean the Break Room. Lewis and Wes stated that if that is what Joe (Barkdull) said then that is what we use. The CSHO informed the employer that these would be the only chemicals the CSHO would look at as potential interferences on the wine samples. Lewis and Wes stated that they understood and those two chemicals were the only chemicals used to clean the Break Room. On July 15, 2010, Lewis also provided the CSHO with a MSDS for the Foaming Germicidal Cleaner. It should be noted that neither of the MSDSs for Foaming Germicidal Cleaner and Pine-Sol listed hydrochloric acid, nitric acid, sulfuric acid or toluene as hazardous ingredients. Refer to Exhibit Log Tab 6 for copies of these MSDSs.

On November 5, 2010, the CSHO called and spoke with Lewis Warren, Environmental and Regulatory Director. During this phone conversation, Lewis stated that they do process drums and/or totes which contain hydrochloric acid, sulfuric acid, nitric acid and toluene. Lewis also stated that the Break Room is cleaned everyday, or at least everyday.

24. Comments (Employer, Employee, Closing Conference): (a)-(b) Employees interviewed said that they clean the Break Room everyday with a chemical in the spray can. This employee provided the CSHO with a 19-ounce spray can of Foaming Germicidal Cleaner and said that is what they use to clean the Break Room. Employees interviewed also said that they do not use very much of the spray cleaner, and it is mainly used to clean the tops of the tables and the microwaves. Employees interviewed also said that do not use the spray cleaner on the outside of the refrigerators, and they do not clean the vending machines because the Pepsi guy does most of that.

25. Other Employer Information: (a)-(b) On May 5, 2010, Kenneth Fent, Industrial Hygienist for NIOSH, performed personal air sampling using thermal decomposition tubes and charcoal (100/50) tubes on various processes located throughout the facility. Thermal decomposition tubes were used to provide qualitative identification of all chemicals in the ambient environment at the time of sampling. Charcoal tubes were used to quantitatively identify employees' exposure to several chemicals present in the ambient environment at the time of sampling. Sampling was performed simultaneously on each employee using the thermal decomposition and charcoal tubes. However, NIOSH waited until after the thermal decomposition tubes were analyzed before they analyzed the charcoal tubes because due to the vast amounts of chemicals present throughout the facility, NIOSH was not sure what chemicals to analyze each of the charcoal tubes for.

On May 18, 2010, the CSHO received NIOSH's sampling results for the thermal decomposition tubes via email. 144 chemicals were found to be present in detectable quantities (i.e. above the limit of detection (LOD)) on NIOSH's thermal decomposition tubes. These chemicals included, but were not limited to the following: acetone, acetic acid, benzene, trichloroethylene, acrylic acid, triethylamine, ethanolamine, toluene, methacrylic acid, perchloroethylene, morpholine, xylene, styrene, 2-butoxyehtanol and benzaldehyde. Refer to Exhibit Log Tab 47 for copies of NIOSH's sampling results for the thermal decomposition tubes.

26. Classification:

| Serious | Knowledge | S or O | Repeat? | Willful? |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | Z Add transaction | A Add | S Serious | 5,000.00 | | |

U. S. Department of Labo(
Occupational Safety and Health Administration

# Worksheet

Fri Jan 14, 2011 12:57PM

| | |
|---|---|
| Inspection Number | 313128068 |
| Opt. Insp. Number | 0810 |

| | | | | | |
|---|---|---|---|---|---|
| Establishment Name | **Indianapolis Drum Service** | | | | |
| Type of Violation | S Serious | Citation Number | 01 | Item/Group | 019(b) |
| Number Exposed | 72 | No. Instances | 2 | REC | |
| Std. Alleged Vio. | 1910.141(g)(4) | | Egregious | | |

| Abatement Completed Code | Days to Abate | Days Type | Final Abatement Due Date |
|---|---|---|---|
| | 15 | W | |
| Abatement Documentation Required | Date Abated | Date Verified | |
| Yes | | | |

| MULTISTEP | | | | |
|---|---|---|---|---|
| Type | Days | Due Date | Track | Completed Code |
| | | | | |

| | | |
|---|---|---|
| Substance Codes | 1430 | HYDROGEN CHLORIDE |
| Substance Codes | 1860 | NITRIC ACID |
| Substance Codes | 2310 | SULFURIC ACID |
| Substance Codes | 2460 | TOLUENE - SKIN |

