P. O. Box 981241 • 48198-1241
624 South Mansfield • Ypsilanti, Michigan 48197
Voice: 734-482-0977 • E-Mail: info@afsmith.com
Estimating/Purchasing Fax: 734-482-2034
Accounting Fax: 734-482-0817

City of Ann Arbor

RFP – No. 22-83

Wheeler Center Lighting Improvements

QUOTATION FORM

SECTION 2 – MATERIAL, EQUIPMENT AND ENVIRONMENTAL ALTERNATES

The Base Bid proposal price shall include materials and equipment selected from the designated items and manufacturers listed in the request for quotation. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the Contractor wishes to quote alternate items for consideration by the City, it may do so under this Section. A complete description of the item and the proposed price differential must be provided. Unless approved at the time of award, substitutions where items are specifically named will be considered only as a negotiated change in Contract Sum.

If an environmental alternative is bid the City strongly encourages bidders to provide recent examples of product testing and previous successful use for the City to properly evaluate the environmental alternative. Testing data from independent accredited organizations are strongly preferred.

Item Number	Description	Add/Deduct Amount
None		

If the Contractor does not suggest any material or equipment alternate, the Contractor should complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any material or equipment alternate under the Contract.

Signature of Authorized Representative of Contractor Brian D. Koepp Date 01/10/2023

Brian D. Koepp, President

BID FORM

SECTION 3 - TIME ALTERNATE

If the Contractor takes exception to the time stipulated in the Summary of Work-Mechanical, it is requested to stipulate below its proposed time for performance of the work. Consideration will be given to time in evaluating the quotation.

None

If the Contractor does not suggest any time alternate, the Contractor should complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any time alternate under the Contract.

Signature of Authorized Representative of Contractor Brian D. Koepp Date 01/10/2023

Brian D. Koepp, President

BID FORM

SECTION 4 - MAJOR SUBCONTRACTORS

For purposes of this Contract, a Subcontractor is anyone (other than the Contractor) who performs work (other than or in addition to the furnishing of materials, plans or equipment) at or about the construction site, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of Contract with the Contractor), but shall not include any individual who furnishes merely the individual's own personal labor or services.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision to Section 4 of the General Conditions covering subcontractor's employees who perform work on this contract.

For the work outlined in these documents the Bidder expects to engage the following major subcontractors to perform the work identified:

Subcontractor (Name and Address)	Work	Amount
None		
	Electrical	
	Programming/Controls	

If the Bidder does not expect to engage any major subcontractor, the Bidder should complete the following statement:

For the work outlined in this request for bid, the bidder does NOT expect to engage any major subcontractor to perform work under the Contract.

Signature of Authorized Representative of Contractor Brian D. Koepp Date 01/10/2023

Brian D. Koepp, President

BID FORM

SECTION 5 – CONTRACTOR REFERENCES

Include a minimum of 3 references from similar project completed within the past 10 years.

1) U of M - School of Dentistry-FA | $2,365,000.00 | 2020 - 2022
Project Name | Cost | Date Constructed

Greg Brand - Granger Construction Co. | 734-904-1169
Contact Name | Phone Number

2) U of M - Ruthven -FA | $1,260,000.00 | 2019 - 2022
Project Name | Cost | Date Constructed

Robert Rankin - Barton Malow | 248-302-4468
Contact Name | Phone Number

3) Yankee Air Museum - New Hanger | $732,225.00 | 2021 - 2022
Project Name | Cost | Date Constructed

William Clark - Quadrants | 248-960-3900
Contact Name | Phone

A.F. SMITH ELECTRIC INC. SINCE 1920

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Voice: 734-482-0977 • E-Mail: info@afsmith.com
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Qualifications, Experience and Accountability

1) Qualifications: See the attached for a Company Profile. As for staff, our office staff has many years of experience in estimating, project management and project administration. Our field staff are all graduates of the Ann Arbor Electrical Training and Apprenticeship program as well as many years of experience beyond that.

2) References: Will be provided if needed and being considered for award.

3) Quality Assurance: We do not currently have a plan in place, but all of our field staff are trained professionals who install the work according to established industry standards and in accordance with the NEC. We also have our Project Managers and Superintendent work closely with the field staff to ensure proper installations.

4) Sub-Contractors: There is no need for subcontractors on this project. We will be performing this project 100% with our own direct employees.

_____

Brian D. Koepp, President
A. F. Smith Electric, Inc.

a.f.smith ELECTRIC INC.

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Company Profile

Soon after electricity first began to power the country, A.F. Smith Electric was there. Established in 1920, the company provides superior electrical contracting services to commercial, residential, industrial, and institutional clients throughout South-Central Michigan.

With a client base that includes Michigan's leading manufacturers, property managers, engineering firms, contractors, construction managers, developers, academic institutions, government institutions, commercial businesses, and residential homeowners. A.F. Smith Electric has built its reputation for quality work and customer satisfaction job-by-job and project-by-project.

With today's fast changing and constantly evolving technology in electrical systems, a company must meet the increasingly sophisticated needs of its customers, whatever those needs may be. To meet these needs, we maintain an ongoing schedule of training classes for our staff. On a continuing basis we provide instruction in the latest technology, safety procedures, tools, and products. When our electricians are in the field, they are among the best prepared professionals in the work force. With a large core of skilled electricians and an office staff, with over 200 combined years of electrical experience and a full-time safety director, we've developed the effective working relationships and skill sets that translate into smoothly running projects.

A.F Smith has a very extensive and diversified resume of successfully completed projects. Please see the attached sheets for a selection of projects spanning from 2010 through to current projects.

A.F. Smith Electric's service department is second to none. Darrell Kasem is our Service manager and with over 22 years of electrical experience, there is almost no situation he has not encountered and solved. We have five full-time service electricians that are on call 24 hours a day / 7 days a week to handle any emergency situation that may arise, and a pool of more, which are assigned to various construction projects, to supplement any need. Our response time for an emergency call is typically as follows:

- A call back within 45 minutes if the initial phone call is not answered.
- An electrician on site within 2 hours of contact.

A.F. Smith's service electricians are skilled problem solvers as well as highly skilled electricians. We perform service / electrical maintenance for a wide variety of clients. Below is a small list of existing clients we provide service for.

Ford Motor Company
Eastern Michigan University
University of Michigan
Dexter Community Schools
Costco Wholesale
Eby-Brown Company
I.H.A. Health Care Systems
Ann Arbor District Library
City of Ypsilanti/Parks and Rec. Dept.
American Honda
Washtenaw Community College
Ann Arbor Public Schools
Ypsilanti Public Schools
City of Ann Arbor Parks & Rec
Republic Parking
American Soy Products
Briarwood Mall
St. Joseph Mercy Hospital

The above list is just a portion of the clients served through A.F. Smith's service department and doesn't count all the apartment / condo communities and residential customers that we serve.

Aside from our construction and electrical service divisions, A.F. Smith also provides the following services:

- Complete underground installations / circuit tracing and repair
- Site lighting
- Customized maintenance programs
- Data / communication networks
- Design / Build
- Energy efficient retrofitting
- Power quality / power management analysis
- Programmable logic controllers
- Security / camera / card access systems
- Fire alarm systems
- Thermography

Our mission is to provide these services in a professional manner with quality and value as our objective. In order to help us achieve our mission we own and maintain the following equipment and staff licensed operators to insure safe and quality installations.

- 22 electrical construction / service vans
- 4 construction / delivery pickup trucks
- 1 stake / delivery truck
- 36' one-man bucket truck
- 65' Boom / Ladder truck
- Backhoe
- Front end loader
- Auguring equipment
- Underground boring equipment
- Dump Truck
- Equipment Trailers
- Vibra-plow
- Underground cable locating equipment
- Man-lifts
- Concrete coring and cutting equipment
- Thermal cameras

A.F. Smith Electric has the experience, training, staff, equipment, and willingness to handle all your electrical needs. We have been serving the community for over 100 years and plan on doing so for another 100 years to come.

Brian D. Koepp, President
734-482-0977
bkoepp@afsmith.com

a.f.smith
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Workplace Safety

1) Safety Program: See copy within packet. If additional copies are needed, feel free to let me know.

2) Evidence of EMR: See attached EMR Letter

3) OSHA-10 Training: I confirm that all of our employees, not just on this project but on all of our projects, will have at least the OSHA-10 but our general requirement of all of our employees is to have the OSHA-30 training. Certificates for those employed on this project will be provided upon request.

4) Safety Record: See attached Citation. We pride ourselves on being very safety conscious and having a very clean safety record in which we had no written violations in over 12 years, until the summer of 2022 in which an accidental "Shock" took place. Subsequently, we engaged in extensive counseling with OSHA to help ensure this type of incident does not happen again.

_____

Brian D. Koepp, President
A. F. Smith Electric, Inc.

OAKLAND INSURANCE
COMMERCIAL INSURANCE • BONDS • PERSONAL INSURANCE

September 30, 2022

RE: A. F. Smith Electric, Inc.
P O Box 981241
Ypsilanti, MI 48198

To Whom It May Concern,

The experience modification rating for A. F. Smith Electric, Inc. for the last three years is as follows:

Policy Term	EMR
9/30/2022 – 9/30/2023	.69
9/30/2021 – 9/30/2022	.67
9/30/2020 – 9/30/2021	.67

If you should need any additional information, please do not hesitate to call.

Sincerely,

Renee Murany

Renee Murany
Commercial Account Manager

Michigan Department of Labor and Economic Opportunity
530 West Allegan Street
P.O. Box 30645
Lansing, MI 48909
Phone: (517) 284-7680 Fax: (517) 284-7685

Inspection Number: 1606597
Inspection Date(s): 07/08/2022 - 08/03/2022
Issuance Date: 09/15/2022
Optional Reporting Number: 22-071/11

Citation and Notification of Penalty

Company Name: A.F. Smith Electric, Inc. and its successors
Inspection Site: 2150 M-36, Pinckney, MI 48169

Citation 1 Item 1 — Type of Violation: **Serious**

408.41723(3)(a): CS PART 17, ELECTRICAL INSTALLATIONS
The employer shall do all of the following:

(a) Limit access to energized electrical equipment such as, but not limited to switch gear, transformers, and service panels to a qualified person
(b) An accident prevention sign on electric apparatus, equipment, and enclosures was not present with the voltage indicated.
(c) A conductor of an ampacity of not less than the rating of the circuit breaker or fuses protecting that circuit was not used.
(d) A bare conductor or earth return was used for a temporary circuit.
(e) Electrical wiring was not protected from physical damage.

Employer not limiting access of other employer employees to energized electrical panels. A maintenance employee accidentally switched on a circuit breaker/switch, which controlled the two hundred seventy-seven (277) volt lighting circuit that employees were working on.

Date By Which Violation Must be Abated: **Corrected During Inspection**
Proposed Penalty: **$2,000.00**

Citation 1 Item 2 — Type of Violation: **Serious**

408.41724(3) CS PART 17, ELECTRICAL INSTALLATIONS

An employee shall not be permitted to be in proximity to any part of an electric power circuit that he may contact unless the employee is protected against electric shock by de-energizing the circuit and locking out and tagging it, or unless the employee working on an energized circuit is guarded by insulation, insulated tools, or insulating matting or blankets sufficient to protect against the voltage involved.

No lock out tag out and/or de-energizing of a two hundred seventy-seven (277) volt lighting circuit prior to employees being allowed to work in the proximity. Other on-site employee energized the two hundred seventy-seven (277) volt lighting circuit breaker/switch at the main electrical panel creating an energized circuit.

Date By Which Violation Must be Abated: **Corrected During Inspection**
Proposed Penalty: **$2,000.00**

See pages 1 through 3 of this Citation and Notification of Penalty for information on employer and employee rights and responsibilities.

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Workforce Developement

1) Workforce Development: It is our initial plan to have 1 Foreman, 2 Journeymen and 2 Apprentices on this project.

2) Compensation Package: See the attached IBEW Local 252 Wage Letter.

3) We are a union Electrical Contractor affiliated with the National Electrical Contractors Association (NECA) and the International Brotherhood of Electrical Workers (IBEW) local 252. As such, A. F. Smith Electric, Inc. is affiliated with the Joint Apprenticeship and Training Program. Specifically, the Ann Arbor Electrical and Training Committee, for this area. Please see the attached citificate.

_____

Brian D. Koepp, President
A. F. Smith Electric, Inc.

