Attachment AA

The following article is courtesy of Baghouse.com

Dust Collector Fire and Explosion Highlights Need for Combustible Dust Considerations In System Designs

A massive fire and explosion in the dust collection system of a New Hampshire wood pellet manufacturer demonstrates the need for adequate system design to prevent combustible dust explosions in general industry.

May 16 2012 – Baghouse.com Editorial | We recently published a news article on Environmental-Expert.com about OSHA's enforcement actions concerning last year's combustible dust fire and explosion at the New England Wood Pellet Company's Jaffrey, New Hampshire wood pellet plant.

On October 20 2011, a combustible dust fire began in the wood pellet cooler, most likely caused by a spark or ember from the pellet hammer mill. The fire then spread through the ductwork throughout the plant, eventually reaching the dust collector causing it to explode. When the collector exploded, the explosion vented through the baghouse's explosion vents into adjacent storage silos setting them ablaze further spread the fire throughout the plant. More than 100 firefighters and emergency personnel from at least 14 towns worked for over 15 hours to put out the blaze.

The OSHA report outlines specific areas where the plant lacked adequate spark detection devices, fire suppression systems, and explosion venting/protection within the dust collection system. The fact that the plant had been cited by OSHA for several of the same issues previously after a 2008 incident, led to OSHA assessing total fines of $147,000.

Examining what went wrong in this incident highlights the need for diligence on the part of plant management and operators regarding the dangers of combustible dust.

What Went Wrong?

The October 20 2011 fire and explosion at the Jaffrey, NH plant was not the first combustible dust related incident at the plant. In 2008 the plant experienced a similar fire and explosion that caused more destruction than the most recent one. After completing its investigation, OSHA at that time fined the plant over $100,000 for safety violations that led to the fire. Subsequently, the plant, in an attempt to prevent another such occurrence, “retained engineers and consultants, and spent over $2 million on various improvements to enhance worker safety at its Jaffrey facility” according to a release from the company. This apparently including the installation of some explosion isolation devices in the ductwork (Rembe explosion isolation device) and installed explosion protection (explosion vents) on the baghouse. However the company’s effort and expense failed to prevent another incident from occurring.

Fire fighters work to put out a massive blaze caused by a destructive combustible dust fire and explosion at the New England Wood Pellet Company’s Jaffrey, NH facility.

The OSHA report is quite thorough in its description each poorly designed, installed and operated part of the dust collection system either caused or intensified fire and subsequent explosion.

For example the report cites the plant for 2 main offenses. The first one is regarding poor housekeeping throughout the plant that led to large accumulations of combustible wood pellet dust forming on top of machinery (such as the pellet cooler where the fire began) and on elevated surfaces such as overhead rafters, ceiling joists, troughs, etc. Secondly, and more seriously, the plant was cited under the General Duty Clause of the OSHA Charter* for failing to take reasonable steps to prevent a combustible dust fire/explosion from occurring. OSHA cited several industry standards such as the National Fire Protection Association building code that the plant failed to heed in the design and construction of the plant’s dust collection system.

Ductwork Lacked Sufficient Spark Detection, Fire Suppression, or Explosion Isolation Devices

A major oversight in the ductwork system, was the lack of appropriate spark detection, fire suppression or fire isolation devices on all of the ductwork between the various machines throughout the plant. For instance, OSHA reported that the connecting ductwork between the pellet hammer mills, the pellet cooler, the bucket elevators storage silos and most of the dust collectors in the plant had no spark detection system, fire suppression system, or explosion isolation devices installed. The only control device the plant had was an explosion isolation device on the conveying duct between the pellet cooler and the pellet cooler baghouse. However, the device did not function properly and allowed the fire to propagate further downstream into the baghouse.

NFPA 664 (2012) Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities: 8.2.1. and Hazard Determination 8.2.4.1. – Conveying systems with fire hazards should be isolated to prevent propagation of fire both upstream and downstream (OSHA isolation can mean spark detection and suppression). 5.2.5.1 Prevention of Fire Extension: When limitation of fire spread is to be achieved the following criteria shall be demonstrated…(4) Particulate processing systems (dust collection systems) shall be designed, constructed, equipped and maintained to prevent fire or deflagration from propagating from one process system to an adjacent process system.

Additionally, the ductwork was not engineered and/or constructed to sufficient strength to withstand the maximum anticipatable explosive pressure resulting from a conflagration involving its intended payload (combustible wood dust). This led to the duct bursting open, releasing the explosion into the plant near firefighters and may have been a contributing factor in the fire by-passing the isolation device.

NFPA 664 (2012) 8.2.2.2.3, Sets forth alternative safety criteria for ducts with a deflagration hazard, to ensure that the ducts are builds with a sufficient strength and with appropriately sized/located protection devices to handle the maximum expected pressure generated by a dust explosion.

Baghouse Was Not Adequately Protected Against Explosion Hazards

The plant recently installed explosion vents on the baghouse explosion vents.* However, the design and installation of the explosion protection on this particular baghouse may actually made things worse than if there had been none at all.

When the fire reached the baghouse and caused the finely dispersed dust to ignite, the resulting pressure and fireball should have been vented outside the building. However, the explosion vents on the baghouse faced the direction of adjacent storage silos (containing wood dust). When the explosion was vented out it ignited the storage silos resulting in a major portion of the fire.