AVD/Variable Information:

29 CFR 1910.141(g)(4): Food or beverages were stored in area(s) exposed to toxic material(s):

a) Break Room - On July 15, 2010, wipe samples were conducted on the surface of the tabletop located directly in front of the Quastar Microwave, the surfaces of two tabletops where employees eat and drink, and the surface of the refrigerator located underneath the freezer door. The amounts of hydrochloric acid found on these wipe samples ranged from 25.1 $\mu$g to 270 $\mu$g, approximately 10.0 to 82.8 times the limit of quantification (LOQ) of 2.5 $\mu$g. The amounts of nitric acid found on these wipe samples ranged from 46.0 $\mu$g to 70.3 $\mu$g, approximately 9.2 to 14.1 times the LOQ of 5.0 $\mu$g. The amounts of sulfuric acid found on these wipe samples ranged from 10.6 $\mu$g to 20.5 $\mu$g, approximately 2.1 to 4.1 times the LOQ of 5.0 $\mu$g.

b) Break Room - On July 15, 2010, wipe samples were conducted on the surface of the tabletop located between two of the microwaves, the surface of a tabletop where employees eat and drink, the surface of the refrigerator located underneath the freezer door, and the surface of the first Mountain Dew button located on the Pepsi vending machine. The amounts of toluene found on these wipe samples ranged from 23.5 $\mu$g to 38.0 $\mu$g, approximately 1.6 to 2.5 times the LOQ of 15 $\mu$g.

| Penalty Calculations | | | | Adjustment Factors | | | Calculated Penalty | Proposed Adjusted Penalty |
|---|---|---|---|---|---|---|---|---|
| Severity | Probability | Gravity | GBP | Size | Good Faith | History | | |
| H High | G Greater | 10 | 5,000.00 | 0 | 0 | 0 | 5,000.00 | .00 |
| Repeat Factor | | | Quick Fix | | | | | |

| Employee Exposure: | | | | | |
|---|---|---|---|---|---|
| Occupation | Label Remover | Employer | Indianapolis Drum Service | | |
| Duration | 5 months | Frequency | 30-60 min/day | | |
| Employee Name | Willie Quinn | | | | |
| Address | 3514 North Terrace Avenue<br>Indianapolis, IN 46218 | | Phone | (317) 413-4375 | |
| Occupation | Label/Adhesive Remover | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 30-60 min/day | | |
| Employee Name | Hugh Inman | | | | |
| Address | 2933 Percheron Street<br>Indianapolis, IN 46227 | | Phone | (317) 295-2334 | |
| Occupation | Flusher | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 30-60 min/day | | |
| Employee Name | Wayne Hudgins | | | | |
| Address | 1407 South Oxford Street<br>Indianapolis, IN 46203 | | Phone | (317) 787-2254 | |
| Occupation | Pressure Washer | Employer | Indianapolis Drum Service | | |
| Duration | 1.5 years | Frequency | 30-60 min/day | | |
| Employee Name | Wayne Turner | | | | |
| Address | 1218 State Avenue<br>Apt. 1<br>Indianapolis, IN 46203 | | Phone | | |

Instance Description: A. Hazard B. Equipment C. Location D. Injury/Illness E. Measurements

| 4. Date/Time |
|---|
| (a) 7/15/10 9:19 am<br>(b) 7/15/10 9:43 am |

20. Instance Description - Describe the following:

a)Hazards-Operation/Condition-Accident: (a)-(b) On July 15, 2010, the CSHOs (Jason Reason and Laura Groom) performed wipe sampling on several of the surfaces located inside of the Break Room. Due to the variety of chemicals used, emptied, and/or processed throughout the facility, the CSHOs could not identify specific chemicals which could be present on the various surfaces in the Break Room. Thus, the CSHOs did not perform wipe sampling to determine if a specific chemical was present on a surface. Rather, the CSHOs performed wipe sampling to determine if multiple chemicals were present on a surface. After discussing this issue with the laboratory (Analytics Corporation), the CSHO (Jason Reason) decided to perform three different types of wipe sampling to detect three different classes of chemicals (solvents, metals and acids). In all, the CSHOs took twelve wipe samples to determine if the surfaces where employees were eating and/or drinking were as free as practicable from accumulations of any identifiable hazardous chemicals. While performing each wipe sample, the CSHOs used a wipe sampling template from the OSHA Technical Manual that limited the wipe sample area to the required 100 $cm^2$. The CSHOs also wore nitrile gloves while performing each wipe sample. To prevent any cross-contamination from occurring between wipe samples, the CSHOs used a new wipe sampling template for each wipe sample, as well as changed gloves in between wipe samples (i.e. wore a new pair of gloves for each wipe sample).