WAGE LETTER

Inside Wireman

SouthCentral Division, Michigan Chapter, NECA/Local Union #252, IBEW

$2.38 package increase for 2022

$0.75 increase to Health Plan

Effective May 30, 2022 thru May 28, 2023

	Journeyman	Foreman	General Foreman	Journeyman 2nd shift	Journeyman 3rd shift	Foreman 2nd shift	General Foreman 2nd shift	Foreman 3rd shift	General Foreman 3rd shift
Base Rate	**43.28**	**49.77**	54.10	50.77	56.87	58.38	63.46	65.40	71.09
Vacation (15%)*	6.49	**7.47**	8.12	7.62	8.53	8.76	9.52	9.81	10.66
Health Plan	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
*Pension DB = 12% (5.19) + Pension Compliance Contribution (3.00**):*									
Pension - Defined Benefit	**8.19**	**8.19**	**8.19**	**8.19**	**8.19**	**8.19**	**8.19**	**8.19**	**8.19**
Pension - Defined Contribution (10%)	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
NEBF - 3%	1.49	1.72	1.87	1.75	1.96	2.01	2.19	2.26	2.45
Training (2.0%)	0.87	1.00	1.08	1.02	1.14	1.17	1.27	1.31	1.42
School (2.0%)	0.87	1.00	1.08	1.02	1.14	1.17	1.27	1.31	1.42
LMCF	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
LMCF (drug/safety - employer)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
LMCF (drug/safety - employee)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	75.68	83.64	88.93	84.86	92.32	94.17	100.39	102.77	109.72
National LMCF	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Administrative Maintenance Fund	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

Apprentices:

	1st 40%	2nd 50%	3rd 60%	4th 70%	5th 80%	6th 90%
Base Rate	17.31	21.64	25.97	30.30	34.62	38.95
Vacation (15%)	2.60	3.25	3.90	4.55	5.19	5.84
Health Plan	10.00	10.00	10.00	10.00	10.00	10.00
*Pension DB = 12% (5.19) + Pension Compliance Contribution (3.00**):*						
Pension	8.19	8.19	8.19	8.19	8.19	8.19
Annuity	4.33	4.33	4.33	4.33	4.33	4.33
NEBF - 3%	0.60	0.75	0.90	1.05	1.19	1.34
Training (2.0%)	0.00	0.43	0.52	0.61	0.69	0.78
School (2.0%)	0.00	0.43	0.52	0.61	0.69	0.78
LMCF	0.08	0.08	0.08	0.08	0.08	0.08
LMCF (drug/safety - employer)	0.05	0.05	0.05	0.05	0.05	0.05
LMCF (drug/safety - employee)	0.03	0.03	0.03	0.03	0.03	0.03
	43.19	49.18	54.49	59.80	65.06	70.37
National LMCF	0.01	0.01	0.01	0.01	0.01	0.01
Administrative Maintenance Fund	0.25	0.25	0.25	0.25	0.25	0.25

Fringe benefit contributions are as follows:

Vacation/Holiday/SUB – 15% of base earnings (added to base), subject to withholding & Social Security taxes

Health & Welfare – $10.00 per hour, contributed by Employer for all employees

Defined Benefit Plan – 12% of journeyman base rate per hour **plus** $3.00** per hour (pension compliance contribution)

***Please note: The Pension Compliance Contribution rate is $3.00 per hour added to the existing 12% pension for all employees. To keep the pension in compliance with Federal pension law.*

Defined Contribution Plan – 10% of journeyman base rate per hour for all employees

NEBF – 3% of gross wages for all employees

Training – 2% of base monthly labor payroll

School – 2% of base monthly labor payroll

NLMCF (National Labor-Management Cooperation Fund): $.01 per hour worked for all employees

NECA (National Electrical Contractors Association): 1.1% of gross payroll contributed by the employer. This is paid by NECA members only.

AMF (Administrative Maintenance Fund): **$.25 per hour worked, contributed by the employer**

Calculated by Andrew Mosser amosser@mineca.org (517) 897-0260

The United States Department of Labor

Bureau of Apprenticeship and Training

Certificate of Registration

ANN ARBOR ELECTRICAL JOINT APPRENTICESHIP & TRAINING COMMITTEE
I.B.E.W. LOCAL UNION #252
6920 JACKSON ROAD - SUITE B
ANN ARBOR, MICHIGAN 48103

Registered as part of the National Apprenticeship Program in accordance with the basic standards of apprenticeship established by the Secretary of Labor

APRIL 16, 2002
Date

MI016 780012(R)
Registration No.

Secretary of Labor

Director, Bureau of Apprenticeship and Training

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Social Equity and Sustainability

1) As we are union contractors, we are able to develop our employees to a point, residency not being one of them. That being said, 2% of our staff lives in Ann Arbor and 55% live elsewhere within Washtenaw County.

2) Equal Employment Opportunity: See attached EEOE Document.

3) Same as 2 above.

4) Sustainable Products: Whenever possible, we employ and purchase sustainable processes and products. However, we are first obligated to provide products and processes in accordance with the project specifications.

5) Environmental Record: We have no history of environmental violations or penalties of any sort or from any agency.

Brian D. Koepp, President
A. F. Smith Electric, Inc.

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Equal Employment Opportunity Employer

A. F. Smith Electric is committed to nondiscrimination in employment. All qualified applicants are welcome to apply for jobs with A. F. Smith Electric, Inc and A. F. Smith Electric, Inc. will not discriminate against any employee or applicant for employment based on race, color, sex, religion, age, physical impairment, national origin, height, weight or marital status. In addition, we provide equal employment opportunity for minorities, women, veterans, returning citizens and small businesses.

A. F. Smith Electric, Inc. is committed to strive to the goal of providing economic opportunities, to the greatest extent feasible.

Brian D. Koepp

Brian D. Koepp, President
A. F. Smith Electric, Inc.

E. Schedule of Pricing/Cost – 20 Points

Company: A. F. Smith Electric, Inc.

Notes:
1. Provide a Unit Price and Total Price for all bid items specified.
2. Quantities included in the bid table represent estimated quantities for different work. The CONTRACTOR shall be compensated for the actual number of items completed using the unit prices provided.
3. The City, at its sole discretion, may elect to delete any portion of the work delineated below, with no change to the unit prices provided. Work shall be determined based upon the availability of funds.
4. Any item not provided in the following list shall be considered incidental.
5. Change order shall be awarded based on the base bid or any combination of a base bid and alternate bid in any manner the City believes to be in its best interest.

Item No.	Item Description	Qty	Unit	Unit Price	Total Price	
1.	General Conditions (Max, 10% of items 2 through 125)	1	LS	$31,300.00	$31,300.00	
SITE LIGHTING						
2.	Lamp Replacement Transformer Conversion (HA)	19	EA	$536.84	$10,200.00	
3.	Lamp Replacement Transformer Conversion (HA) SPARE	2	EA	$255.00	$510.00	
4.	Lamp Replacement Transformer Conversion (HA2)	3	EA	$1,093.33	$3,280.00	
5.	Lamp Replacement Transformer Conversion (HA2) SPARE	1	EA	$510.00	$510.00	
6.	Fixture Replacement (HE)	1	EA	$2,160.00	$2,160.00	
7.	Fixture Replacement (HE) SPARE	1	EA	$680.00	$680.00	
8.	Lamp Replacement (SA)	3	EA	$360.00	$1,080.00	
9.	Lamp Replacement (SA) SPARE	1	EA	$56.00	$56.00	
10.	Fixture Replacement (SB)	2	EA	$840.00	$1,680.00	
11.	Fixture Replacement (SB) SPARE	1	EA	$362.00	$362.00	
12.	Fixture Replacement (SC)	3	EA	$1,070.00	$3,210.00	Labor Only
13.	Fixture Replacement (SC) SPARE	1	EA	Fixture Not Included in	above price due to lack of information	
14.	Fixture Replacement (SE)	3	EA	$2,060.00	$6,180.00	LED Lamp Not Available, Replacing Bollard
15.	Fixture Replacement (SE) SPARE	1	EA	$1,550.00	$1,550.00	
16.	Fixture Replacement (SF)	4	EA	$1,037.00	$4,150.00	
17.	Fixture Replacement (SF) SPARE	1	EA	$510.00	$510.00	

18.	Fixture Replacement (SG)	7	EA	$754.30	$5,280.00
19.	Fixture Replacement (SG) SPARE	1	EA	$510.00	$510.00
AUTO WASH & TRUCK WASH LIGHTING					
20.	Fixture Replacement (A)	14	EA	$1,814.29	$25,400.00
21.	Fixture Replacement (A) SPARE	2	EA	$1,070.45	$2,140.90
22.	Fixture Replacement (B)	8	EA	$602.50	$4,820.00
23.	Fixture Replacement (B) SPARE	1	EA	$277.75	$277.75
DECANT STATION					
24.	Fixture Replacement (A)	4	EA	$1,072.50	$4,290.00
25.	Fixture Replacement (A) SPARE	1	EA	$513.78	$513.78
26.	Lamp Replacement (B)	2	EA	$65.00	$130.00
27.	Lamp Replacement (B) SPARE	1	EA	$5.93	$5.93
FUELING STATION					
28.	Fixture Replacement (A)	16	EA	$1,060.31	$16,965.00
29.	Fixture Replacement (A) SPARE	2	EA	$513.78	$1,027.56
30.	Lamp Replacement (B)	1	EA	$226.00	$226.00
31.	Lamp Replacement (B) SPARE	1	EA	$12.84	$12.84
COVERED STORAGE AND PARKING BLDG					
32.	Fixture Replacement (WB)	9	EA	$500.00	$4,500.00
33.	Fixture Replacement (WB) SPARE	1	EA	$542.53	$542.53
34.	Lamp Replacement (FA)	20	EA	$419.00	$8,380.00
35.	Lamp Replacement (FA) SPARE	2	EA	$5.68	$11.36
SALT/SAND BUNKER					
36.	Fixture Replacement (A)	8	EA	$2,012.50	$16,100.00
37.	Fixture Replacement (A) SPARE	1	EA	$1,049.87	$1,049.87
38.	Fixture Replacement (WA)	1	EA	$920.00	$920.00
39.	Fixture Replacement (WA) SPARE	1	EA	$488.19	$488.19
SALT DOME BUILDING					
40.	Fixture Replacement (A)	4	EA	$3,307.50	$13,230.00
41.	Fixture Replacement (A) SPARE	1	EA	$1,050.00	$1,050.00
VEHICLE STORAGE BUILDING					
42.	Lamp Replacement (D (D1))	65	EA	$207.08	$13,460.00
43.	Lamp Replacement (D (D1)) SPARE	7	EA	$5.68	$39.76
44.	Lamp Replacement (A (A1))	41	EA	$383.05	$15,705.00

45.	Lamp Replacement (A (A1)) SPARE	5	EA	$14.73	$73.65
46.	Lamp Replacement (B (B1))	13	EA	$293.85	$3,820.00
47.	Lamp Replacement (B (B1)) SPARE	2	EA	$14.73	$29.46
48.	Lamp Replacement (C (C1))	3	EA	$245.00	$735.00
49.	Lamp Replacement (C (C1)) SPARE	1	EA	$5.68	$5.68
50.	Lamp Replacement (G)	1	EA	$270.00	$270.00
51.	Lamp Replacement (G) SPARE	1	EA	$5.68	$5.68
52.	Lamp Replacement (H)	8	EA	$251.25	$2010.00
53.	Lamp Replacement (H) SPARE	1	EA	$5.68	$5.68
OPERATIONS BULDING					
54.	Fixture Replacement (K)	4	EA	$970.00	$6,880.00
55.	Fixture Replacement (K) SPARE	1	EA	$951.12	$651.12
56.	Fixture Replacement (K1)	8	EA	$1,446.88	$11,575.00
57.	Fixture Replacement (K1) SPARE	1	EA	$951.12	$951.12
58.	Fixture Replacement (K2)	3	EA	$1,719.00	$5,157.00
59.	Fixture Replacement (K2) SPARE	1	EA	$951.12	$951.12
60.	Fixture Replacement (L)	30	EA	$550.00	$16,500.00
61.	Fixture Replacement (L) SPARE	3	EA	$197.75	$593.25
62.	Fixture Replacement (M)	6	EA	$585.83	$3,515.00
63.	Fixture Replacement (M) SPARE	1	EA	$219.77	$219.77
64.	Fixture Replacement (N)	10	EA	$506.00	$5,060.00
65.	Fixture Replacement (N) SPARE	1	EA	$159.45	$159.45
66.	Fixture Replacement (N2 (N3))	21	EA	$578.00	$12,140.00
67.	Fixture Replacement (N2 (N3)) SPARE	3	EA	$219.77	$659.31
68.	Fixture Replacement (S1)	7	EA	$830.71	$5,815.00
69.	Fixture Replacement (S1) SPARE	1	EA	$417.20	$417.20
70.	Lamp Replacement (Utility Shop/Storage-Type not indicated)	3	EA	$175.00	$525.00
71.	Lamp Replacement (Utility Shop/Storage-Type not indicated) SPARE	1	EA	$14.73	$14.73
72.	Lamp Replacement (A (A1))	59	EA	$382.54	$22,570.00
73.	Lamp Replacement (A (A1)) SPARE	6	EA	$14.73	$88.38
74.	Lamp Replacement (B (B1))	12	EA	$294.17	$3,530.00
75.	Lamp Replacement (B (B1)) SPARE	2	EA	$14.73	$29.46