Additionally, OSHA's investigation showed that the baghouse lacked an explosion suppression system, was not designed and/or constructed to withstand the maximum unvented pressure of a combustible dust explosion, and in the absence of proper explosion protection, was located indoors.

As a result of these failures, when the reached the dust collector, the resulting explosion: blew the dust collector's door off its hinges, creating a missile hazard, blew backwards into the duct, which burst open, and blew out the dust collector's exhaust muffler and roof stack, causing the pressure/deflagration to be vented inside the building near responding firefighters.

NFPA 664 (2012) 8.2.2.5.1.4. Requires an outdoor location for the dust collectors with fire or deflagration hazards, unless they are equipped with one of the following: (4) listed deflagration suppression system, (5) deflagration relief vents with relief pipes extending to safe areas outside the building and the collector meets the strength requirement of this standard (i.e. built with sufficient strength to withstand the maximum expected explosions pressure). NFPA 664 (2012) 8.2.2.5.3 requires dust collectors with deflagration hazards be equipped with an appropriate-sized explosion suppression system and/or explosion relief venting system designed per NFPA 68 (Explosion Protection by Deflagration Venting) and NFPA 69 (Explosion Prevention Systems), and also that such dust collectors be built to design strength that exceeds the maximum expected explosion pressure of the material being collected. NFPA 69, 12.1.2 requires "Piping, ducts, and enclosures protected by an isolation system shall be designed to withstand estimated pressures as provided by the isolation system manufacturer". NFPA 69, 12.2.2.3 "System Verification" requires that systems shall be verified by appropriate testing under deflagration conditions to demonstrate performance."

These design oversights directly increased the destructive power of what had until then been only a dust fire in the ductwork.

Lessons Learned From Wood Pellet Company Dust Explosion

Simply put, this disaster was bound to happen due to glaring design and/or construction flaws throughout the entire system.

The fact that multiple similar incidents have occurred at the facility demonstrates that the dust collection system, and perhaps even the entire production process requires modification to ensure this kind of incident does not occur again.

Under OSHA's National Combustible Dust Emphasis Program, OSHA inspectors are on heightened alert for any combustible dust hazards in facilities in all industries. Indeed OSHA is under a federal mandate and its has as its own goal to issue a comprehensive combustible dust standard for general industry. In the meantime, OSHA has been citing plants under the general duty clause for having combustible dust hazards. In most cases,

OSHA is informally requiring general industry to conform to the NFPA's guidelines for combustible dust hazards. As seen in this case following they suggestions would have prevented this kind of incident from occurring.

Therefore, we can take away from this the need to be conscientious and proactive regarding combustible dust hazards in your facility. As we have seen, being reactive will simply not do.

Footnotes:

* **OSHA General Duty Clause** (a) Each employer — (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (2) shall comply with occupational safety and health standards promulgated under this Act.

* **Baghouse Explosion Vents** – Explosion vents are a form of explosion protection used on baghouses. During normal operation the vents are closed and maintain an air-tight seal. However, if an explosion occurs within the baghouse, the vents are designed to "strategically fail" being the weakest part of the baghouse structure, thus allowing the pressure from the explosion to vent out and away from other combustible materials and workers.

About the Author: *Samuel Dal Santo serves as Chairman of Baghouse.com. Samuel's focus is on bringing about a reconciliation between often distant front office strategy, and field realities. Samuel's unique background and field experience provides him with the needed experience, and real world skills that are often lacking in executive ranks today.*

Attachment BB

More

Dusting Up on Risk & Regulation

A perfect storm of conditions can result in an explosion or fire at a biomass-using facility, events that are often preventable.

By Anna Simet | January 26, 2016

When West Pharmaceutical Services' plant in Kingston, North Carolina, exploded in 2003, resulting in six deaths, dozens of injuries, and complete destruction of the facility, it was ultimately concluded that the accident was preventable. Not simply in that the design of the suspended ceiling and operation of the facility didn't take into account the hazards of combustible dust, but that some employees knew about the dust, but were unaware of the risk. According to the U.S. Chemical Safety Board report, while dust removal and good housekeeping were priorities at the facility, dust accumulated above the ceiling over time, going unrecognized as a serious hazard—even though maintenance workers were aware of the dust, they lacked an effective understanding of the danger.

Dust explosions resulting in injuries, fatalities and facility destruction are not uncommon at grain elevators, woodworking facilities, fossil fuel power generation plants, various food industry sectors involving materials such as sugar, flour, tobacco and more, as well biomass facilities that utilize pulverized or ground wood material to make energy or wood pellets.

Owners, operators and all employees of plants at risk for combustible dust incidents should be educated on the risks. A great teaching tool to use for that purpose is the explosion pentagon, says Tim Cullina, P.E., senior consulting engineer at Fauske and Associates, a process safety engineering company. For a dust explosion to occur, five conditions must be met: a fuel source (combustible dust), an oxidizer (oxygen in air), an ignition source such as a spark, dispersion of the dust and confinement of the dust cloud.

