Forum

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Jones & Henry Engineers, Ltd.

New Archbold Wastewater Treatment Plant Starts

By Dail C. Hollopeter, P.E.

After almost two years of construction, the new wastewater treatment facilities in Archbold, Ohio became fully operational in November 2007. The new or upgraded facilities consist of a raw wet well grease removal system; a new raw wastewater pump; the conversion of two former rectangular final clarifiers to primary settling tanks; the conversion of a former aerobic digester to an aeration tank; the addition of one centrifugal blower and installation of additional fine bubble diffusers; the conversion of two former rectangular clarifiers to chlorine contact tank and post-aeration tank; two new circular final clarifiers; new return sludge pumps; a new plant outfall; conversion of the former tertiary lagoon to a wet weather retention lagoon; new chlorination and dechlorination systems; new ferrous chloride storage tank; conversion of a former secondary anaerobic digester to a primary digester and a new mixing and heating system for the existing primary digester; new gravity belt thickener with feed pump, polymer system, and thickened sludge pump; new computer-based process monitoring and

control system; and a new Operations Building.

For several years, the Village had operated a treatment plant that was overloaded due to increasing loads from a local food processor. The plant showed a high degree of resilience in maintaining treatment

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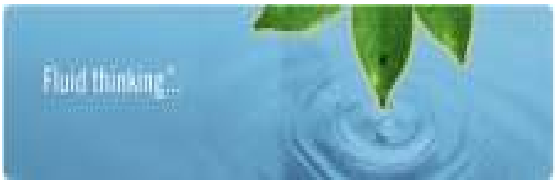
Website Update

By Homer Wilson

Jones & Henry is pleased to announce our new website. We feel our website has become a valuable tool in communicating with our business associates, and the changes should improve our ability to convey information and interact with our clients. We have adopted *Fluid thinking…* as the theme for the site. We feel Fluid thinking reflects our business approach to solving problems in our industry. As a company, we deal primarily with fluids (water, wastewater or storm water). Additionally, we believe that our staff has the ability to look at each project we encounter from a unique perspective, and then apply our knowledge and experience to provide an effective solution to the problem. While we use our past experience and knowledge, we are flexible and work with our clients to develop innovative solutions for you.

New Features - Bidding information including advertisements and bid tabulations will be available on the site. Secure project areas can be set up so clients can have access to important project documents. Also, links are available for your easy reference to valuable information

Please check out our website and let us know what you think.



Visit the web page

www.jheng.com

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New Archbold Wastewater Treatment Plant Starts

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This was an incredibly complex project for its relative size, and all parties involved are to be commended. Jones & Henry Engineers, Peterson Construction, the Archbold Engineering Dept, and Wastewater Supt. Frank D'Ambrosia and his team all displayed a high level of professional competence that brought the project to successful completion on time and with a minimum of change orders.

Dennis Howell, Village Manager

including nitirification, with annual average organic loadings of as much as 200 percent of the design loading. During discussions between the Village and food processor for several years, the food processor would not commit to either pretreating their discharge or making a long-term commitment to the Village for future flows and loadings. Finally, facing deteriorating effluent quality due to high flows and loadings, the Village chose to proceed with the treatment plant improvements

The new facilities have a design average daily flow rate of 2.5 million gallons a day. The design organic loading was increased by 66 percent. Flow rates in excess of 5.0 million gallons a day can be diverted to a wet weather retention lagoon for future treatment. Because of the extensive plant records proving the long -term capability of the secondary treatment system and anaerobic digesters, Ohio EPA approved design organic loadings significantly higher than the recognized standard loadings.

The project involved extensive work in converting existing tankage and piping, much of which was constructed in 1959, to new purposes. It was a tight site with very congested piping in some underground areas and building basements. The plant was overloaded to begin with and to keep treatment units in service as much as possible, it was necessary to implement a complicated sequence of construction. About halfway through the construction, the local food processor announced intentions to close and move production to a new facility in Texas. Instead of gradually diminishing their discharges, their loading to the plant actually increased significantly as they increased production to build up inventories in anticipation of their move. As a result of the announced closure, the Village considered deleting some of the improvements but determined that the construction was too far along to result in significant savings. Recently, due to cooperative efforts of local government and plant management, and outstanding performance at the Archbold processing plant, the food processor announced its intentions to keep their plant in Archbold open. This was a welcome exclamation point to the completion of the wastewater plant improvements.