The CSHO (Laura Groom) took four wipe samples to determine if any metals (particulates, dusts, etc.) were present on surfaces where employees were eating or drinking in the Break Room. All four of these wipe samples were taken with Ghost Wipes and were analyzed for the chemicals contained in the laboratory's "Toxic Metal Profile." These four wipe samples were taken on the following surfaces in the Break Room: surface of tabletop located directly in front of the Quastar Microwave (Wipe-1); surfaces of two tabletops where employees eat and drink (Wipe-2 & Wipe-3); and the outside surface of the freezer handle (Wipe-4). No detectable concentrations or quantities of metals were found on any of the four wipe samples (i.e. all metals analyzed on each of the four of the wipe samples was below the limit of detection (LOD)).

The CSHO (Jason Reason) also took four wipe samples to determine if any acids were present on surfaces where employees were eating or drinking in the Break Room. All four of these wipe samples were taken with the back-up pads located inside of MCEF cassettes and were analyzed for the chemicals contained in the laboratory's "Acid Profile." Per the laboratory's instructions, all of the back-up pads were wetted with deionized water prior to taking each wipe sample and the CSHO sent an unopened MCEF cassette to the laboratory to serve as a blank. These four wipe samples were taken on the following surfaces in the Break Room: surface of tabletop located directly in front of the Quastar Microwave (Wipe-5); surfaces of two tabletops where employees eat and drink (Wipe-6 & Wipe-7); and the surface of the refrigerator located underneath the freezer door (Wipe-8). Detectable concentrations or quantities of hydrochloric acid and nitric acid were found on all four of the wipe samples. Detectable concentrations or quantities of sulfuric acid were found on two of the wipe samples (Wipe-5 and Wipe-8). Refer to the table below for the specific quantities of hydrochloric acid, nitric acid and sulfuric acid found on these wipe samples. Although detectable quantities of hydrochloric acid and sulfuric acid were found on the blank, all of the hydrochloric acid and sulfuric acid quantities found on the wipe samples were 1.6 to 10.5 times higher than the quantities found on the blank.

The CSHOs (Jason Reason and Laura Groom) also took four wipe samples to determine if any solvents were present on surfaces where employees were eating or drinking in the Break Room. All four of these wipe samples were taken with the back-up pads which were once located inside of 3M charcoal badges. The back-up pads were removed by the laboratory and sent directly to the CSHO in a plastic bag. The back-up pads were only removed from the plastic bag just prior to performing the wipe sampling and were only exposed to the ambient atmosphere for approximately 20-30 seconds (includes opening bag, wipe sampling and placing back-up pads inside of vile). These four wipe samples were taken on the following surfaces in the Break Room: surface of tabletop located between two microwaves (Wipe-9); surface of tabletop where employees eat and drink (Wipe-10); surface of refrigerator located underneath the freezer door (Wipe-11); and surface of first Mountain Dew button located on the Pepsi vending machine (Wipe-12). Detectable concentrations or quantities of toluene were found on three of the four wipe samples (Wipe-9, Wipe-11 and Wipe-12). Refer to the table below for the specific quantities of toluene found on these wipe samples.