76.	Lamp Replacement (C (C2))	41	EA	$152.20	$6,240.00
77.	Lamp Replacement (C (C2)) SPARE	5	EA	$5.68	$28.40
78.	Lamp Replacement (C1 (C3))	44	EA	$184.55	$8,120.00
79.	Lamp Replacement (C1 (C3)) SPARE	5	EA	$5.68	$28.40
80.	Lamp Replacement (D (D2))	47	EA	$152.02	$7,145.00
81.	Lamp Replacement (D (D2)) SPARE	5	EA	$5.68	$28.40
82.	Lamp Replacement (E (E2))	56	EA	$229.73	$12,865.00
83.	Lamp Replacement (E (E2)) SPARE	6	EA	$14.73	$88.38
84.	Lamp Replacement (E1 (E3))	30	EA	$187.5	$5,625.00
85.	Lamp Replacement (E1 (E3)) SPARE	3	EA	$5.68	$17.04
86.	Lamp Replacement (F (F1))	13	EA	$233.46	$3,035.00
87.	Lamp Replacement (F (F1)) SPARE	2	EA	$14.73	$29.46
88.	Lamp Replacement (G)	6	EA	$160.83	$965.00
89.	Lamp Replacement (G) SPARE	1	EA	$5.68	$5.68
90.	Lamp Replacement (G2)	4	EA	$140.00	$560.00
91.	Lamp Replacement (G2) SPARE	1	EA	$14.73	$14.73
92.	Lamp Replacement (H)	10	EA	$145.00	$1,450.00
93.	Lamp Replacement (H) SPARE	1	EA	$23.08	$23.08
94.	Lamp Replacement (J)	12	EA	$189.58	$2,275.00
95.	Lamp Replacement (J) SPARE	2	EA	$14.73	$29.46
96.	Lamp Replacement (P)	4	EA	$140.00	$560.00
97.	Lamp Replacement (P) SPARE	1	EA	$14.73	$14.73
98.	Lamp Replacement (T)	6	EA	$129.17	$775.00
99.	Lamp Replacement (T) SPARE	1	EA	$10.42	$10.42
100.	Lamp Replacement (U)	2	EA	$207.50	$415.00
101.	Lamp Replacement (U) SPARE	1	EA	$56.52	$56.52
102.	Lamp Replacement (X1 & X2)	32	EA	$464.38	$14,860.00
103.	Lamp Replacement (X1 & X2) SPARE	4	EA	$135.81	$543.24
104.	Lamp Replacement (X3)	15	EA	$209.67	$3,145.00
105.	Lamp Replacement (X3) SPARE	2	EA	$12.91	$25.82
106.	Demolish (V)	2	EA	$590.00	$1,180.00
107.	Demolish (Vestibule square lights-Type not indicated)	6	EA	$260.83	$1,565.00
108.	Disable in Controller (R)	8	EA	$242.50	$1,940.00

109.	Disable in Controller (R1)	3	EA	$255.00	$765.00	
110.	Disable in Controller (R2)	3	EA	$255.00	$765.00	
111.	Emergency Battery Pack – Replacement	123	EA	$351.34	$43,215.00	
112.	Emergency Battery Pack – Replacement SPARE	13	EA	$173.73	$2,258.50	
113.	Occupancy Sensor – Replacement	21	EA	$312.14	$6,555.00	
114.	Occupancy Sensor – Replacement SPARE	3	EA	$187.14	$561.42	
115.	Controller – Replacement	5	EA	$ Lump Sum	$98,715.00	Line items 115,116,117,118, 120 & 121 are quoted as a Lump-Sum
116.	Main Relay Panel – Replacement	1	EA	$	$	
117.	Relay Panel – Replacement	2	EA	$	$	
118.	Relay Panel – New	2	EA	$	$	
119.	Lighting Panel – New	2	EA	$9,215.00	$18,430.00	Non-PowerLink
120.	Contact Closure - New	100	EA	$	$	
121.	Contact Closure – New SPARE	10	EA	$	$	
122.	Final Closeout	1	EA	$0.00	$0.00	
123.	Permit Allowance	1	EA	$5,000	$5,000	
124.	Misc. Allowance	1	EA	$10,000	$10,000	
125.	Certified Payroll Compliance and Reporting	1	EA	$0.00	$0.00	
TOTAL BASE QUOTATION (ITEMS 1 THROUGH 125)					$572,935.00	

Total Base Quotation: Five Hundred Seventy Two Thousand Nine Hundred Thirty Five Dollars

($572,935.00)

(Amount shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.)

A.F. SMITH ELECTRIC INC.
SINCE 1920

P. O. Box 981241 • 48198-1241
624 South Mansfield • Ypsilanti, Michigan 48197
Voice: 734-482-0977 • E-Mail: info@afsmith.com
Estimating/Purchasing Fax: 734-482-2034
Accounting Fax: 734-482-0817

Authorized Negotiator

Name: Brian D. Koepp

Title: President

Phone #: 734-482-0977

Email: bkoepp@afsmith.com

Brian D. Koepp

Brian D. Koepp, President
A. F. Smith Electric, Inc.

ATTACHMENT B
GENERAL DECLARATIONS

City of Ann Arbor
Guy C. Larcom Municipal Building
Ann Arbor, Michigan 48107

Ladies and Gentlemen:

The undersigned, as Bidder, declares that this Bid is made in good faith, without fraud or collusion with any person or persons bidding on the same Contract; that this Bidder has carefully read and examined the bid documents, including City Nondiscrimination requirements and Declaration of Compliance Form, Living Wage requirements and Declaration of Compliance Form, Prevailing Wage requirements and Declaration of Compliance Form, Vendor Conflict of Interest Form, Notice of Pre-Bid Conference, General Information, Bid, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans (if applicable) and understands them. The Bidder declares that it conducted a full investigation at the site and of the work proposed and is fully informed as to the nature of the work and the conditions relating to the work's performance. The Bidder also declares that it has extensive experience in successfully completing projects similar to this one.

The Bidder acknowledges that it has not received or relied upon any representations or warrants of any nature whatsoever from the City of Ann Arbor, its agents or employees, and that this Bid is based solely upon the Bidder's own independent business judgment.

The undersigned proposes to perform all work shown on the plans or described in the bid documents, including any addenda issued, and to furnish all necessary machinery, tools, apparatus, and other means of construction to do all the work, furnish all the materials, and complete the work in strict accordance with all terms of the Contract of which this Bid is one part.

In accordance with these bid documents, and Addenda numbered N/A, the undersigned, as Bidder, proposes to perform at the sites in and/or around Ann Arbor, Michigan, all the work included herein for the amounts set forth in the Bid Forms.

The Bidder declares that it has become fully familiar with the liquidated damage clauses for completion times and for compliance with City Code Chapter 112, understands and agrees that the liquidated damages are for the non-quantifiable aspects of non-compliance and do not cover actual damages that may be shown and agrees that if awarded the Contract, all liquidated damage clauses form part of the Contract.

The Bidder declares that it has become fully familiar with the provisions of Chapter 14, Section 1:320 (Prevailing wages) and Chapter 23 (Living Wage) of the Code of the City of Ann Arbor and that it understands and agrees to comply, to the extent applicable to employees providing services to the City under this Contract, with the wage and reporting requirements stated in the City Code provisions cited. Bidder certifies that the statements contained in the City Prevailing Wage and Living Wage Declaration of Compliance Forms are true and correct. Bidder further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

The Bidder declares that it has become familiar with the City Conflict of Interest Disclosure Form and certifies that the statement contained therein is true and correct.

The Bidder encloses a certified check or Bid Bond in the amount of 5% of the total of the Bid Price. The Bidder agrees both to contract for the work and to furnish the necessary Bonds and insurance documentation within 10 days after being notified of the acceptance of the Bid.

If this Bid is accepted by the City and the Bidder fails to contract and furnish the required Bonds and insurance documentation within 10 days after being notified of the acceptance of this Bid, then the Bidder shall be considered to have abandoned the Contract and the certified check or Bid Bond accompanying this Bid shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Bid, or if this Bid is rejected, then the accompanying check or Bid Bond shall be returned to the Bidder.

In submitting this Bid, it is understood that the right is reserved by the City to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

SIGNED THIS 10th DAY OF January, 2023.

A. F. Smith Electric, Inc. Bidder's Name	Brian D. Koepp Authorized Signature of Bidder
P. O. Box 981241, Ypsianti, MI. 48198-1241 Official Address	Brian D. Koepp, President (Print Name of Signer Above)
734-482-0977 Telephone Number	bkoepp@afsmith.com Email Address for Award Notice

ATTACHMENT C
LEGAL STATUS OF BIDDER

(The bidder shall fill out the appropriate form and strike out the other three.)

Bidder declares that it is:

* A corporation organized and doing business under the laws of the State of Michigan, for whom Brian D. Koepp, bearing the office title of President, whose signature is affixed to this Bid, is authorized to execute contracts.

NOTE: If not incorporated in Michigan, please attach the corporation's Certificate of Authority

~~* A limited liability company doing business under the laws of the State of _____, whom _____ bearing the title of _____ whose signature is affixed to this proposal, is authorized to execute contract on behalf of the LLC.~~

~~* A partnership, organized under the laws of the state of _____ and filed in the county of _____, whose members are (list all members and the street and mailing address of each) (attach separate sheet if necessary):~~

_____

_____

_____

_____

_____

~~* An individual, whose signature with address, is affixed to this Bid: _____~~ __ _____
(initial here)

Authorized Official

Brian D. Koepp **Date** January 10th, 2023

(Print) Name Brian D. Koepp Title President

Company:
A. F. Smith Electric, Inc.

Address:
P. O. Box 981241, Ypsilanti, MI. 48198-1241

Contact Phone (734) 482-0977 Fax (734) 482-2034

Email bkoepp@afsmith.com

ATTACHMENT D
PREVAILING WAGE DECLARATION OF COMPLIANCE

The "wage and employment requirements" of Section 1:320 of Chapter 14 of Title I of the Ann Arbor City Code mandates that the city not enter any contract, understanding or other arrangement for a public improvement for or on behalf of the city unless the contract provides that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. Where the contract and the Ann Arbor City Code are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used. Further, to the extent that any employees of the contractor providing services under this contract are not part of the class of craftsmen, mechanics and laborers who receive a prevailing wage in conformance with section 1:320 of Chapter 14 of Title I of the Code of the City of Ann Arbor, employees shall be paid a prescribed minimum level of compensation (i.e. Living Wage) for the time those employees perform work on the contract in conformance with section 1:815 of Chapter 23 of Title I of the Code of the City of Ann Arbor.

At the request of the city, any contractor or subcontractor shall provide satisfactory proof of compliance with this provision.

The Contractor agrees:

(a) To pay each of its employees whose wage level is required to comply with federal, state or local prevailing wage law, for work covered or funded by this contract with the City,

(b) To require each subcontractor performing work covered or funded by this contract with the City to pay each of its employees the applicable prescribed wage level under the conditions stated in subsection (a) or (b) above.

(c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.

(d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the wage and employment provisions of the Chapter 14 of the Ann Arbor City Code. The undersigned certifies that he/she has read and is familiar with the terms of Section 1:320 of Chapter 14 of the Ann Arbor City Code and by executing this Declaration of Compliance obligates his/her employer and any subcontractor employed by it to perform work on the contract to the wage and employment requirements stated herein. The undersigned further acknowledges and agrees that if it is found to be in violation of the wage and employment requirements of Section 1:320 of the Chapter 14 of the Ann Arbor City Code it shall has be deemed a material breach of the terms of the contract and grounds for termination of same by the City.

A. F. Smith Electric, Inc.
Company Name

Brian D. Koepp — 01/10/2023
Signature of Authorized Representative — Date

Brian D. Koepp, President
Print Name and Title

P. O. Box 981241, Ypsilanti, MI. 48198-1241
Address, City, State, Zip

734-482-0977 / bkoepp@afsmith.com
Phone/Email address

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500

ATTACHMENT E

LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than $10,000 for any twelve-month contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than $10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than $10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here [___] *No. of employees*__

The Contractor or Grantee agrees:

(a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as $14.82/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than $16.52/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance with Section 1:815(3).

Check the applicable box below which applies to your workforce

[___] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits

[X] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits

(b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.

(c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.

(d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

(e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

A. F. Smith Electric, Inc.
Company Name

624 S. Mansfield St.
Street Address

Brian D. Koepp 01/10/2023
Signature of Authorized Representative Date

Ypsilanti, MI. 48197
City, State, Zip

Brian D. Koepp, President
Print Name and Title

734-482-0977 / bkoepp@afsmith.com
Phone/Email address

ATTACHEMENT G

Vendor Conflict of Interest Disclosure Form

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict of interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
5. Please note any exceptions below:

Conflict of Interest Disclosure*	
Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.	( ) Relationship to employee ( ) Interest in vendor's company ( ) Other (please describe in box below)
None	

*Disclosing a potential conflict of interest does not disqualify vendors. In the event vendors do not disclose potential conflicts of interest and they are detected by the City, vendor will be exempt from doing business with the City.

I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the Vendor by my signature below:

A. F. Smith Electric, Inc.		734-482-0977
Vendor Name		**Vendor Phone Number**
Brian D. Koepp	01/10/2023	Brian D. Koepp, President
Signature of Vendor Authorized Representative	**Date**	**Printed Name of Vendor Authorized Representative**

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500, procurement@a2gov.org

ATTACHMENT H

DECLARATION OF COMPLIANCE

Non-Discrimination Ordinance

The "non discrimination by city contractors" provision of the City of Ann Arbor Non-Discrimination Ordinance (Ann Arbor City Code Chapter 112, Section 9:158) requires all contractors proposing to do business with the City to treat employees in a manner which provides equal employment opportunity and does not discriminate against any of their employees, any City employee working with them, or any applicant for employment on the basis of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight. It also requires that the contractors include a similar provision in all subcontracts that they execute for City work or programs.

In addition the City Non-Discrimination Ordinance requires that all contractors proposing to do business with the City of Ann Arbor must satisfy the contract compliance administrative policy adopted by the City Administrator. A copy of that policy may be obtained from the Purchasing Manager

The Contractor agrees:

(a) To comply with the terms of the City of Ann Arbor's Non-Discrimination Ordinance and contract compliance administrative policy, including but not limited to an acceptable affirmative action program if applicable.