Cullina, who teaches a class on the basics of combustible dust, says that it's also important to understand that removing of the dust and confinement of the dust cloud. doesn't safeguard a facility against an event—it may still be susceptible to deflagration. "You're not going to explode, but if you take away the confinement and still have a dust cloud, oxygen and ignition, it can be just as damaging. Deflagration only needs four of those items—I refer to it as the deflagration diamond.

Apart from employee education, understanding the role of various regulatory agencies—OSHA, fire marshals, building departments and the National Fire Protection Association have in enforcing codes and safety requirements is crucial, according to Cullina.

Sorting Out Authority

NFPA, which is made up of volunteers who sit on technical committees to provide expertise for the development of codes and standards designed to minimize the risk and of fires and explosions, OSHA, insurance companies and the local permitting authorities may all recommend or require different things, Cullina points out. "What is really going to protect your people and your facility? In each case, it's about education, and how much each authority having jurisdiction (AHJ) understands about combustible dust and risk assessment."

Going back 15 years, many of the AHJs were not aware of combustible dust hazards, according to Cullina. For example, in one jurisdiction, it was against code to install an indoor bucket elevator. "The builder requested a variance from this requirement, and the building department granted it without conditions," Cullina says. "The permitting authority was unaware of the risks of using a bucket elevator indoors to transfer combustible particulate. If this had been an agricultural facility, an OSHA standard would have mandated additional ignition control requirements, but in this case, that OSHA standard did not apply. The local insurance broker issued a policy without inspection. Even if there was an inspection, there is no guarantee that the insurance inspector would have been aware of the risk from combustible dust. The NFPA standards for combustible dust have been in place for many years. But the owner, the permitting authority, and the insurance company were not aware of these standards."

NFPA is not an enforcement or an inspection agency, Cullina points out—it has no power, nor does it police or enforce compliance with the contents of NFPA documents. "That job is left to the local jurisdictions that adopt the NFPA documents as code," he explains. "Most commonly, fire protection requirements are enforced through fire marshal inspections. They'll have a list of things they're looking for to make sure that at a minimum, you've addressed them, and they may or may not include some of the specifics of NFPA. But usually, they're more generic, like certain plumbing requirements, which are common and understood. The combustible dust standards haven't been, but they are more so now because a lot more attention has been brought to bear on it."

In some cases, the local authority might be aware of combustible dust issues and have made the requirements, and other cases they haven't trained themselves to look for it. "The fire marshal is the only entity in the process with authority to bring things to a screeching halt. If they see something wrong, they can shut you down," Cullina says. "OSHA doesn't have that authority."

Local jurisdictions may or may not make certain NFPA standards laws—for example, NFPA 664, which applies to

woody biomass. “They may or may not make you put in the explosion vent, or a suppression system,” Cullina points out. “They may or may not be sensitive to checking whether you’re completely grounded so that you won’t create a static spark. From OSHA’s point of view, the very existence of this standard lets us know this is a problem and that you should know about it if you’re in this business. Even if they don’t have a standard specifically for your individual piece of equipment or operation, you do have the general duty clause which says you’ll provide a safe workplace.”

Therefore, OSHA can use NFPA standards as evidence of knowledge that the industry has a standard, and remedies for hazards. “It’s an onion—there are these different layers, we have to talk about all these different aspects to get a broad picture [of requirements].”

The key component to all of these codes, designs and specification is to have someone in the design, engineering and operations with clear evidence of capability and relevant experience with combustible dust to ensure that the systems not only comply with the NFPA codes and standards, but also to provide on-going support for any modification to existing operations, according to Justin Price, project engineer at Evergreen Engineering.

Risk at New, Existing Facilities

“Some typical examples of fires and failure can be seen across the wood products industry, all are symptomatic and provide us with great lessons we can learn to protect the lives of our employees,” Price says. “We see many fires started from material building up on motors and bearing or other mechanical components. Once the wood builds up on these components, it acts like an insulator and retains the heat. The heat then is cause for the event. This can happen quickly, and is many times in places that are difficult to reach and therefore often overlooked in the housekeeping task.”

Other times, it is simply poor design, in that the bearing is inaccessible. “Alternatively, pressure relief systems are not in place,” Price says. “Even to the extent that process interlocks are not applied.”

When we are designing a new facility, the key to compliance and best method of mitigating risk is hiring the right engineering/designer who has the experience. “For existing operations, we find it very helpful to begin with a standard combustible dust checklist that is available through OSHA,” Price says. “From that checklist, you can determine the biggest risk factors to consider as you move to the next step, which is to perform the combustible dust assessment. The combustible dust assessment will identify the hazards and mitigation that should be installed for each.”

An ideal design eliminates the ignition sources, operates well-above or well-below the flammable limits, or provides an inert atmosphere, according to Price. In these designs, there is no effect or mitigation of the dispersion, confinement or fuel on the dust explosion pentagon. “This means that the fuel and dust will be present in the system, and a performance-based design option will need to be incorporated into the overall mitigation plans,” Price says. “There are no ideal designs, so one must take care to protect the failure with the detection devices, extinguishing or suppression systems.”

Price says typical design flaws his firm sees include poor design in bin venting, detection and suppression systems in the pneumatic systems, and for the material handling, poor designs in the chutes and transitions of the conveyors. Another area of concern is that although many portions of biomass and pellet plants’ raw material will fall outside the moisture content requirements of NFPA (greater than 25 percent) for deflagration protection, the designs do not consider what happens when the material collects in corners, pockets and other areas of the equipment and dries, Price points out. “When the material dries and a bearing failure occurs, fires are very common.”