| Substance | Sample Number | Quantity Found on Wipe Sample | Limit of Detection (LOD) | How Much Over LOD |
|---|---|---|---|---|
| Hydrochloric Acid | Wipe-5 | 207 µg | 2.5 µg | 82.8 |
| Nitric Acid | Wipe-5 | 70.3 µg | 5 µg | 14.1 |
| Sulfuric Acid | Wipe-5 | 20.5 µg | 5 µg | 4.1 |
| Hydrochloric Acid | Wipe-6 | 25.1 µg | 2.5 µg | 10.0 |
| Nitric Acid | Wipe-6 | 54.4 µg | 5 µg | 10.9 |
| Hydrochloric Acid | Wipe-7 | 28.1 µg | 2.5 µg | 11.2 |
| Nitric Acid | Wipe-7 | 60.6 µg | 5 µg | 12.1 |
| Hydrochloric Acid | Wipe-8 | 31.2 µg | 2.5 µg | 12.5 |
| Nitric Acid | Wipe-8 | 46.0 µg | 5 µg | 9.2 |
| Sulfuric Acid | Wipe-8 | 10.6 µg | 5 µg | 2.1 |
| Toluene | Wipe-9 | 23.5 µg | 15 µg | 1.6 |
| Toluene | Wipe-11 | 38.0 µg | 15 µg | 2.5 |
| Toluene | Wipe-12 | 27.7 µg | 15 µg | 1.8 |

Employees eat and drink in the Break Room everyday during their lunch break. Employees also purchase food and drink items from the vending machines located in the Break Room during their lunch break and other breaks. Employees are not required to wash their hands before entering the Break Room or prior to eating or drinking. Prior to or while eating and drinking, employees also touch all of the areas and surfaces where the CSHOs performed the wipe sampling. Thus, the concentrations of hydrochloric acid, nitric acid, sulfuric acid and toluene found on the surfaces in the Break Room present an ingestion hazard.

Section XIV (*Citing Improper Personal Hygiene Practices*) of the Field Operations Manual (FOM) states that "a citation under 1910.141(g)(2) and (4) shall be issued where there is reasonable probability that, in areas where employees consume food or beverages (including drinking fountains), a significant quantity of a toxic material may be ingested and subsequently absorbed." Section XIV of the FOM further states that "for citations under 1910(g)(2) and (4), wipe sampling results shall be taken to establish the potential for a serious hazard."

Based on the CSHOs' wipe samples, employees are exposed to small amounts of hydrochloric acid, nitric acid, sulfuric acid and toluene while eating and drinking in the Break Room. Because employees are exposed to these chemicals everyday, the potential exists for employees to experience chronic effects due to ingesting small amounts of these chemicals every time they eat and/or drink in the Break Room (sometimes multiple times per day). Repeated ingestion of small amounts of toluene on a daily basis could potentially lead to hepatic effects (jaundice, liver failure, etc.), gastrointestinal (GI) effects (vomiting, abdominal pain, nausea, etc.) and central nervous system (CNS) effects (light-headedness, confusion, dizziness, blurred vision, etc.). Repeated ingestion of small amounts of hydrochloric acid, nitric acid and/or sulfuric acid on a daily basis could potentially lead to severe burns and/or irritation to the respiratory tract, as well as GI effects (burns to the lining of the stomach, diarrhea, vomiting, nausea, etc.). The effects of ingesting hydrochloric acid, nitric acid and/or sulfuric acid together within short durations could potentially cause the health effects from ingesting these acids to become additive, which would vastly increase any potential injuries.

b) Equipment: Detectable Quantities of Toluene, Hydrochloric Acid, Nitric Acid and Sulfuric Acid Found on Several Wipe Samples
c) Location: Break Room
d) Injury/Illness: Jaundice, liver failure, vomiting, abdominal pain, nausea, burns to the lining of the stomach, diarrhea, light-headedness, confusion, dizziness, blurred vision, severe burns and/or irritation to the respiratory tract
e) Measurements: **Refer to OSHA Air Sampling Reports 435618137 (Wipes 1-4), 435618152 (Wipes 5-8) and 435618145 (Wipes 9-12) for Wipe Sampling Information and Results**

| 21. Photo Number | Location on Video |
|---|---|
| | |

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26. Classification:

| Serious | Knowledge | S or O | Repeat? | Willful? |
|---|---|---|---|---|
| Yes | Yes | Serious | No | No |

| First Repeat | Second Repeat | Repeat Penalty |
|---|---|---|
| | | |

| Event Date | Event Code | Action Code | Citation Type | Penalty | Abate Date | Final Order |
|---|---|---|---|---|---|---|
| | **Z Add transaction** | **A Add** | **S Serious** | **.00** | | |