(b) To post the City of Ann Arbor's Non-Discrimination Ordinance Notice in every work place or other location in which employees or other persons are contracted to provide services under a contract with the City.

(c) To provide documentation within the specified time frame in connection with any workforce verification, compliance review or complaint investigation.

(d) To permit access to employees and work sites to City representatives for the purposes of monitoring compliance, or investigating complaints of non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the Ann Arbor Non-Discrimination Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Non-Discrimination Ordinance, obligates the Contractor to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract.

A. F. Smith Electric, Inc.
Company Name

Brian D. Koepp 01/10/2023
Signature of Authorized Representative Date

Brian D. Koepp, President
Print Name and Title

P. O. Box 981241, Ypsilanti, MI. 48198-1241
Address, City, State, Zip

734-482-0977 / bkoepp@afsmith.com
Phone/Email Address

Questions about the Notice or the City Administrative Policy, Please contact:
Procurement Office of the City of Ann Arbor
(734) 794-6500

Bid Bond

AIA® Document A310™ – 2010

Bid Bond No. FED03773

CONTRACTOR:
(Name, legal status and address)
A.F. SMITH ELECTRIC, INC.
624 S Mansfield St.
Ypsilanti, MI 48198

SURETY:
(Name, legal status and principal place of business)
GRANITE RE, INC.
14001 Quailbrook Drive
Oklahoma City, OK 73134

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)
City of Ann Arbor
4251 Stone School Rd
Ann Arbor, MI 48108

BOND AMOUNT: Five Percent of the Bid Amount (5.00% of Bid Amount)

PROJECT:
(Name, location or address, and Project number, if any)
Wheeler Center Lighting Improvements; RFP# 22-83

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (I) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 27th day of December, 2022.

(Witness) W. Jeffrey Koepp

(Witness) Karla K. Heffron

A.F. SMITH ELECTRIC, INC.
(Principal) Brian D. Koepp *(Seal)*
(Title) Brian D. Koepp, President

GRANITE RE, INC.
(Surety) Connie Smith *(Seal)*
(Title) Connie Smith, Attorney-in-fact

091110

GRANITE RE, INC.

GENERAL POWER OF ATTORNEY

Know all Men by these Presents:

That GRANITE RE, INC., a corporation organized and existing under the laws of the State of MINNESOTA and having its principal office at the City of OKLAHOMA CITY in the State of OKLAHOMA does hereby constitute and appoint:

MICHAEL J. DOUGLAS; CHRIS STEINAGEL; CHRISTOPHER M. KEMP; KARLA HEFFRON; SAMUEL DUCHOW; ROBERT DOWNEY; JULIA DOUGLAS; CONNIE SMITH; KORY MORTEL; ELIOT MOTU its true and lawful Attorney-in-Fact(s) for the following purposes, to wit:

To sign its name as surety to, and to execute, seal and acknowledge any and all bonds, and to respectively do and perform any and all acts and things set forth in the resolution of the Board of Directors of the said GRANITE RE, INC. a certified copy of which is hereto annexed and made a part of this Power of Attorney; and the said GRANITE RE, INC. through us, its Board of Directors, hereby ratifies and confirms all and whatsoever the said:

MICHAEL J. DOUGLAS; CHRIS STEINAGEL; CHRISTOPHER M. KEMP; KARLA HEFFRON; SAMUEL DUCHOW; ROBERT DOWNEY; JULIA DOUGLAS; CONNIE SMITH; KORY MORTEL; ELIOT MOTU may lawfully do in the premises by virtue of these presents.

In Witness Whereof, the said GRANITE RE, INC. has caused this instrument to be sealed with its corporate seal, duly attested by the signatures of its President and Assistant Secretary, this 3rd day of January, 2020.

Kenneth D. Whittington, President

Kyle P. McDonald, Assistant Secretary

STATE OF OKLAHOMA)
) SS:
COUNTY OF OKLAHOMA)

On this 3rd day of January, 2020, before me personally came Kenneth D. Whittington, President of the GRANITE RE, INC. Company and Kyle P. McDonald, Assistant Secretary of said Company, with both of whom I am personally acquainted, who being by me severally duly sworn, said, that they, the said Kenneth D. Whittington and Kyle P. McDonald were respectively the President and the Assistant Secretary of GRANITE RE, INC., the corporation described in and which executed the foregoing Power of Attorney; that they each knew the seal of said corporation; that the seal affixed to said Power of Attorney was such corporate seal, that it was so fixed by order of the Board of Directors of said corporation, and that they signed their name thereto by like order as President and Assistant Secretary, respectively, of the Company.

My Commission Expires:
April 21, 2023
Commission #: 11003620

Notary Public

GRANITE RE, INC.

Certificate

THE UNDERSIGNED, being the duly elected and acting Assistant Secretary of Granite Re, Inc., a Minnesota Corporation, HEREBY CERTIFIES that the following resolution is a true and correct excerpt from the July 15, 1987, minutes of the meeting of the Board of Directors of Granite Re, Inc. and that said Power of Attorney has not been revoked and is now in full force and effect.

"RESOLVED, that the President, any Vice President, the Assistant Secretary, and any Assistant Vice President shall each have authority to appoint individuals as attorneys-in-fact or under other appropriate titles with authority to execute on behalf of the company fidelity and surety bonds and other documents of similar character issued by the Company in the course of its business. On any instrument making or evidencing such appointment, the signatures may be affixed by facsimile. On any instrument conferring such authority or on any bond or undertaking of the Company, the seal, or a facsimile thereof, may be impressed or affixed or in any other manner reproduced; provided, however, that the seal shall not be necessary to the validity of any such instrument or undertaking."

IN WITNESS WHEREOF, the undersigned has subscribed this Certificate and affixed the corporate seal of the Corporation this 27th day of December, 2022.

Kyle P. McDonald, Assistant Secretary

GR0800-1

A.F.Smith Electric, Inc.

CORPORATE SAFETY MANUAL
&
Workplace Electrical Safe Work Procedures

Table of Contents

A.F. Smith Electric, Inc.
624 S. Mansfield, Ypsilanti, MI.
734-482-0977

Our Commitment to You

A.F. Smith Electric, Inc. most valuable assets are its employees, to whom we are committed to protecting to the fullest extent possible. In safeguarding this asset, we are obligated to provide employees with as safe a work environment as possible. This includes everything associated with the job site; equipment, tools, ground conditions along with a well-managed team of competent and experienced supervisors.

In an effort to achieve a safe work environment, we ask every employee to work safely, report deficient or defective equipment, report any unsafe activities of those working around them and refrain from taking shortcuts. We also encourage employees to inform their supervisor of any suggestions for improving the working conditions, providing safer and/or more productive tools, or employing a better process or method which would reduce exposure to hazards or risks to them or their fellow workers.

Brian D. Koepp: Brian D. Koepp
President

Jeff Sykes: _____
Safety Director/Underground Estimator/Project Manager

Safety Roles and Responsibilities

Executive Management

- Approve and outline the Corporate Safety Policies and Procedures
- Ensure that Safety is a core value in all phases of work and business practices
- Provide safety goals and monitor compliance throughout the company
- Authorize necessary expenditures for safety equipment, training and practices
- Instill safety mentality throughout Company operations. Include safety performance in performance evaluations
- Require all subcontractors to abide by the Corporate Safety Program via contract language
- Review all accidents/incidents/injuries during the weekly executive meeting

Safety Director

- Establish, organize, monitor and enforce the safety policies and procedures of A.F. Smith Electric
- Study and provide information regarding safety regulations and standards
- Educate and train all levels of employees regarding safety compliance with emphasis on the importance of safety
- Develop safety recommendations for specific tasks, workflows and equipment
- Enforce compliance with reporting requirements
- Investigate accidents, incidents which include Stop Work, and injuries: communicate with employees, with Company management, with the insurance company, the victims, and any attorneys in the interest of the Company. Attend claims reviews
- Review and implement corrective action plans for any noted trends
- Assess the effectiveness and quality of the program
- Perform periodic jobsite and facility safety inspections, report findings, with recommendations for corrective action
- Respond to and resolve all noted safety violations
- Attend MIOSHA/OSHA project inspections as the Company representative
- Monitor all required safety related recordkeeping
- Organize and conduct all Corporate Safety meetings
- Develop all required site-specific safety programs
- Monitor the selection and use of personal safety apparatus/apparel
- Monitor the Company's safety training needs: CCO status, CPR/First Aid, HAZMAT, Respiratory Protection, Traffic Control, CDL, DOT, etc.
- Enforce compliance of all safety requirements of the Company, applicable Regulatory agencies, the Client, per the contract documents
- Review and update the Corporate Safety Manual as needed

Safety Roles and Responsibilities continued...

Assist the President in developing project specific safety program requirements and communicate the requirements to all parties during pre-construction and progress meetings

- Call the President when MIOSHA/OSHA or other enforcement regulatory inspectors arrive on the job site
- Communicate project specific safety program requirements to all subcontractors and enforce their compliance
- Track safety corrective action requests that were issued to subcontractors along with verification of the corrective action done with time/date stamp
- Maintain current Miss Dig Logs for their projects and save them as part of the job files
- Discuss corrective action(s) with supervisors in Stop Work situations

Superintendents/Foremen/Site Lead

- Have full responsibility to implement, direct and enforce the Corporate Safety Program
- Take appropriate corrective action including stopping work, on noted deficiencies, unsafe conditions and document the stop work safety condition on the A.F. Smith Electric Incident Report under the "Near Miss" category. Stopping work for safety requires stopping, notifying the Safety Director, correcting the problem and resuming the work if safe.
- Inspect the safety of the job site and document findings on a daily basis with documentation.
- Discuss the safety inspection findings at the progress meetings
- Based on the inspection findings, assign safety corrective action items to the appropriate work group or subcontractor
- Assist in the designating appropriate parking and lay down areas
- Challenge all visitors arriving at the job site for validity of purpose for their presence on the job site
- Call the President and Safety Director when MIOSHA/OSHA or other enforcement regulatory inspectors arrive on the job site.
- Fill out and discuss the STA (Safety Task Analysis, Form found in Appendix) with each work crew prior to beginning the work. Note: The STA may be used in place of the Tool Box Talk.
- Conduct a Tool Box Talk each week. Note: The STA may be used in place of the Tool Box Talk.

Employees

- Participate in Tool Box Talks
- Assist in completing the STA (Safety Task Analysis, Form found in Appendix) prior to beginning your daily work assignment
- Visually inspect all tools at the beginning of the day, reporting defects to your supervisor
- You have the authority to stop work, by pointing out unsafe working conditions, equipment, or unsafe acts of others, with no retaliation.

Disciplinary Policy and Procedures

It is the policy of A.F. Smith Electric, Inc to uniformly enforce the safety & health rules.

It is the policy of A.F. Smith Electric, Inc. to discipline in a progressive manner so as to change the behavior if the errant employee rather than merely terminate the employment of the employee for an infraction of the safety rules.

The following procedure reflects the corrective action to be followed when discipline is necessary. The individual's immediate supervisor and/or company Owners handle all discipline.

The Company, further, recognizes that there are certain types of employee problems that are serious enough to justify either a suspension, or, in extreme situations, termination of employment, without going through the usual progressive discipline steps.

A. **CLASS "A" Violations** are violations with a potential for death, serious injury or physical harm that may result, at the discretion of the Company, in immediate termination.

Examples of Class "A" violations include:

1. Gross insubordination to a superior.
2. Gross negligence, or intentional behavior, which disregards the potential impact to property or person.
3. Stealing or abusing Company property.
4. Possession of and/or carrying a firearm or other weapon on Company property or jobsites. Physical assault or threat thereof on an employee, customer, member of the public or subcontract employee.
5. Violation of the A.F. Smith Electric's Drug and Alcohol Policy.
6. Unauthorized personal use of Company equipment, including misappropriation, loss or damage resulting from failure to properly maintain or safeguard.
7. Sleeping during work time, not including official break times.
8. Falsification of information.
9. Violation of the Electronic Devices and Cell Phone Policy.
10. **For Supervisors Only:** Failure to enforce report or comply with Safety Rules or other A.F. Smith Electric policies.

Disciplinary Policy and Procedures Continued...

B. **CLASS "B" Violations** are violations that can result in death or serious physical harm.

Action:	**First Offence (lifetime)**	**Written Warning**
	Second Offence (lifetime)	**Suspension from all company jobsites for 3 consecutive work days without pay.**
	Third Offence:	**Permanent termination from A.F. Smith Electric employment.**

Examples of CLASS "B" violations include:

1. Operating Roll over Protection Structure (ROPS) Equipment without the seatbelt being used.
2. Riding on equipment not designed to do so or transporting people as a passenger where there is no seat and/or seatbelt.
3. Entering a confined space without proper testing of the atmosphere and/or required permits not obtained.
4. Failure to use a proper lockout or removing another person's lockout without proper permission.
5. Working while under a suspended load without the use of proper blocking.
6. Exiting running equipment without the parking brake being set and the equipment out of gear.
7. Working/walking outside the protected zone in traffic.
8. Failure to tie off or use other protective methods while working at heights greater than 6(six) feet
9. Failure to have a ladder in a trench within 25' while working in the trench.
10. Working in a trench without the proper slope/benching/shoring or mechanical protection as provided by a trench box. This includes working outside the box.
11. Failure to use rigging as recommended by the manufacturer.
12. Removing and/or disabling safety equipment such as but not limited to grinding guards, back up alarms, signs, barricades, caution or danger tape.