Fires and failure are not unusual across the wood products industry in general, and while unfortunate, there is a silver lining—they provide the rest of the industry with great lessons and takeaways to protect the lives of employees.

In Price’s opinion, the key to risk mitigation at biomass and pellet mill operations is to draw on the years of experience in the engineered wood products, sawmills and composite panel products operations, as they experience many of the same issues. “This isn’t to say the wood product industry has it figured out, but more so to say that they have some great processes in place for the hazard identification and equipment to help with the mitigation techniques,” he says.

Cullina points out that just because a facility might be meeting its AHJ requirements, it doesn’t mean the facility is safe. “There’s a spectrum when you talk about “right” or “wrong,” and that’s where you introduce the concept of risk assessment and risk management,” Cullina says. “The right and wrong is whether you did what the code says, and that’s much easier to enforce. You may be aware of the requirements, but are you aware of ducts or other types of transport systems inside your plant and what’s going on inside them?”

For existing facilities, undergoing a combustible dust audit, or risk assessment, can determine whether the facility is up to code, identify safety issues, ensure employees are aware of and trained to deal with and avoid hazardous scenarios, as well as determine an appropriate risk mitigation plan.

Walk Through an Audit

A combustible dust audit begins with a site visit to the facility by Fauske’s or Evergreen’s audit team to review and evaluate several elements of the facility that affect the wood dust mitigation and control program. Prior to the visit, Evergreen will request background information from the facility to assess current mitigation and control plans as well as other relevant safety programs.

The general process and procedures of the audit include document reviews, facility inspections and employee interviews that are intended to provide a representative assessment of employee knowledge of the facility’s wood dust control program and the hazards associated with combustible wood dust. “The audit will encompass all aspects of the facility’s wood dust control program. Safety committee meeting minutes will be reviewed, along with crew safety meeting minutes to evaluate whether hazards are being addressed and acted upon,” Price says. Maintenance records, management bulletins, and safety notices will be reviewed to ensure good communication is happening between the committees, management, and employees.

During the on-site audit review, the audit team will complete various general and focused inspections to help assess the facility’s activities and conditions to determine the effectiveness of the program’s achievement.

"Should there be specific observations of hazardous systems during the audit, we will focus their inspection on these particular systems," Price says.

At the conclusion of the audit, a closing meeting will be held with client's project team to provide an overview of the audit findings. "Any critical dust conditions identified will be brought to their attention. If high-risk conditions are found, they will be brought to the senior management team immediately," Price says.

Within a month of the closing audit meeting, the audit team will provide a final written report, including a series of recommendations to help the facility improve the level of compliance going forward.

Boiling It Down
Proactive risk mitigation, and knowing your facility, its fuel and unique risks—and training all employees to share in that knowledge—could prevent disaster, Cullina emphasizes. "Dust collectors are a really common component in biomass facilities. Do you know how much risk you have of that dust being ignited in that dust collector? Is there a chance your dust collector could explode? When you have a baghouse, you've got four of the five explosion pentagon elements already. All you need is the ignition source, and you've met all of the requirements to create that explosion. It would be a very good idea to ensure that your baghouse is appropriately grounded so that you're not going to create static spark that might in turn ignite the dust."

There is no excuse for not knowing that a facility has combustible dust, according to Cullina, and there are many lists available that identify combustible dusts. "But to make it even simpler, if your powder or dust is organic, then it is combustible," he says, adding that it is every facility's responsibility to understand the particular dust it has, especially when creating a protection system against it. "This is really important when making calculations, to decide, for example, how big the vent has to be," he says. "You should be using data from the dust that's used in the plant at that point. Take a sample and have it analyzed so that you know the combustible dust characteristics and can appropriately design the relief valve and the explosion vent. A lot of people don't have the individual data to do that. You've got to test your own dust, you need to know what your risk is, and that's part of your risk assessment, to make effective risk management decisions."

Cullina points back to West Pharmaceutical Services, noting that the facility was very clean and well-kept, meeting codes and regulation. "But, unknown to them, their process was creating very small, fine particles of dust. The maintenance guys, they knew the dust was up there, but it didn't mean anything to them—they hadn't been trained on it. People think only operators need to know [about risks], but all employees need to understand this risk—if dust is accumulating somewhere, it needs to be cleaned up."

NFPA Codes Relevant to Biomass Industry
• NFPA 68: Guide for Venting of Deflagrations
• NFPA 69: Explosion Prevention Systems
• NFPA 77: Static Electricity
• NFPA 91: Exhaust Systems for Air Conveying of Materials
• NFPA 650: Pneumatic Conveying Systems for Handling Combustible Materials
• NFPA 652: Standard on the Fundamentals of Combustible Dust
• NFPA 654: Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Dust
• NFPA 664: Standard for the Prevention of Fire and Explosion in Wood Processing and Woodworking Facilities

SOURCE: Evergreen Engineering

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Fire Prevention Tips for Wood Pellet Plants

My last blog discussed the **dangers of wood pellet plant facilities** and included an overview of several recent incidents. Today, I would like to review a few fire prevention tips for wood pellet plants. The process of manufacturing wood pellets involves all the right ingredients for explosions and fires to occur with a concerning frequency the potential to cause serious injuries, damage to property, and interruption of production.