The new facilities were constructed by Peterson Construction Company at a final cost of $5.55 million. The project was constructed with a high degree of cooperation among all involved parties. The plant improvements were designed by Jones & Henry Engineers. During construction, the Archbold Engineering Department functioned as the engineer and as the resident project representative, with Jones & Henry providing shop drawing reviews and answering questions. The treatment plant staff worked hard to maintain treatment during the construction while being trained on the new equipment. The new plant facilities are performing very well with typical effluent CBOD, suspended solids, and ammonia concentrations of 2 mg/L, 7 mg/L, and 1 mg/L, respectively. An open house is scheduled for June 8.

Arc Flash Safety in the Workplace

by Paul McNichol, P.E.

Introduction

Explosive equipment failures and the rate of serious burn injuries in the electrical industry have been studied for many years. Detailed investigation into the arc flash phenomena by many researchers has led the NFPA to adopt arc flash guidelines in NFPA-70E for work performed on or near energized electrical equipment. Beginning in 2002 the National Electric Code adopted Arc flash Hazard labeling requirements and the IEEE-1584 "IEEE Guide For Performing Arc Flash Hazard Calculations" was released.

While OSHA recommends that work on electrical equipment be performed while de-energized, the requirement for continuous supply of power has brought about the need for electrical workers to perform maintenance work on exposed live electrical equipment. When electrical workers work on energized equipment they expose themselves to potential electrical shock hazard. Although electrical safety programs have existed since the beginning of electricity, arc flash hazard has not been prominently addressed until recently.

What is Arc Flash ?

Two familiar examples of an electric arc that approximate an arc flash event would be that produced by an arc welder or a bolt of lightning. The latter more closely resembles an arc flash event due to its uncontrollable nature. Generally, arc faults are limited to systems where the system voltage is in excess of 120 volts. Lower voltage levels can initiate arcs but normally will not

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Arc Flash Safety in the Workplace

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sustain them. Specifically, an Arc Flash is the result of a rapid release of energy caused by a short circuit between two or more electrical conductors. The cause of the short circuit normally burns away and the arc fault is then sustained by the air between the conductors. The massive energy discharge associated with an arc flash burns the conductors and enclosures alike, vaporizing the metal and thus causing an explosive volumetric increase in the surrounding air known as the arc blast. The blast wave is conservatively estimated to result from a 40,000 to 1 expansion ratio. The blast pressure can tear apart structures, creating deadly shrapnel. Workers caught in this deadly pressure wave can be lifted off of their feet and propelled away from the source of the blast. The intense heat generated by an arc flash can cause serious burns to workers standing up to 10 feet away.

Below is a picture that illustrates the deadly nature of Arc Flash incidents. The picture was taken by a security camera and captures the immediate aftermath (less than 2 seconds afterwards) of an Arc Flash event. The event was initiated by a worker laying in the bottom of the 15KV switchgear shown. It is theorized that this worker's tools inadvertently came into contact with the live bus to initiate the event. The worker to the right was standing in the door of the switchgear cubicle when the flash occurred. He weighs over 300 pounds and was propelled over 12 feet by the force of the arc blast. . The worker to the left was laying in the bottom of the cubicle is engulfed in flames as he staggers away from the switchgear. Both individuals were seriously injured. Neither worker was wearing personal protective equipment (PPE).

Purpose of an Arc Flash Hazard Analysis

The purpose of an arc flash analysis is to identify the following:

- Potential arc flash hazards associated with work on energized electrical equipment.
- Arc Flash protection boundary
- The proper PPE and protective clothing necessary to prevent injury during an Arc Flash event.