Disciplinary Policy and Procedures Continued...

C. **Class "C" Violations** are violations which at management's discretion do not fit the Class "B" violations, but are a violation of recognized standard safety practices or rules.

Action:	**First Offense:**	**Document verbal warning**
	Second Offense:	**Written Warning**
	Third Offense:	**Suspension from all company jobsites for 3 consecutive work days, without pay.**
	Fourth Offense:	**Permanent termination from A.F. Smith Electric employment.**

Note: All discipline in this category is cumulative.

Examples of Class "C" Violations include:

1. Failure to use proper PPE as required by law and provided by your Company.
2. Failure to use a Ground-Fault Circuit Interrupter (GFCI) while using powered electrical hand tools.
3. Using an electrical extension cord with a missing ground plug.
4. Failure to have proper guarding while operating powered hand tools.
5. Operating equipment without the thoroughly adhering to the operating procedures governing such equipment.
6. Failure to inform supervision, in a timely manner, of an accident, injury, near miss or utility hit.
7. Jumping off of equipment, including non-use of standard egress and ingress of the equipment.
8. Standing, sitting, straddling the cap step on a step ladder.
9. Standing on the guard rails of scaffolding or man lifts/man baskets.
10. Eating, drinking, smoking in areas not designated for these purposes.
11. Horse play and/or practical jokes of any form.
12. Failure to cover and/or, mark open holes
13. Smoking on all construction sites and U-M buildings. Smoking is prohibited on all U-M grounds.

A.F. Smith Electric, Inc retains the right to amend the Disciplinary Policy and Procedures at any time. If any amendments are made, A.F. Smith Electric will provide a letter of amendment to notify all employees.

Site Entrance Authorization Policy

Hazards that are inherently present during the construction operations pose special concerns for visitors that arrive expecting to walk or tour the construction site, especially when the visitors arrive for a surprise visit representing a regulatory body. In order to ensure the safety of these visitors, it is the policy of **A.F. Smith Electric, Inc.** to get permission for these visitors, to do their job, with the proper management person present.

Any person, organization or groups of persons must obtain authorization before entering on or into **A.F. Smith Electric, Inc.** construction sites for any regulatory purposes other than the following:

- **Police** – carrying out the official duties of a police officer
- **Fire Fighters** – carrying out the duties as a fire fighter
- **Emergency Medical Provider** – carrying out the duties of EMS

All other persons, organizations or groups of a regulatory nature may obtain permission for entry on or into the construction sites by contacting any of the following persons:

- **President**, Brian D. Koepp

Hazard Identification & Risk Assessment

A.F. Smith Electric, Inc. is committed to providing a place of employment, as free of recognized hazards as is reasonably achievable. Therefore, every employee attends tool box talks, attends STA (Safety Task Analysis) briefings prior to starting the job and from time to time attends a class called "Recognizing Hazards at Company Job Sites".

Prior to beginning a task, the STA (Safety Task Analysis) is completed with the work crew. The job steps are identified, the hazards associated with the job steps are identified, and the means or methods to mitigate or eliminate the hazards are agreed to. The crew members then print their name on the form. The crew gets together at the end of the day to discuss the results of the work that day. All crew members sign out with the understanding that there were no accidents, incidents or near misses. If, there were any accidents, incidents, or near misses, an incident report is generated and forwarded to the Corporate Safety Director. The STA is then completed by the foreman/superintendent, signed and dated and forwarded on as required. All completed STA's are filled and maintained for a minimum of 2 years.

Note: See attached form of a STA, Incident form, Daily Equipment Inspection Log, and Weekly Supervisor's Checklist.

Electronic Devices and Cell Phone Policy

Effective and accurate communication is an essential part of an organization. While the Company understands and supports the necessity to maintain open communication when working, it is imperative that controllable distractions are eliminated. The Company prohibits the use of any device that inhibits the natural ability to hear or comprehend the changing environment. Therefore, while performing work of **A.F. Smith Electric, Inc.** the phone and other electronic device usage policy must be adhered to in the following manor:

- Electronic devices are strictly prohibited! This is inclusive but not limited to headphones, ear buds, MP3 players, I-pods, radios, CD players, Blue Tooth devices.
- The use of any cell phone while operating construction equipment and/or moving a vehicle while on the work site is prohibited.
- Reading, writing, or sending TEXT messages while operating construction equipment, a Company vehicle or personal vehicle while on Company business is not allowed.
- Use of a personal cell phone for personal calls, are limited to emergencies. The operator must discontinue construction activities to take or make the necessary call, preferably during a break or lunch time.

Where any applicable law conflicts with the provisions of this policy, the policy shall be amended as necessary to comply with the law while preserving, as fully as possible, the principals and intent of the policy.

Workplace Violence Policy

A.F. Smith Electric, Inc. is committed to preventing workplace violence and to maintaining a safe work environment. Given the increasing violence in society in general, A.F. Smith Electric, Inc. has adopted the following guidelines to deal with intimidation, harassment, or other threats of (or actual) violence that may occur during business hours or on its premises or work sites.

All employees, including supervisors and temporary employees, should be treated with courtesy and respect at all times. Employees are expected to refrain from fighting, "horseplay", or other conduct that may be dangerous to others. Firearms, weapons, and other dangerous or hazardous devices or substances are prohibited from being on the premises of A.F. Smith Electric, Inc. or on the work site without proper authorization.

Conduct that threatens intimidates or coerces another employee, a customer, or a member of the public at any time, will not be tolerated. This provocation includes all acts of harassment, including harassment that is based on an individual's gender, sexual orientation, race, age, or any other characteristic prohibited by Federal, State, or local law.

All threats of (or actual) violence, both direct and indirect, should be reported as soon as possible to your immediate supervisor or any member of the management team. This includes threats by employees, as well as threats by customers, venders, solicitors, or other members of the public. When reporting a threat of violence, you should be as specific as possible.

All suspicious individuals or activities should also be reported as soon as possible to a supervisor. If you see or hear a commotion or disturbance near you, do not place yourself in peril. Try not to intercede or see what is happening. Call the proper public authority to get the problem handled by a professional. The incident will then be properly investigated and handled by A.F. Smith Electric, supervisor in charge.

A.F. Smith Electric, Inc. encourages their employees to bring any dispute or differences with other employees to the attention of their supervisors and/or the management team prior to the situation escalating into violence. At no time will A.F. Smith Electric, Inc. discipline an employee for raising a concern.

Confined Space Policy & Procedure

A.F. Smith Electric, Inc. Confined Space Policy is very simple. No employee or subcontractor employee is permitted to enter any confined space for any reason, prior to being trained on how to take air samples, what the proper steps are for determining the status of the confined space entry using forms ("D") Confined Space Evaluation Form. The status is determined by using a 4-gas air monitor to determine the presence or absence of Oxygen, Flammables, Methane gas, Hydrogen Sulfide (H2S) gas or any other chemical that may cause an IDLH situation. **When encountering IDLH (Immediately Dangerous to Life or Health) conditions no confined space entry permits will be issued and no persons are permitted to enter the space.**

All perspective confined space entrants, attendants, and supervisors shall be trained on their duties using the Confined Space Learning safety program and tested to determine their understanding. The attendant is required to be attentive to the persons in the confined space, communicate but never leave until all persons are out. In an emergency, fire, air monitor alarms, or other unusual conditions, the attendant shall sound an alarm for help; plant, 911, or other agreed to options and stands by to assist as necessary. **The attendant shall NEVER enter the confined space. Attendants are to monitor only one confined space.**

The entrant supervisor shall complete a STA (safety task assignment) with the work crew, reviewing the job steps, the hazards, & methods to mitigate the hazards, and make sure the confined space evaluation form is completed. The entrant supervisor verifies that the air monitor is in place & working, the ventilation device is operating and no hazards are being created. The entrant supervisor can sign the completed form along with the work crew.

If the air monitor determines that the confined space is not safe to enter, then a Permit-Required Confined Space Analysis From ("E") is required to be completed & posted at the entry area for any entrant to review & sign in & out of the confined space. **Continuous air monitoring & forced ventilation is required when using a Permit-Required Confined Space Entry.** The attendant shall have rescue equipment at the entry site, shall have emergency communication device for calling the plant, 911 or other agreed to options and have a means of continuous communication with the work crew. **The attendant never leaves the entry area while the work crew is in the confined space, and never enters the space in an emergency.**

When the work is complete or the end of the shift occurs, the entrant supervisor shall verify that all the employees that signed in & out of the confined space are accounted for, remove the permit from the entry area & close or turn over the space to the next entrant supervisor.

Electrical Safety Policy

A.F. Smith Electric, Inc. employees are classified into two categories: Exposed and authorized employee's electricians and apprentice electricians who are trained using STA (Safety Task Analysis) prior to going to work. Company will ensure that work practices performed on or in proximity to electrical equipment/energy sources are evaluated to determine if proper safety precautions are instituted.

This training process helps the employees avoid being electrocuted while working around energized equipment. This training includes the awareness of electrical hazards, the when and why for using lock out and tag out systems, along with hands on of doing lock outs.

All electric powered hand tools and extension cords shall be visually inspected at the beginning of each shift for defects. If defects are sent back to the shop for repair. GFCI's are to be used from the point of power supply out to the point of use. Extension cords shall never be less than a 12-3 with the ground plug in place.

Broken insulation, including welding cable and extension cords, are not to be "repaired" using duct, masking, or scotch tape. Only 20,000-volt electrical tape may be used for temporary repairs a maximum of 1 time in 10 feet. Extension cords shall never be spliced or "tied" into a disconnect box.

Extension cords and welding cable are to be routed around wet areas and/or overhead if possible to avoid tripping hazards and damage. Keep cords out of high vehicular traffic areas to prevent cords from being damaged. Never assume that open electrical cabinets/panels are de-energized.

Only qualified employees shall work on energized electrical parts. Working around overhead power lines presents special safety hazards that need to be addressed on the STA, prior to using ladders, scaffolding, cranes, forklifts, man lifts, aerial lifts or man baskets. Check with your electrician for the proper clearance distances prior to beginning work. If you have to work within the prescribed safe distance to energized electrical parts, then have the power de-energized or barricaded to prevent contact.

Excavating and Trenching Policy

A.F. Smith Electric, Inc. is committed to protecting its employees during excavating and trenching activities. To accomplish this commitment, every employee is required to be trained using box talks, participate in the STA (safety task assignment) process and attend vendor lead safety training regarding equipment, processes and methodology for excavating, referencing proper excavating methods from the OSHA/MIOSHA laws and trenching by various CD's. The supervisor is always the competent/qualified person.

Prior to beginning excavating, the area to be excavated shall have been evaluated by each utility company representative using the One Call (811) locating service. During the excavating process, pot holing will be used to identify the exact location and height of any utility needing to be excavated around.

The competent/qualified person shall do all the following on a shift and changing conditions basis:

- verify soil type and document
- verify protection system being used (slope, trench box, shoring) is installed and being used correctly
- ingress/egress ladders are within 25 feet
- spoils pile is greater than 2 feet away from excavation walls
- vibration from heavy equipment has no impact on the excavation
- barricaded from vehicle and/or pedestrian traffic
  water accumulation and removal
- support for structures (buildings, roadways, sidewalks, telephone poles) is in place
- weather (thunderstorms, rain, high wind)
- verify path of travel for overhead loads does not go over employees
- verify the continuous air monitoring is in place and functioning (checking for oxygen content, methane, hydrogen sulfide (rotten egg smell) and flammables)
- maintain a copy of the trench box certifications from the manufacturer.

Employees shall not cross over a trench or excavation without having the proper cat walk with proper hand rails (top rail, middle rail) being in place. Employees are not to be in the path of loads passing over their bodies or work under suspended loads without blocking/cribbing.

Excavations and trenches shall be back filled as soon as tasks are accomplished or barricaded by no less than a snow fence, to keep individuals from falling in to the excavations that are left open for future use.

Fall Protection Safety Policy

A.F. Smith Electric, Inc. is committed to protecting its employees by training them using tool box talks, and STA's (Safety Task Analysis) to identify the hazards associated with falling and providing them with the information and equipment necessary to prevent injuries from falling from a distance of six(6) feet or greater. Employees found not following the requirements of the training that has been provided will be retained and then disciplined as outlined in the Disciplinary Policy. All training and discipline is documented.

The site-specific fall protection is developed and set in motion each work shift by the superintendent using the STA for the work identified on the STA. The job steps, hazards and methods of mitigation are identified and discussed with the work crew. Any accident/incident/near miss is documented on the A.F. Smith Electric incident report form and sent to the Corporate Safety Director office for review.

All equipment used will meet the minimum fall protection standards as outlined by ANSI, ASTM, or OSHA/MIOSHA.

Precautions will be evaluated and mitigated when working around the following types of work:

- Excavating, trenching,
- Roofing, leading edge work,
- Using ladders, scaffolding,
- Operating man lifts, scissors lifts, elevated work platforms.