The amount of wood, dust, various ignition sources inherent in the wood pellet production process presents a high risk of explosion and fire. However, there are strategies that can be implemented to reduce the risk of fire and explosions and to mitigate the impact should they occur:

- **Conduct a Risk Assessment** – professionals, like fire protection engineers, are well-versed at identifying risks for various facility types. A risk assessment will include a physical survey of the facility or designated area to identify and quantify various explosion and fire threats to life, property, and business operations. The assessment will identify and quantify various defenses against those threats. The results of the assessment will be carefully analyzed and any significant weaknesses in the explosion and fire defenses will be identified. Specific solutions to correct these weaknesses are then developed and are optimized for cost and function. The building owners, tenant, and stakeholders should be involved in the process of optimizing solutions so that their specific objectives are understood and satisfied.

- **Combustible Dust Considerations –** many times, incidents at wood pellet production facilities involve combustible dust, as seen in the examples described above. A few strategies to help mitigate combustible dust exposure include:
  - Process equipment that contains combustible materials, including combustible dust, should be shut-down, and cleaned

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"It is very reassuring to know when emergencies arise that

of all combustible materials before performing any maintenance activity;

- Applying water to a fire within enclosed equipment that contains combustible fines and powders is inherently dangerous and should be avoided because the water application can disturb combustible powders and rouse them into a flammable dust cloud, which can result in a flash fire or explosion;
- Generally it is safer to **shut down the equipment and use firefighting equipment** to protect the exposures, allowing the fire inside the equipment to burn itself out; and
- Any factory that handles, processes, or produces combustible dusts—and especially a factory with this reported history of combustible dust incidents—would be well-advised to retain the services of a qualified expert to regularly audit the plant for combustible dust fire and explosion hazards and provide recommendations for mitigating those hazards in accordance with applicable NFPA combustible dust standards. The expert should also be retained to provide general awareness training on combustible dust explosion risks to the plant's management, operations, and maintenance personnel.

- **Overall Construction Standards** – According to **Rob Cruickshank** of the RSA Group, "using non-combustible construction materials and composite panel insulation are first choices when it comes to wood and biomass pellet production plants." He further advises that composite panels should have a minimum fire resistance of two hours, and be made with mineral wool rather than expanded foam plastic insulation. Walls separating fuel storage facilities from the rest of the plant should be concrete and provide at least two hours of fire separation.

As the wood pellet production industry continues to grow, so does the importance to facility owners of developing strategies to minimize the exposure to fire and explosion risks. Steps should be taken to design explosion and fire safety into these facilities, as well as implementing safe operation and effective maintenance processes. An experienced **fire protection engineer** with credentials in combustible dust risks is a great partner to help you develop the appropriate explosion and fire protection design and prevention strategies needed to help mitigate the exposure of your employees, facilities, and the surrounding communities to these risks.

*By **Jeff Harrington**, CEO and Founder of Harrington Group, Inc.*

[Harrington Group's] assistance and expertise is only a phone call away."

Jeff Cooper, Michelin North America

Attachment DD

Fire chief: Dust caused pellet company explosion

by NBC 10 News
Tuesday, August 20th 2013

EAST PROVIDENCE, R.I. — The East Providence fire chief says dust was the cause of an explosion and four-alarm fire at a wood pellet company.

The explosion and fire happened Tuesday at Inferno Wood Pellets Co. on 275 Ferris Ave. was reported at about 2:35 p.m.

One worker was injured. Chief Oscar Elmasian of the East Providence Fire Department said he was thrown 20 feet because of the explosion and suffered first- and second-degree burns. The worker was transported to Rhode Island Hospital and released.

"Upon arrival of the first two companies, it was confirmed it was a dust explosion. We had heavy fire in the middle portion of the building. We quickly went to four alarms due to the complexity of the business that is run here because of the pellet company, and also the size of the building," Elmasian said.

Fire crews from Seekonk, Providence, Pawtucket, Warren and Barrington also responded to the blaze.

Elmasian said the fire was tough to put out because of the flammable material inside and the building's location.

At one point, firefighters were ordered out of the factory when part of the

building's roof collapsed.

Several people heard the explosion and ran outside to find out what happened.

"There was a lot of white smoke coming out of the building at first, and all the alarms were going off. So I called 911, talked to the fire department, and they didn't even realize what was going on, and when they got out here, I came down to the end of the road to stop traffic from coming into the street," said Stephen Oliveria, who works as a security guard at a nearby building. "I dismissed it to be an explosion at first and I thought one of the towers just fell over. But then I looked and all of the towers were there and just smoke."

Neighbor John Crawford told NBC 10 that about a year ago, he saw fire trucks race up and down to the plant almost daily.

"This has been ongoing. They'd be coming and showing up here at the plant," he said.

Crawford told NBC 10 that he wrote a detailed e-mail to the former East Providence fire chief in September 2012 about his safety concerns.

"(The former chief) responded to me pretty promptly and just tried to alleviate my concerns and just say, you know, 'They've installed a state-of-the-art system over there. You shouldn't be too concerned about it.' But as you can see with what happened today, it's a definite concern over there," he said.