Elements of an Arc Flash Hazard Analysis

Data Collection

To perform an arc flash hazard analysis, data is collected about the facility's power distribution system. The data essentially includes specifications of every device and lengths and cross sectional area of all interconnecting cables. The electrical service provider should be contacted for information including the minimum and maximum fault currents that can be expected at the service entrance to the facility. Once the data has been collected, it is entered into a computer program used to perform a short circuit study followed by an overcurrent protective device coordination study.

Short-Circuit Study

The purpose of the short circuit study is to determine the maximum available fault current at each significant point in system. The short circuit values obtained from this analysis are generally used as a means of comparison to determine if equipment is rated to withstand, and/or interrupt, the calculated fault currents.

Coordination Study

An overcurrent protective device coordination study involves the examination of the electrical system overcurrent protective devices (fuses, relays, circuit breakers). The primary goal is to ensure that over-current protective devices are rated, and/or adjusted so only the device nearest the fault opens. The result is to isolate the faulted circuit from the system while permitting the rest of the system to remain in operation. The secondary goal of the coordination study is to limit the fault energy, thereby reducing the arc flash hazard level at electrical equipment. These two goals often conflict to where one may have to be sacrificed to achieve the other.

The resultant data from the above two studies can then be fed into the equations described by either NFPA 70E or IEEE Standard 1584. From these equations the following arc flash data can be quantified:

- Available incident energy due to an arcing event
- Required flash protection boundary distances
- Required minimum PPE requirement.

For more information on an Arc Flash study at your facility, contact Paul McNichol at 419-473-9611.

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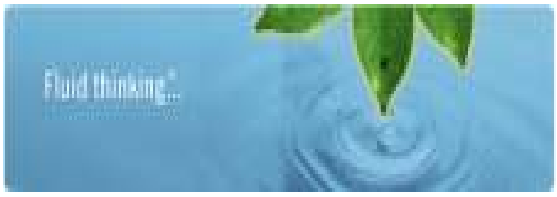

Fluids are not only the matter we deal with, but represent the process we use in developing solutions to unique problems. We are not limited to past solutions. Our success is demonstrated by our repeat business. Whether we are designing, modifying, or optimizing a system, our experienced engineers and operators lend their expertise for quality results. Our commitment to our clients and employees is best stated in our Mission Statement.

Jones & Henry is dedicated to providing quality engineering services. We are committed to meeting project requirements with exceptional service; to developing long-term relationships with our clients; and to providing continuing opportunities for our colleagues.

Developing long term relationships is rooted in our professionalism.

Employees in the Spotlight

Jean Pierre Nassaux, P.E., has been appointed an Associate. Jon joined Jones & Henry's staff in 2005. He received his Bachelor of Science in Civil Engineering degree from Lawrence Technological University, and is a registered Professional Engineer in Ohio and Michigan. Jon is the Director of Structural Engineering at Jones & Henry. He is responsible for structural engineering designs and evaluations, setting the direction and standards for the structural engineering department and monitoring the quality control and output of the structural engineering staff.

Christopher J. Hauser, P.E. has joined Jones & Henry's staff as a Senior Engineer. Mr. Hauser has twenty-three years of experience with consulting firms, focusing on storm water related projects, including Army Corps of Engineers and FEMA related issues. At Jones & Henry, he will be responsible for hydraulic and hydrologic studies, utility system modeling, and flood plain and storm water management projects. Chris received his Bachelor of Science in Civil Engineering degree from the University of Texas San Antonio, and is a registered Professional Engineer in Ohio.

Clow Valve Company Issues a Product Safety Notice

Jones & Henry has received the following notice:

The Clow Valve Company has issued a product safety notice for Medallion and F2500 fire hydrants with cast years of 2002, 2003 and 2004.

"Clow has confirmed that from mid 2002 to mid 2004 a manufacturer-approved grease was used to lubricate the upper stem threads that causes corrosion of the thread material. If left unimpeded the corrosion could eventually result in a hard or, in extreme cases, impossible-to-operate hydrant."

For further details on this public notice and how to obtain replacement parts please visit the Clow Valve Company web site at www.clowvalve.com.