11-TTAG-013

Company Name	Algonquin Industries
NAICS	331319
Address	1800 S US Highway 61
City	Osceola
State	AR
ZIP	72370
County	Mississippi
Number of Employees	27
Year Established	1976
Company Web Site	http://www.algonquin-industries.com
Contact Person	Matt Slonaker
Title	Plant Engineer
Phone	870-563-5207
Email Address	mslonaker@algonquin-industries.com
Fax	870-563-1207
Secondary Contact Name	Matt Stowe
Secondary Contact Title	General Manager
Secondary Contact Phone	870-563-5207
Secondary Contact Email	mstowe@algonquin-industries.com
Resource Provider	Leiver Technical Services, LLC
RP Address	10300 Legacy Lane
RP City	Hackett
RP State	AR
RP ZIP	72937
RP County	Sebastian
RP Project Contact	Timothy A. Fox

RP Title	President
RP Phone	479-883-1600
RP Email	tfox@leiver.com
RP Fax	877-534-8370
Project Area	None of the above - 32 - (Please provide short description in box provided below)
Project Area Brief Description	Electrical Safety
Federal Agency	- Not Applicable -
Project Title	11-TTAG-013 - Arc Flash Hazard Assessment & Mitigation – Phase 1 of 2
Competitive Challenges	Algonquin Industries, a division of Rea Magnet Wire Company, began Osceola operations in 1976. Algonquin produces bare and insulated aluminum and copper wire, bar products, and transformer lead cables and contributes to Rea Magnet Wire Company's position as the largest producer of magnet wire in North America and China and the second largest in the world. Magnet wire is a required component of every motor and transformer, no matter who builds it or where in the world it's built. Everything that is electrically driven - from cars to computers - contains magnet wire. If you depend on electricity, you depend on magnet wire. As with any viable company in today's turbulent economy, Algonquin Industries must produce a superior product at competitive prices while maintaining a manufacturing environment that is conducive to retaining a highly skilled and dedicated work force.
Specific Problem	OSHA has recently published its Electrical Safety Standard: Final Rule. This standard became effective on August 13th, 2007 and established the National Fire Protection Association (NFPA) 70E as the national consensus standard for electrical safety in the workplace. The NFPA 70E is a comprehensive guide to electrical safety and requires that electrical hazards be quantified and labeled in order for employees to be able to identify, and understand, the hazards associated with their job duties. These new standards are being driven by the fact that utility companies are increasing the capacity of their service to meet growing demand and arc flash incidents are killing more employees on a daily basis (CapSchell, Inc.) than shock hazard or electrocution. Understanding the electrical hazards identified by this project will enable employees to select the appropriate PPE that will protect them from these hazards thus reducing the chance of suffering serious injury or death. Algonquin Industries has an immediate need to complete these mandated assessments.

Solution	Until recently, quantifying arc flash incident energy levels, and the subsequent heat and pressure developed by the arc flash, was done by hand and was very time consuming and difficult. There are approximately 14 variable attributes that must be considered when quantifying arc flash and blast hazards. Software developers and electrical engineers have been working together to produce software that enables these assessments to be completed relatively quickly, accurately, and with less chance of human error. The software used in this project was developed by ESA, in Clackamas, Oregon and allows the user to model an electrical distribution system and estimate incident energy levels based on IEEE 1584 and NFPA 70E standards. The incidents energy levels are expressed in calories per centimeter squared (cal/cm2) and are used to designate, or select, the appropriate PPE to protect employees working on or near energized electrical equipment. This overall process involves: gathering electrical equipment installation data, electrical system modeling, short circuit assessment, protective device coordination, arc flash assessment, equipment labeling, and electrical safety program implementation. The first phase of this project will include gathering necessary data, modeling the electrical system, and calculating available short circuit current throughout the system. The short circuit current will then be used in the second phase which will include: protective device coordination, arc flash assessment, labeling, and program implementation.
Implementation Plan	Leiver Technical Services, LLC will systematically analyze the electrical distribution system at the Algonquin Industries facility in Osceola, Arkansas. The analyses require that a great deal of data be obtained by on-site assessment. The gathered data will then be entered into a commercially available software program that will allow the short circuit currents, arcing currents, device coordination, and arc flash hazards to be calculated. The end result not only quantifies the electrical hazards but also identifies these hazards via labeling and ultimately provides a method to designate the appropriate PPE to protect employees.
Maintenance Plan	After the assessments have been completed, electrical equipment labeled, and appropriate PPE purchased, an Electrical Safety Program based on the NFPA 70E will be developed. This comprehensive program will outline the electrical safety program procedures, controls and principles. The solution will be maintained in accordance with these principles which include periodic audits and assessments of the equipment and personnel.
Step 1	GATHER ELECTRICAL SYSTEM DATA The first step of the first phase will be to gather data on the electrical distribution system that is necessary for a comprehensive assessment. The data will be gathered via on-site surveys,

	existing single-line diagrams and drawings, and equipment manufacturers' documentation. The data will include: electric utility service, bus voltages, fuse and circuit breaker settings/ratings, transformer data, cable installation data, switchboard, panelboard, and switchgear data, motor specifications, and motor control center ratings. Performed by Timothy A. Fox
Step 1 Time	20.00
Step 1 Budget	$2,000
Step 2	ELECTRICAL DISTRIBUTION SYSTEM MODELING The second step of the first phase will be to create a model of Algonquin Industries' electrical distribution system. The modeling process involves entering the equipment data in a manner that replicates the actual installation. The equipment is "electrically connected" in the software program and is an interactive simulation of the installation. This model then allows for the protective device coordination, short circuit, and arc flash studies to be performed. Performed by Timothy A. Fox
Step 2 Time	20.00
Step 2 Budget	$2,000
Step 3	PERFORM SHORT CIRCUIT ASSESSMENT After the model is developed and verified, a short circuit study will be performed to calculate the available 3 phase symmetrical fault current at various buses throughout the electrical distribution system. These buses will be identified as points in the system where an employee may be exposed to an energized part thus increasing the risk of injury or death. This is accomplished via the software program. These fault currents must be known in order to determine how long it will take the protective devices (fuses, circuit breakers etc.) to open and clear the fault while taking into account, the motor contribution to the short circuit. These times, coupled with the short circuit current, will be used in the second phase of this project to estimate the incident energy levels. The fault current is a major attribute that dictates the severity of an arc flash and the resulting energy. Performed by Timothy A. Fox
Step 3 Time	10.00
Step 3 Budget	$1,000
Increased Sales	$0
Retained Sales	$0
CS Inventory	$0

CS Labor	$20,800
CS Materials	$0
CS Other	$208,000
II Plant	$0
II IS	$0
II Workforce	$10,495
II Research	$0
II Other	$0
AUI	$0
SOI	$0
Job Retention	0
Job Creation	0
YN 90Days	Yes
YN Affiliation	No
YN Agreement	Yes
YN Total Project Price	Yes
Explain Total Project Price	
YN Cash Match Agreement	Yes
Copied	No
TTAG ID	11-TTAG-013
Signature Panel - RP AR Name	Timothy A. Fox
Signature Panel - RP AR Email	tfox@leiver.com
Signature Panel - Enterprise AR Name	Matt Slonaker
Enterprise - Email	
Signature Panel - Enterprise AR Email	mslonaker@algonquin-industries.com
Include in Batch	Yes

Batch Number	NA
Application Status	Pending
Organization	AMS
BatchTest	Processed
Batch Date	
Set Batch Number	
Lvl4	Yes
Application Description	1-Quality Projects
SBIR-STTR	No