Jacque Moakler-Wendel said she's one of the many partners who used to operate Narragansett Pellet, the plant's former name.

"They made the fire codes very tough for us. They absolutely hid behind the fire codes in order to put us out of business. We had to declare bankruptcy thanks to the fire codes," she said.

Moakler-Wendel said she was surprised that the new owners were able to afford to bring the building up to code and receive a license to operate.

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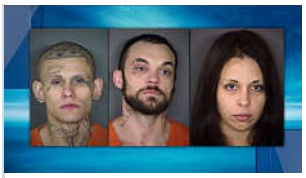

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Managing Combustible Dust & Safety Concerns in Biomass/Wood Pellet Industry

Posted by AnnMarie Fauske on Fri, Nov 01, 2013 @ 02 22 PM

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By Jeff Griffin, Fauske & Associates, LLC

I had the chance to go the USIPA (US Industrial Pellet) conference this week in Miami. Aside from being a great location for a show, it was fascinating to hear how the wood pellet/biomass industry has been growing in the USA and Europe and to hear how companies are ramping up to increase production. Though the Biomass industry is relatively new, this year they had production of 10 MT alone and world demand for wood pellets is supposed to increase more than threefold by 2030.(1) Much of the production to meet this need will be in the US and Canada.

With such rapid growth, there are significant concerns about safety, both for workers and for the processes itself. Several of the speakers referenced how wood pellet production is a 'new' art. **Unlike the Chemical industry, which has well defined processes and hazard mitigation, the pellet industry is still developing best practices for processing and production of their material. Coming from an engineering firm that specializes in process safety, this caught my attention.**

The chemical industry had a series of explosions in the 1960's that drove innovation to appropriately test new materials and scale up production in a safe way. Fauske & Associates, LLC was one of the leaders of that process, and we developed technology to address process-scale-up concerns. While we continue to be a

leader in that field – we have spent the last several years responding to the OSHA Combustible Dust NEP (2) by characterizing the explosive nature of materials through experimentation and providing on-site support to clients with combustible dust issues.

The wood pellet/biomass industry has not been immune to combustible dust concerns. There have been several events in recent years; some recent examples are listed below:

- 2009 – Geneva Wood Fuels LLC for six alleged serious violations of workplace safety standards following an August 2009 explosion at the wood pellet manufacturing plant in Strong, Maine (3)
- 2011 – Dust Explosion at Georgia Biomass due to overheated bearing (4)
- 2012 – BC Dust explosion for beetle-dried wood (5)
- 2013 – OSHA Cites New England wood pellet

Like the chemical industry in the 60's, the pellet industry is growing rapidly, and with that growth comes safety concerns. The raw materials going into the pellet making process needs to be well understood, and the production process needs to be appropriately assessed to ensure that risks are identified and controlled. Characterizing the hazards inherent to the raw materials and having expert support in assessing the risks associated with the process is essential for developing a sound safety program for pellet facilities.

The National Fire Protection Association (NFPA) provides guidance for handling combustible dusts. Standards like NFPA 664 guides safe dust handling in wood processing facilities. In addition, AdvancedBiomass.com also has a great summary of standards and mitigation controls. (6) Standards like NFPA 68 guide venting, and 654 guide prevention of fire and dust explosions. A new code, NFPA 652, (7) is currently in development and will be the overarching standard for managing combustible dust. While currently in a draft form, this code will require that facilities handling combustible dust have the following at a minimum:

- Test data is needed for the materials being processed
- A Process Hazard Analysis (PHA) needs to be conducted to ensure
- A dust management program needs to be developed and instituted

Pelletized fuels in a new and exciting area in the Biomass industry that is expanding rapidly. Rapid growth often coincides with modifying or creating new ways to increase output of existing process equipment to keep up with demand. These changes in processing will raise new questions about safety that will need to be addressed for the industry to succeed. Understand the risks present in processing their materials so they can safely scale-up their processes.

Fauske & Associates, LLC is a Chicago-based process safety engineering firm specializing in testing and consulting on material hazards. This includes combustible dust testing and on-site assessments per NFPA Standards. We have worked with several pellet companies to provide both testing and consulting services.

Sources

1http://www.renewableenergyworld.com/rea/news/article/2013/03/biomass-to-more-than-triple

2https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=directives&p_id=3830

3 http://www.reliableplant.com/Read/23313/OSHA-cites-Maine-pellet-mill

4 http://industrialfireprevention.blogspot.com/2011/07/georgia-biomass-explosion.html

Attachment FF

Enviva's Cottondale facility damaged by fire

Posted: Jun 11, 2017 12:00 AM EDT
Updated: Jun 11, 2017 05:35 PM EDT

COTTONDALE, Fla. - A Jackson County energy-pellet plant has returned to safe operations following a fire Saturday morning.

A spokesperson for Enviva released this statement:

"Enviva's Cottondale Plant incurred minor damage due to a fire on Saturday, June 10th. Two employees were treated for smoke inhalation and have returned to work. After a thorough inspection, the plant returned to safe operations mid-afternoon on Saturday, June 10th. We appreciate the efforts by the local fire departments and first responders who quickly controlled the incident and ensured the health of employees."