If rescue is required:

- Self-rescue if possible
- Assisted rescue by fellow employees using an aerial lift
- Professional assistance by calling 911

Fire Extinguisher Care & Use Policy

A.F. Smith Electric, Inc. employees are familiarized in the care and use of portable ABC dry chemical fire extinguishers through tool box talks. Every employee reviews the requirements prior to being assigned work at the job site and during annual review through the tool box talks. The training program teaches the importance of a daily visual inspection; with a monthly inspection and an annual inspection requirement. These inspections are also part of the required inspections for all the Powered Mechanical Equipment and the weekly site safety inspection.

The fire extinguisher care and use is also addressed in the welding and cutting training for the fire watch requirements.

First Aid/CPR/AED

A.F. Smith Electric, Inc. is committed to providing the necessary emergency First Aid/CPR/AED training to assist all our employees in the event that there is an accident which requires them to use the training. All employees are trained in first aid/CPR and AED. This training is available apprenticeship hall and is a required course to qualify for the OSHA 30-hour certificate. This course is required to be taken every 3 years in order to maintain certification. Additionally, the course on Blood Borne Pathogens is required and covers all the necessary contents that are mandated by OSHA.

First Aid kits are maintained on every job site and are inspected every week by the project superintendent. Any missing items are replaced. These First Aid Kits have all the necessary supplies required for protection when blood borne pathogens are of concern.

Training for Blood Borne Pathogens for all employees is conducted prior to assignment, addresses universal precautions, hand washing requirements, PPE requirements with location (First Aid kit) for this type of PPE.

Cleanup of the contaminated area is accomplished by using a dilute solution of bleach with proper disposal of clean up materials as addressed in the training program.

Medical records are retained for 30 years after employee leaves the employment of A.F. Smith Electric and offers Hepatitis B vaccine at no cost to employee that was exposed.

Note:

- All training is documented and complies with the American Red Cross training requirements.
- When necessary, employees are to call 911 for emergency assistance.
- First aid kits contain eye wash kits and supplies.

General Lifting Policy & Procedure

A.F. Smith Electric, Inc. requires that every employee assigned to do manual lifting shall have been trained using the Safety Task Assignment (STA) form and follow the following procedure.

1. Size up the load. Do not attempt to lift alone when there may be any doubt in your mind about your ability to lift the load safely.
2. Make sure you have a clear path of travel.
3. Make sure that your footing is secure, keeping your feet flat, about shoulders width apart, with a firm grip on the base of the object to be lifted.
4. Tighten your abdominal muscles, squat down bending your knees, place firm grip on the load, and then stand in a smooth straight motion, keeping the object as close as possible to your body. Remember to keep your back as straight as possible.
5. Never jerk or twist while in the lifting motion.
6. If the load is too heavy, either get help or use a mechanical lifting device.
7. When setting a load down, use the reverse process.
8. Be sure to move your feet when turning with a load to minimize twisting your back.

When required to move (lift) a load that is too heavy get help. The help can be in the form of another employee, hand powered mechanical lifting equipment (chain fall, come-a-long, hydraulic hoist) and/or powered mechanical lifting equipment.

Hand and Power Tools Safety Policy

A.F. Smith Electric, Inc. is committed to providing portable and powered tools that are safe to use for each employee. The employees are therefore held responsible to do their part to accomplish this commitment by doing all of the following: visually inspect each tool prior to its use every day, inform the supervision team of any defects found, stop work when the tool fails to meet the safety requirements, and use the tool for the intended purpose the manufacturer made the tool to accomplish.

Each employee is trained, using the STA's (safety task assignments) to use the right tool for the job, to communicate unsafe actions and conditions to the supervision team for corrective action, to use the guards that the manufacturer provided with each tool, to put a "Do Not Use" tag on the tool describing the defects that takes the tool out of service, to never disable the guards and to use the prescribed PPE when using the tool.

Electrical power tools must be grounded or double insulated. The tool is not to be used if the ground plug is missing from un-insulated tools. The tool must be taken out of service and red tagged.

Operators of Powder Actuated Tools, (PASLOADE, HILTI's, RAMSET) shall be licensed prior to using these types of tools. The manufacturer's representative will train the perspective operators of these tools.

Hazard Communication Policy

A.F. Smith Electric, Inc. is sometimes a Construction Management company that does not handle, store, purchase or applies to various any types of hazardous chemicals. When in this role, the Company does supervise the various subcontractors that may use hazardous chemicals as a result of the work that is contracted.

When A.F. Smith Electric, Inc. is in the role of self-performing the work, all employees will have the appropriate Hazardous Chemicals awareness training: will act as the repository for all SDS's information for the subcontractors that are on the job site. The training is conducted through review the STA process along with their supervisor using tool box talks and SDS on the specific chemicals being used.

Additionally, all subcontractors are required to provide A.F. Smith Electric, Inc. with the SDS's for the chemicals that they expect to use, PRIOR to mobilizing to the site. If the subcontractor elects to change or add additional chemicals, the subcontractor is to provide A.F. Smith Electric, Inc. with the additional SDSs PRIOR to the subcontractor using the said chemical/s. This will allow for evaluation of the chemicals to be by used and awareness training to occur as necessary.

SDSs will be consulted to identify the spill prevention responses necessary for the chemicals on hand. This will include: the kind of spill kit, the quantity of response materials as a result of the types of chemicals and action necessary for adequate clean up.

The supervisor will coordinate all cleanup efforts. All emergency communication for outside assistance shall be imitated by or through the on-site supervisor.

Hearing Protection Policy

A.F. Smith Electric, Inc. is committed to protecting the hearing of all its employees by providing training during tool box talks, with annual review of the hearing protection requirements, evaluating the job sites, and providing the proper hearing protection as outlined in the PPE policy.

The types of work that the employees of A.F. Smith Electric, Inc. is hired to perform is usually not in areas that conform to a rigid evaluation which provides for always having to use hearing protection. Each supervisor and employee is to evaluate the need, style and procurement of hearing protection. The supervisor is to enforce of the proper hearing protection based upon the training and the work conditions at the job site. The supervisor issues and enforces the use of the proper hearing protection at the job site at no cost to the employee.

A rule of thumb to use in the field, "if I have to raise my voice to communicate with you at a distance of 3 feet, then the noise level is probably above 85dB and is high enough to need hearing protection.

Housekeeping/Spill Cleanup Policy

A.F. Smith Electric, Inc. is committed to a safe environment for all of our employees. As a result of this commitment, all employees are trained through tool box talks and the use of STA'S to recognize the hazards associated with poor housekeeping, proper spill prevention and response procedures. All spills, after clean up and proper disposal, will be documented and reported to the client.

Housekeeping involves the understanding that all tools have a place and that at the end of the day all tools should be found in that designated place. All employees have a responsibility to pick up and discard trash, using the proper trash receptacle. Class "A" materials or burnable materials in the correct dumpster. Class "B" materials stored properly, capped, marked, away from flammables, and as necessary diked. A spill kit, with clean up materials adequate to handle the anticipated amounts and types of chemicals, will be maintained at the job site.

All materials are to be stored properly in the lay down areas providing adequate areas for walking and rigging activities.

All wastes are identified in the bid pack submitted with estimate of construction.

Scrap metals are to be segregated from paper and wood and put in the scrap metal dumpsters. Wood is to be segregated from paper and metal, with all nails either bent over or removed.
Trash is to be labeled TRASH and is separated from all other forms of waste.

All waste that may be susceptible to a spill or of contaminating the environment is to be stored to prevent such contamination or be stored in leak prevention devices.

Welding, Cutting and Hot Work Policy

A.F. Smith Electric, Inc. employees use various forms of welding equipment, cutting and other spark producing tools. It is the A.F. Smith Electric, Inc. safety policy to train using, tool box talks, vendor lead training, on the job discussions and formal certification classes for every affected employee in the care, use, inspection, fire extinguishers, fire hazards and the general requirements associated with the operation of these types of tools. Any tool found to be defective shall be taken out of service and repaired prior to use.

Prior to beginning any hot work (Welding, Cutting, Grinding) the area shall be evaluated using a Hot Work Permit to determine the impact of the associated hazards. This evaluation shall include: the presence of flammables, explosives, the proximity to fire extinguishers and fellow workers. Any welding, cutting or burning that creates a hazardous environment shall have proper ventilation.

When the object to be cut or welded cannot be removed from the area then all flammables will be moved. Where flammables cannot be moved guards/shields will be used and a fire watch is required to be posted. The fire watches' sole job is to warn of a fire, put the fire out using the fire extinguisher he has with him, if possible and to remain at the hot work area for 30 minutes after the work producing the hazard has stopped. If the fire watch is on duty as part of a Confines Space Entry, the fire watch can double as the confined space attendee.

Warning: If the hot work operation cannot be completed safely, then the hot work will not be done. Either other methods will be used or surrounding conditions will be made safe in order to complete the work.

Ladder Safety Policy

A.F. Smith Electric, Inc. is committed to providing the proper safe tools for each employee to complete the job that has been assigned. This commitment includes training every employee in the proper care, use, and inspection of ladders. The training is provided using tool box talks and STA'S (Safety Task Analysis) prior to any work being done.

All ladders shall have a daily visual inspection prior to use. The inspection shall include: Integrity of all component parts, uniformity of rung spacing, and the load capacity on the manufacturers label.

Extension ladders shall extend 3 feet above the landing point, be tied off to prevent movement, and placed at an angle of 4 to 1. Employees shall use the 3-point method (The three-point system means three of your four limbs are in contact with the ladder you are climbing at all times – two hands and one foot or two feet and one hand) for climbing the ladders with hands free of tools or equipment. Tools can be carried in tool belts or raised in buckets.

Step ladders if used shall be properly spread open and placed on a firm level surface. Step ladders shall never be used in the folded leaning position.

Ladders in general shall only be used as ladders. They shall never be used as picks, walkways and or scaffolding. If the ladder becomes defective, the ladder is to be removed from service, tagged out of service, and removed to an area for repair. If the ladder is beyond repair, the ladder is to be destroyed prior to disposal.

Lockout, Tag Out and Block Out Policy

A.F. Smith Electric, Inc. is committed to training its employees to work in a safe manner regardless of the environment they are assigned to accomplish their tasks. With that thought in mind, all A.F. Smith Electric, Inc. employees use tool box talks, and STA (Safety Task Analysis) as documented training for lockout and tag out of powered or unpowered processes construction, maintenance or repair.

Lock out, Tag out and/or Block out of equipment is required when any unexpected movement of the object being worked on puts the employee or other employees in harm's way. The sources of the unintended motion can be: steam power, electrical energy, hydraulic pressure, water pressure, mechanical power, chemical reaction power and gravity. The types of work to be accomplished which will require the precautions of locking, tagging or blocking includes: set up, adjustment, repair, service, and maintenance. If power must be on during final adjustment, the supervisor is required to review the process if all employees involved.

Locking, Tagging and/or Blocking can be accomplished in one of three ways, depending upon the crew, the client and/or the work to be accomplished in relationship to other crew members or trades persons working on the same system with the same energy source.

These tasks can be accomplished in the following way:

1. Each individual employee uses a lock
2. An authorized employee of a crew or a supervisor for given set of employees can do the locking
3. Tagging and/or blocking out of the energy source.

Generally, the process is as follows:

1. Research the system to be de-energized
2. De-energize the system (disconnect, block, and bleed) at the selected locations
3. Verify that the system is inactive by attempting to activate the controls and then place locks, tags and/or blocks to keep the system in the inoperable mode.

To restore the operation of the system:

1. Remove all tools and equipment not necessary for the system to function
2. Remove all locks, tags and/or blocks
3. Reconnect power system and cycle the operating controls.
4. Adjust as necessary remembering to stay back far enough to avoid a mishap if things are not lined up properly.

Personal Protective Equipment (PPE)

A.F. Smith Electric, Inc. is committed to the safety of its employees through the use of specific personal protective equipment and the dress code at the job site. All employees are expected to wear: shirts with at least 4" sleeves, full length pants with no open tears, work boots with steel toes and high viable vests. A.F. Smith Electric, Inc. supplies a hard hat, ear plugs, work gloves, safety glasses, and hard hat attachments in the form of face shields, hearing protection, and fall protection devices. All employees receiving PPE supplied by the company will be trained in its proper care, use, fit, sanitation and maintenance along with the proper method of wearing the PPE using tool box talks, and STA.S. Additionally, retraining will occur when/if there is a change in the type of tools being used, the PPE changes, and lack of use by the employee.

Any employee needing replacement PPE, due to the PPE being worn out, needs to give the defective PPE to their supervisor and get new PPE. Lost or stolen PPE will be replaced at no cost to the employee. All employee owned PPE must meet the same quality standards that company PPE meets. Damaged, defective or unsanitary equipment will not be used.

Failure to wear the proper PPE may result in disciplinary action up to and including discharge. Note: Reference the roles & responsibilities and disciplinary action sections of this safety manual. Also, ALL training is documented.

Powered Mechanical Equipment Policy

A.F. Smith Electric, Inc. employees use all of the following types of powered mechanical equipment. This includes cranes, forklifts, aerial lifts, man lifts, and elevated working platforms. All equipment will have an operating back up alarm.

The A.F. Smith Electric, Inc. Powered Mechanical Equipment Policy requires that only trained and certified employees required to operate any of the aforementioned equipment shall be trained using the manufacturers operating manual with the immediate supervisor, and operate the equipment for the qualified instructor/supervisor for observation and approval prior to taking a competency test. This training is required every 3 years.