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Previous Story:

A Jackson County energy-pellet plant is in need of some major repairs after a fire destroyed several of its conveyors.

Multiple fire department responded around 10:00 a.m. Saturday to Enviva's Cottondale facility located on Farren Ranch Road.

Marianna Fire officials said the fire started in one of the conveyors transferring wood pellets and spread quickly to other conveyors because the system was in operation.

Fire crews spent three hours getting the fire under control. Firefighters from Cottondale, Jackson County, Alford, and Graceville assisted Marianna crews.

Two workers who tried to help extinguish the fire before crews arrived were treated for smoke inhalation at a local hospital, according to Marianna Fire officials.

While firefighters described the damage as "substantial," they said workers were able to resume production before they left the plant early Saturday afternoon.

The cause of the fire is undetermined.

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Attachment GG

Fire at Enviva facility not expected to result in major downtime

By Erin Voegele | January 09, 2014

A fire broke out at Enviva LP's 500,000 metric ton pellet facility in Southampton County, Va., in the early morning hours of Jan. 8. According to a statement released by the company, the fire broke out at approximately 2:30 a.m. in the facility's pellet processing system.

Enviva LP owns a 500,000 metric ton pellet facility in Southampton County, Va.
Enviva LP

"Enviva operators took immediate and appropriate action and called the local fire department," said the company in a statement. "We are grateful for the rapid and professional response of fire departments from Franklin, Courtland, Newsome and Hunterdale. Most importantly, no one was hurt as a result of this event."

According to Enviva, the company is currently assessing the root cause of the fire and the damage, but does not currently expect to experience any major downtime or loss.

Enviva first announced development of the project in November 2011, and broke ground on the facility in July 2012. The facility had been operational for less than a year at the time of the incident.

Information published by Envivia specifies that wood pellets produced at the Southampton plant are transported by truck to the Port of Chesapeake for export to European utilities. The plant employs more than 70 full-time employees.

Enviva owns four other pellet plants, including a 365,000 metric ton plant in Ahoskie, S.C.; a 90,000 metric ton facility in Amory, Miss.; a 500,000 metric ton plant in Northampton County, N.C.; and a 136,000 metric ton plant in Wiggins, Miss.

Related Articles

ENplus certifies 8.1 million metric tons of wood pellets in 2016

ExxonMobil expanding New Jersey research facility

Froling Energy installs biomass boiler at corrections facility

EIA: Densified biomass production reaches 570,000 tons in June

DMT to supply desulfurization process to California AD facility

Fire and Ice

Attachment HH

Air Quality
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

SHEILA C. HOLMAN
Director

June 21, 2016

CERTIFIED MAIL 7016 0340 0000 9267 7147
RETURN RECEIPT REQUESTED

Mr. Jason Ansley, Plant Manager
Enviva Pellets Ahoskie, LLC
142 NC Route 561 East
Ahoskie, North Carolina 27910

Subject: **Notice of Violation**
Wood Dryer Electrostatic Precipitator Grid Downtime March-June 2015
Enviva Pellets Ahoskie, LLC
Ahoskie, Hertford County, North Carolina
Air Permit No. 10121R03, Facility ID: 4600107, Fee Category: Title V

Dear Mr. Ansley:

On June 24, 2016 Ms. Betsy Huddleston of this office completed Enviva Ahoskie's annual full compliance evaluation, which included records review. During her review Ms. Huddleston observed that the No. 1 grid in the wet electrostatic precipitator (WESP) had been down for extended periods from March through June of 2015 while the wood chip dryer appeared to be in operation. She requested additional records from Mr. Joe Harrell to better define the downtimes. She concluded the downtime dates were March 26, 2015 through April 1, 2015, and April 10, 2015 through June 9, 2015, with exclusion of plant shut down days for maintenance or malfunction on April 16, May 19 through May 21, May 30, and May 31, 2015. This totaled 31 days where the No. 1 grid was down while the other two grids and dryer appeared to be in operation.

Based upon information provided by Mr. Harrell, this office understands that the grid downtime was attributed to a pump failure (it was replaced on April 14, 2015), buildup on the grid that eventually broke loose, and fires at the plant that hampered operations, which delayed attention to the No. 1 grid failure. The Division of Air Quality (DAQ) did not receive any malfunction notifications for this period, and had been informed of only one fire on May 31, 2015.

Permit General Condition No. 6 stated, "the facility shall be properly operated and maintained at all times in a manner that will effect an overall reduction in air pollution. Unless otherwise specified by this permit, no emission source may be operated without the concurrent operation of its associated air cleaning device(s) and appurtenances." This requirement is also found in General Condition F. of your current Title V permit (T04). The permit has no condition allowing a long-term alternate operating scenario on the WESP. While malfunctions may be reported under 15A NCAC 2D.0535, frequent and long term control equipment downtime is not acceptable without a permit or special consent issued by the DAQ.

If Enviva wishes to frequently operate the WESP on a reduced number of fields while the plant is in production, a permit application for an alternate operating scenario must be submitted. Stack testing would likely be required in the permit.