Operators of powered mechanical equipment are to follow and never exceed the operating requirements of the equipment. This includes: lifting capacities, weight limits, and fall restraint, proper tie off points, electrical line clearances, ramps, fueling, visibility balancer, counterbalances, trailer chocks, trainer supports, dock plates, and NORMAL use characteristics that may be found in the operating manual and/or Federal, State or local safety laws.

There are no field or shop modifications allowed to be made on any of the powered mechanical equipment unless permission has been received from the manufacturer in writing and the Corporate Safety Manger has a copy of the permission on file.

Prior to operating any powered mechanical equipment, the operator of said equipment shall complete a "Daily Equipment Inspection Log". All the items noted as being defective shall be corrected prior to operating the equipment. The original copy of the inspection form is maintained at the job site by the foreman/superintendent for proof of inspection, repair or removal of service. A copy of the inspection form goes to the shop for evaluation and repair as necessary. The shop will attach the inspection form to the parts/ repair/ inventory ticket for a minimum of 5 years. This form looks like the form found in the appendix.

Owner of powered mechanical equipment shall be notified of defects and have repairs made.
If equipment is gas powered, be sure to shut off engine before fueling, the gas cap must be attached to tank. NO smoking when filling gas tank.

Please note: All crane operators shall be CCO (Certified Crane Operators) licensed by the appropriated jurisdiction prior to operating a crane for A.F. Smith Electric on any project.

Rigging Safety Policy

A.F. Smith Electric, Inc. is committed to lifting and moving various construction equipment and materials in s safe manner while constructing bulk material storage and handling facilities for our clients.

To achieve the goal of safely using rigging, every employee using rigging is trained using, a video on Crane Hand Signals, a demonstration on visual inspection techniques on synthetic, wire and chain slings, a demonstration on visual inspection of rigging apparatus including hooks with latches, shackles, spreaders, and miscellaneous rigging devices, a demonstration of the impact of lifting angles, a review of calculating weights to be lifted and determining the center of gravity for odd shaped lifting. Additionally, selected topics are discussed using "The Rigging Handbook", third edition.

Every employee assigned to operate any Powered Mechanical Equipment shall have been trained and licensed as may be required by OSHA/MIOSHA prior to operating any equipment.

Any employee assigned to rig shall do the following: Select the best type of rigging configuration for the item to be lifted, inspect all the rigging prior to the lift, making sure that the hooks have latches, remove defective rigging and attach a red tag/do not use tag, then notify the superintendent of its condition. The employee doing the rigging shall not knowingly exceed the safe working load of any of the rigging.

Once the rigging has been attached to the load, attach a tag line to the load and signal the equipment operator to lift, visually inspecting the load for stability. Stop all movement that would cause the load to swing over any individual.

All rigging equipment when not in use, shall be properly stored in an area which avoids a tripping hazard, out of the dirt and so that it can be readily inspected or selected for future use.

Scaffold Erection, Inspection & Use Policy

A.F. Smith Electric, Inc. employees erect, inspect, and use scaffolding during the various phases of the construction process. In order to use this type of tool, it is the A.F. Smith Electric, Inc. policy to train every employee on the erection, inspection use and care requirements using vendor awareness training & other professional supplied scaffold training. The training program addresses all the following items: Fall Protection hazards, Electrical hazards, Falling objects hazards, the uses and weight capacities of various scaffolds. An employee failing to work as trained on or around scaffolding shall be reinstructed and disciplined as required by the Disciplinary Policy.

The Fall Protection policy shall be followed by every employee during the erection process, during which every piece of the scaffolding will be inspected by the qualified person overseeing the set-up process. After the scaffolding is erected, the qualified person shall conduct a final inspection and place a green tag at the access point if the scaffolding is built correctly and meets the safety standard requirements. A yellow tag may be used to warn of some safety deficiencies that require additional safety protection while using the scaffolding. A red tag is placed on the scaffolding to stop anyone from using the unsafe scaffolding.

All scaffolding receiving the initial green tag shall be inspected prior to the beginning of each shift & periodically throughout the day. When defects are found, the qualified person shall stop the work placing a red tag on the scaffold, repair the defects, and inspect the scaffolding, and place a green tag back on the scaffolding if it passes the inspection.

All erection, inspection and use of scaffolding shall follow the OSHA/MIOSHA requirements as a minimum.

Subcontractors Site Safety Program Policy

The A.F. Smith Electric, Inc. Safety Policies requires a copy of the subcontractors' site safety program along with any applicable SDS's, in manual or in CD form, to be submitted to the Management Team prior to being authorized to move onto the work site. The safety manual will include all of the pertinent information required by MIOSHA, OSHA, which ever may apply, along with a current copy of the annual equipment inspections.

Additionally, the subcontractor management and employees shall attend an onsite safety orientation, conduct tool box talks weekly, conduct weekly site inspections in the areas that their employees are working; correct any deficiencies found during the inspection and maintain their areas free of housekeeping hazards.

All subcontractors should understand that their performance of their safety duties will be reviewed during a post completion evaluation process to be used in future bidding and contract awards process.

Unsafe Conditions Notice

This form may be used to inform an owner, client, or subcontractor of an unsafe condition existing on the project.

This form should be used when the existing unsafe condition is not being corrected by the appropriate subcontractor in spite of notification by A.F. Smith Electric, Inc. to correct the unsafe condition.

See attached form.

Attached Safety Documents

UNSAFE CONDITION FORM

DATE: _____

Attention: _____

Company: _____

Project: _____

RE: FAILURE TO CORRECT AN UNSAFE JOB CONDITION

An unsafe condition has been orally explained and described to members of your organization. As of this date, this unsafe condition has not been corrected.

Please accept this letter as formal notification of the existence of the unsafe condition, which creates a hazard to everyone involved. This unsafe condition is described below. We request that IMMEDIATE corrective action be implemented to alleviate this potential hazard/deficiency.

Also, your company will be totally responsible for any and all MIOSHA fines resulting from this condition.

Existing Unsafe Condition:

_____

_____

_____

_____

_____

Distribution: Job Site File
Home Office Project Files

CONFINED SPACE EVALUATION FORM

Date:	Plant/Project
Description/Location:	
Purpose of Entry	
Work Procedure:	

TEST EQUIPMENT AND ATMOSPHERIC TEST RESULTS

TIME	OXYGEN 19.5 -23.5%	FLAMMABLE 10% LEL or less	CO 35ppm or less	OTHER: PEL:	OTHER: PEL:
☐ AM ☐ PM					
☐ AM ☐ PM					
Instrument		**Serial No.**		**Span Calibrations Date:**	

HAZARD ANALYSIS			If "Yes" Describe"
What did the space last contain?:			
SDS (s) available for previous contents	☐ES	☐O	
Are the previous contents corrosive or toxic?	☐ YES	☐ NO	
Are there any hazards posed by residue?	☐YES	☐NO	
Are any chemicals or materials being introduced to the space for work procedure?	☐YES	☐NO	
Are there any hazards posed by the work chemicals or materials?	☐YES	☐NO	
Are there any hazards posed by the work procedure?	☐YES	☐ NO	
Are there any air contaminants introduced by the work procedures?	☐YES	☐ NO	
Is there a possibility of an oxygen deficient atmosphere? (less than 19.5%)	☐YES	☐NO	
Is there a possibility of an oxygen enriched atmosphere? (greater than 23.5%)	☐YES	☐ NO	
Could the atmosphere be flammable or explosive?	☐ YES	☐ NO	
Does the atmosphere have the potential for becoming flammable or explosive?	☐YES	☐ NO	
Are the interior surfaces potentially slippery?	☐YES	☐ NO	
Does the configuration of the space pose any problems?	☐YES	☐ NO	
Are there any projections, protrusions, or sharp edges that could cause injury?	☐YES	☐NO	
What is the size of the entry opening?			
Where is the location of the entry opening?:			
Is equipment required to gain access to the entry opening?	☐YES	☐NO	
Is there any around the entry opening that poses a hazard?	☐YES	☐ NO	
Does the entry opening present any fall hazards?	☐YES	☐NO	
Does the entry opening require barricading or protection?	☐YES	☐ NO	
Are there any potential hazards presented by adjacent processes or operations?	☐YES	☐NO	
Does the space contain any mechanical equipment?	☐YES	☐ NO	
Is there any equipment connected to the space that poses a hazard?	☐YES	☐NO	
Are there any pipes, lines, slices, or ducts that contain fluids attached to the space?	☐ YES	☐NO	
Is blanking, blinding, or other isolation means required?	☐YES	☐NO	
Is lock-out procedures and the lock-out equipment required?	☐ YES	☐NO	
Is there the potential for engulfment or entrapment?	☐ YES	☐NO	
Does the space present any temperature extremes?	☐YES	☐NO	
Is there the presence of pests (insects, spiders, rodents, etc.) or infectious agents?	☐ YES	☐NO	
Are there any excessive noise producing operations present?	☐YES	☐NO	
Will there be any hazards posed by equipment taken into the space?	☐YES	☐NO	
ADDITIONAL OBSERVATIONS OR CONCERNS:			

CONFINED SPACE EVALUATION FORM

EVALUATOR

Name (Printed)	Signature	Date/Time AM PM

DATE: _____

JOB #_____

EMPLOYEE NAME	TIME IN	TIME OUT

STA (Safety Task Analysis) form

A.F. Smith Electric, Inc.
Workplace Electrical Safe Work Procedures

Purpose and Scope

A.F. Smith Electric, Inc. is committed to providing a safe and healthy work environment and to protecting employees from injury or death caused by uncontrolled electrical hazards in the workplace. The purpose of A.F. Smith Electric's Electrical Safety Program is to establish work policies, practices, and procedures to train employees in basic electrical hazard recognition and safe work practices. This program applies to qualified and non-qualified employees who are exposed to electricity as part of their job.

Program Responsibilities

Management. Along with providing financial and leadership support, the management of A.F. Smith Electric will assist the Program Administrator, Supervisors, and Employees in complying with this policy.

Program Administrator. The Program Administrator is responsible for:

- Identifying work tasks that need to be performed by a qualified employee
- Conducting electrical safety inspections
- Correcting electrical safety hazards as soon as possible
- Ensuring all new electrical equipment and components comply with this program
- Reviewing this program annually and revising if necessary
- Maintaining a list of all qualified employees (***Appendix E***)
- Conducting training for employees

Supervisors. Supervisors are responsible for:

- Conducting periodic work inspections using the form in ***Appendix B***
- Ensuring employees are provided with and use the appropriate PPE
- Ensuring employees comply with all aspects of the Electrical Safety Program
- Testing electrical hand tools every three months with an ohmmeter

Employees. An employee will only work on electrical equipment if he/she is a qualified worker, meaning he/she has been trained and authorized to perform work on deenergized electrical equipment and components. Employees are responsible for:

- Wearing the appropriate PPE when working with or around electrical equipment
- Reporting electrical safety hazards to their supervisor of the Program Administrator
- Following the safe work practices outlined in this program
- Visually inspecting electrical equipment, tools and cords before each use
- Completing all required training

Work Practices

All electrical equipment will have the manufacturer's name, trademark or other descriptive marking which identifies the organization responsible for the product. The equipment will also have its operating voltage, current, wattage or other rating clearly marked on it.

Qualified employees will use lockout/tagout procedures on all electrical equipment while completing maintenance work. Lockout/Tagout procedures are found in A.F. Smith Electric Lockout/Tagout Program. If the equipment cannot be deenergized because it would introduce an additional or increased hazard, or it is infeasible due to the design or its operational limitations (i.e. emergency alarm systems), A.F. Smith Electric, Inc. will follow the NFPA 70E arc flash requirements & guide lines to perform the work. No work will be performed on energized equipment or exposed live parts by A.F. Smith Electric employees without wearing the proper Cal suite and appeal for the voltage they are exposed to. Any electrical circuit or conductor shall be considered energized until all of the following steps have been completed by a qualified employee:

- Identify all possible sources of voltage

- Identify and locate all disconnecting means:

Review appropriate drawings (or other equally effective means), tags, labels, and signs to identify and locate all disconnecting means. For electrical lockout/Tagout, determine that power will be interrupted by a physical break and not de-energized by a circuit interlock. Make a list of disconnecting means to be locked/tagged.
Review other work activity in the area that might be impacted by the lockout to determine if other workers might be exposed to energy sources, electrical energy hazards or hazards due to lack of electricity (darkness, etc.). If any exposure is identified, use the appropriate procedure to eliminate the hazard.

- Verify possibility of a visible open point:

Review disconnecting means to determine if it will be possible to verify a visible gap or if other precautions are necessary.

- Apply LOTO devices, as per A.F. Smith Electric LOTO requirements. Capacitors, conductors, and/or any device capable of storing energy (excluding batteries) must be discharged, shorted, and grounded in addition to locking out the source of energy. (Circuits over 750 Volts require special training and shall be completed by a Qualified Contractor.)

- Use an approved and tested voltage detector to verify that all conductors and circuit parts are de-energized. Refer to Appendix B, Section 6. Identify the appropriate voltage detector required. Test for the absence of voltage at each location. Verify operation of the detector using live-dead-live procedure or in accordance with manufacturers' recommendations.

- Suitable temporary barriers, or barricades, shall be installed when access to opened enclosures containing exposed energized equipment is not under the control of an authorized person.
All work on or near electrical equipment not placed in an electrically safe condition shall be considered energized work and shall use safe work practices including an Energized Work Permit appropriate to the voltage and energy level.