Permit Specific Condition 2.1.A.1.f. requires Enviva to establish the minimum primary voltage and minimum current on the WESP within the first 30 days of the effective date of the permit, which was March 22, 2015. Enviva established the first official day of monitoring against the minimums as June 9, 2015. Mr. Harrell provided an observation dated May 27, 2015 to suffice as documentation of minimum voltage and current, which are 20 kV and 200 mA for each grid. The condition also requires Enviva to monitor and record the primary voltage and current through the precipitator daily. Enviva has been recording the average voltage and current for each 24-hour day on each WESP grid, which meets the permit requirement. Ms. Huddleston reviewed the daily voltage and current averages from June 9, 2015 through March 31, 2016. There were 23 days where the average voltage was below the minimum for at least one TR set, and 45 days where the average current on at least one field was below the minimum.

The purpose of conducting the monitoring under Condition 2.1.A.1.f. is to provide indication that the wood dryer is operating in compliance with its particulate emission limit established under 15A NCAC 2D.0515. Voltages and currents below the minimums could be considered as noncompliance with 2D.0515. It is recommended that Enviva further review WESP operations to confirm grid minimum voltage and current.

This letter serves as a formal notification that Enviva's failure to properly operate and maintain the WESP for 31 days between March 26, 2015 and June 9, 2015 was a violation of Permit General Condition No. 6. This violation can result in possible civil penalties as per North Carolina General Statute 143-215.114A. **A civil penalty may be assessed against a company who violates or fails to act in accordance with the terms, conditions, and/or requirements of any permit issued under General Statute 143-215.108.**

Please remember to report this NOV in your March 2016 Title V Annual Compliance Certification. If you have any questions or concerns, please contact Ms. Betsy Huddleston or me at (252) 946-6481.

Sincerely,

Robert P. Fisher, Regional Supervisor
Division of Air Quality, NCDEQ

RPF/eth

cc: WARO
RCO/SSCB

(g:\AQ\Shared\Hertford46\00107\20160721nov.doc)

Attachment II

May 25, 2017

VIA E-MAIL AND U.S. MAIL

Jamie Kritzer
Acting Deputy Secretary for Public Affairs
Office of Environmental Education and Public Affairs
North Carolina Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601
jamie.kritzer@ncdenr.gov

Re: Public Records Request: Enviva's Ahoskie, Northampton, Sampson, and Hamlet Wood Pellet Manufacturing Facilities; Nature's Earth Wood Pellet Manufacturing Facility.

Dear Mr. Kritzer:

Pursuant to North Carolina public records law, N.C. GEN. STAT. §§ 132-1 to 132-11, GreenLaw requests production of public records in the possession or control of the Department of Environmental Quality regarding:

1) Any past or pending air permit applications submitted by wood pellet manufacturing facilities since January 1, 2009, including but not limited to Enviva Ahoskie, Facility ID No. 4600107; Enviva Northampton, Facility ID No. 6600167; Enviva Sampson, Facility ID No. 8200152; Enviva Hamlet, Facility ID No. 7700096; Nature's Earth Pellets, Facility ID No. 8300104;
2) Any testing results from wood pellet manufacturing facilities, including but not limited to facilities listed in paragraph (1), since January 1, 2009, as well as out-of-state test results in the Department's possession, including but not limited to test results from Enviva Wiggins and Enviva Amory pellet manufacturing facilities located in Mississippi, since January 1, 2009;
3) Any records pertaining to the selection, formulation, or accuracy of emission factors utilized in drafting permits or in compliance monitoring at the facilities listed in paragraphs (1) and (2) since January 1, 2009;
4) Any records pertaining to proposed or actual production limits, softwood limits, or other synthetic minor limits for air permits at facilities listed in paragraph (1) since January 1, 2009.

Electronic copies are preferred. If the permit applications listed in paragraph (1) are only available in paper format, and copying or scanning will be burdensome, please contact me. We may prefer to narrow our request.

As used in this letter, the term "public records" or "records" includes all written, printed, recorded, or electronic documents, materials, communications, correspondence, memoranda, notations, copies, diagrams, charts, tables, spreadsheets, formulas, directives, observations, impressions, drafts, contracts, letters, messages, e-mails, deleted e-mails, emails in personal accounts, mail, notes, records of phone conversations, calendar entries, and text messages in the possession, custody, or control of the Department of Environmental Quality. N.C. GEN. STAT. § 132-1. Please provide any electronic records, including electronic mail, in their native file format.

Public records must be provided to a requestor "as promptly as possible" upon payment of any fees, which shall not exceed the actual cost of reproducing the public record. N.C. GEN. STAT. §§ 132-1, 132-6, 132-6.2. Please notify us before proceeding if costs will exceed $100. However, we also request a fee waiver as production of the requested information is in the public interest and will contribute significantly to the public's understanding of how emission factors are selected for permitting in the emerging wood biomass industry. This information is not being sought for commercial purposes.

If you withhold any responsive information or records, please provide an index describing each item withheld and explaining the statutory exception that you believe applies to justify withholding each document, in sufficient detail to allow us and/or a court to evaluate the application. In the event of deletions or redactions, we request that a reason be stated for each denial or partial denial of access.

Thank you in advance for your cooperation. We are available to review public records prior to any duplication and are willing to discuss other ways to facilitate the production of the requested public records. Please do not hesitate to contact me at 404-659-3122 or *panderson@greenlaw.org* to arrange for inspection, copying, and electronic transmission of the requested public records.

Sincerely,

Patrick Anderson