Warning Labels

This section covers the warning labelling for shock and arc flash protection requirements necessary for qualified workers who perform work on a site where A.F. Smith Electric is responsible for the health and safety of the personnel involved.

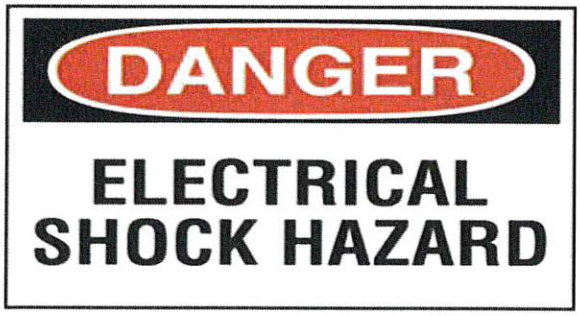
Warning Label Requirements

There are two main warning label requirements for compliance with the codes and standards. Both the US National and Canadian Electrical Codes require that Basic Labels and Arc Flash Protection
Boundary Labels be present. These labels are required on electrical equipment the exposed energized components. The following are examples of locations where you would expect to find these labels:

- Panel Boards
- Disconnect Switches
- Fuse Panels
- Breaker Panels
- Motor Control Centers (MCC's)
- Control Panels
- Transformers
- Generators

Basic Label

The basic label is in place to warn workers that shock hazards exist.

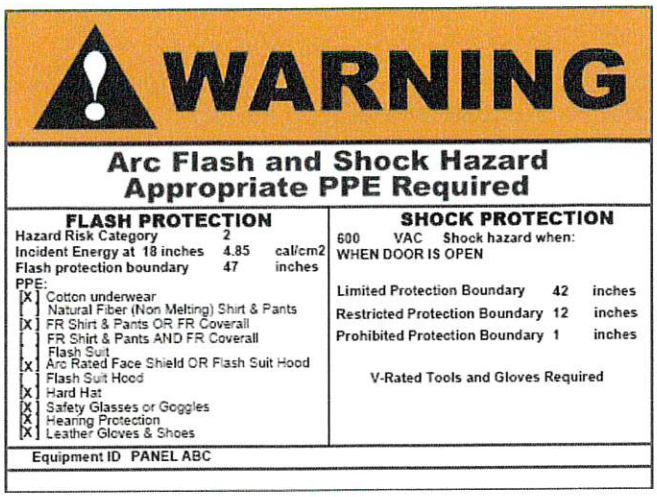


Arc Flash Protection Boundary Labels

Arc Flash Protection Boundary Labels provide additional information regarding Arc Flash Protection Boundaries and the safe Limits of Approach Distance. This is the label that is applied when an Arc Flash Incident Energy study has been completed and provides details in terms of the following:

- PPE Level requirements
- Arc Flash Incident Energy in Cal/cm_2
- Voltage Limits of Approach:
  - Limited
  - Restricted
  - Prohibited

Arc Flash Protection Boundary Example



Arc Flash Hazard Warning Label Explanation

• The "Flash Hazard Boundary" in inches is variable and refers to the distance the Arc Flash will emanate from the original short circuit toward the worker.
• The thermal "Incident Energy" is measured in "Cal/cm2".
• The "PPE" Level Arc Thermal Performance Value (ATPV) is used to select the appropriate PPE to theoretically prevent greater than second degree burns.

Shock Hazard Warning Label Explanation

Example:
Per the label above, the "Shock Hazard Approach Boundary" for 600 Volts in inches is fixed and refers to the distance from exposed energized parts that require the worker to wear PPE.

• The "Limited Approach Boundary" - 42"

• The "Restricted Approach Boundary" - 12"

• The "Prohibited Approach Boundary" - 1"

Working On or Near Energized Systems

Energized Work Planning Process

If a shutdown request is refused, the QTL shall complete:

• Work Plan (see Attachment A-1);
• Shock Hazard Analysis (see Attachment A-2);
• Arc Flash Hazard Analysis (see Attachment A-3);
• Energized Work Permit (see Attachment A-4)

Additionally, the QTL must verify that:

• Responsible supervision has determined that the work is to be performed while the equipment or systems are energized.

• Involved personnel have, in the past 3 years, received instructions on the work techniques and hazards involved in working on energized equipment; and that

• Suitable personal protective equipment and safe guards are provided and used.

An electrically hazardous task must be analyzed considering two primary hazards—flash hazard and shock hazard. These hazards are identified by using boundaries based on energy levels.
Performing work inside these boundaries requires training, planning, procedures, and PPE for flash protection and shock protection. In addition, shorting or grounding of low-voltage circuits might result in equipment damage, process upset, shutdowns, electrical burns, or explosions due to electric arcs.

Generate and Document a Work Plan

The QTL shall generate and document the step-by-step plan that describes the necessary activities to execute the task. The plan must address each issue described in the checklist, as illustrated in
Attachment 1 to this Appendix.

Perform and Document a Shock Hazard Analysis

Shock hazard boundaries are divided into the following categories, which identify the minimum approach distance to a live part:

• The Limited Approach Boundary (limited work class)
Activity or work inside this boundary must be performed by a qualified person as defined in
Section 6.3 of the WESP. When there is a need for an unqualified person to cross the limited approach boundary to perform a minor task or look at equipment, a qualified person shall advise him or her of the possible hazards and ensure that the unqualified person is safeguarded. Barricades or appropriate warning signs shall be erected no closer to the live parts than the limited approach boundary.

• The Restricted Approach Boundary (restricted work class)
This boundary is the closest approach distance for an unqualified person. Under no circumstance shall such unqualified person be permitted to cross the restricted approach boundary. To cross the restricted approach boundary, a worker must meet the following requirements:
a. Be a qualified person as defined in Section 6.3 of the WESP
b. Have and understand an approved plan
c. Use personal protective equipment appropriate for the conditions
d. Position his or her body in a way that minimizes risk of inadvertent contact
In some instances, work outside the restricted approach boundary but within the person's reach may be classified as restricted work if, in the judgment of the personnel involved, conductive objects or unguarded body parts could make unintentional contact or cross the prohibited approach boundary.

• Prohibited Approach Boundary (prohibited work class)
This boundary is the minimum approach distance to an exposed energized conductor or circuit part and is the closest point to prevent flashover. To cross the prohibited approach boundary and enter the prohibited space shall be considered the same as making contact with exposed energized conductors or circuit parts. To cross the prohibited approach boundary, a worker must meet the following requirements:
a. Be a qualified person as defined in Section 6.3 of the WESP
b. Have specific training to work on live parts
c. Have and understand a documented plan justifying the need to work inside the prohibited approach boundary
d. Use PPE approved for working on live parts that is rated for the voltage and energy level involved
e. Have completed and received approval of an Energized Work Permit

Flash protection boundary dimension must be calculated based upon the amount of available energy.
The QTL must perform a flash-hazard analysis and document the resulting arc flash boundary referencing Tables 4a and 4b of CSA Z462 and Annex H or Table 130 of NFPA 70E and necessary
PPE (see Appendix D for PPE requirements).
Exceptions: If values have been established through engineering analysis or if the equipment has been labeled with the flash-protection boundary and the hazard/risk category established, a flash hazard analysis need not be performed.

Complete an Energized Work Permit

The QTL shall complete an Energized Work Permit. All Energized Work Permits shall be kept on file for documentation and audit purposes. A standby person is required for all work requiring an Energized Work Permit.

Note: Diagnostics do not require an energized work permit. Only a qualified person who is trained to understand the following shall perform diagnostics:

- Must be competent in understanding the hazards associated with diagnostics.
- Proper selection and use of diagnostic test instruments.
- Work methods.
- Selection of the proper PPE to perform the task. If any body parts or objects (conductive or non-conductive) enter the restricted workspace surrounding live parts, voltage rated gloves are required.

The Energized Work Permit requires the signatures of the electrically qualified person, Safety Team Member, Corporate Health, Safety and Environment Manager (CHSEM) and PM, along with detailed plans for this work.

Working on Energized Equipment 50 to 240 Volts

Purpose and Scope

This section establishes minimum requirements for working on equipment energized from 120/240-Volt single-phase systems, 120/208-Volt three-phase systems, 120-Volt single-phase systems, 240-Volt three-phase systems, and 125-Volt DC systems. The electrical tasks are performed in lighting panels, relay enclosures, distribution panels, wire ways, instrument power panels, process control system (PCS) cabinets, and similar equipment. This applies to all qualified AFS personnel and all subcontractors performing work on behalf of AFS.

The section covers both construction and maintenance electrical tasks. Construction tasks include modifications, additions, and removal of electrical parts. Maintenance tasks include troubleshooting and testing after the facilities have been in operation.

General

Worker Qualification

The QTL needs to ensure that only qualified workers are performing the work, as per Section 6 of the WESP. The employee shall be instructed about any unique features of the particular equipment, including the specific actions that he or she must take in executing the task. The supervisor must ensure that the employee understands the assigned task and all of its safety implications.

Danger from Hazards

Work on energized 50 to 240-Volt equipment is hazardous. Adequate precautions must be taken to prevent contact with energized parts. The best practice is to avoid working on or near energized circuits between 50 and 240 Volts. Personnel must be reminded frequently that 120/240-Volts A/C is potentially lethal and accounts for the majority of fatalities from electrical shock.

Need for Planning

The number of electrical incidents involving work around energized systems between 50 and 240 Volts indicates the need for well-understood procedures. No work shall be attempted until the safety planning is complete and there is assurance that the work can be done safely.

The QTL will verify that there are no means to avoid working on energized equipment. Prior to completion of the Energized Work Permit, the following alternatives must be considered:

- Shutdowns could be held during off-hours
- The facility could accept the inconvenience of a shutdown during normal working hours

The Energized Work Permit will detail why the work cannot be de-energized. The work plan will detail a step by step procedure for completing the energized work. The site-specific HASP must address actions to be taken in the event of any emergency.

Personal Protective Equipment

All personnel within the flash hazard boundary must use appropriate personal protective equipment (PPE).

Working on Energized Equipment Over 750 Volts

Purpose and Scope

Work or completion of Arc Flash Hazards Analysis on equipment energized at over 750 Volts shall not be performed by AFS employees unless expressly authorized through an Energized Work
Permit and stringent requirements with final approval from an AFS Senior Regional Safety Health
Manager (SRSHM) or CHSEM.

Release of a Worker Who is in Contact with Energized Equipment

There are innumerable possibilities, and it is obviously impossible to try to explain a method for each case. The procedures listed below shall be included in applicable JSAs and shall be reviewed prior to work commencing to ensure that all affected personnel are familiar with their individual roles in the event of an emergency.
If a worker is locked on to an energized part, *never* simply rush to their aid. If their body is energized, you may find yourself unable to release if you contact skin to skin.
If you are the first responder or other rescue party person, then your first responsibility is to yourself.
Attempting an unplanned rescue may mean that not only does your rescue mission fail but both you and the victim may be injured or electrocuted.
• If at all possible, turn off the source of electricity (i.e., disconnect switch, light switch, circuit breaker, etc.) If this is not an option for any reason, use non-conductive material such as plastic or dry wood to separate the source of electricity from the victim or vice versa.
• If the injuries appear serious or extensive, call emergency services using the emergency number for your country. Explain the circumstances clearly.
• Check the victim's vital signs such as depth of breathing and regularity of heart beat. If either one is affected by exposure to electricity or if the victim is unconscious, perform CPR until the victim regains heartbeat and breathing or qualified help arrives to take over.

• If the victim is otherwise ok, treat any areas of the victim's body that may have sustained burns.
• If the victim is responsive and does not appear seriously injured but looks pale or faint, s/he may be at risk of going into shock. Gently lay the victim down with head slightly lower than chest and feet elevated.
• Arrange for medical attention.
If there is any doubt about the victim's condition whatsoever, call for an ambulance. Elderly people in particular may suffer cardiac arrest (heart attack) or even a stroke as the result of the often violent electric shock. In many cases, the electric shock itself may not kill the victim, but can easily be a trigger for some other life-threatening condition.

Operation of Cranes, Excavators, Drill Rigs or Aerial Devices in Proximity to Electrical Hazards

The limited approach boundary for all energized overhead lines varies from state to state and province to province. The approach boundary is also dependent on the voltage transmission. The greater the voltage transmission, the greater the safe approach boundary will be. Check local requirements and consult with the Utility Owner before proceeding with work tasks near overhead electrical hazards.

Live underground electrical lines shall be given special consideration because of the inability to visually locate per Utility Clearance protocols. One Call or suitable utility locator shall be used prior to commencement of digging activities. When feasible, potholing, daylighting or air knifing shall be used for confirmation of location and depth. Windy situations may require increasing the distance or planning the lift for another time. Caution shall be taken to ensure that the counter weight does not enter the limited approach boundary.

Where the above requirements are not feasible, the first choice is that the line be de-energized.

Where it is not possible to de-energize the line, the work may be performed as required for the limited work class as shown in Attachment A-2 "Shock Hazard Analysis". This would require contacting the local electrical service provider to implement additional safeguards such as insulating blankets. A live-work plan and a standby person who can be used as a spotter at a safe location and distance are mandatory in this scenario. The live-work plan would address who is in charge as well as other safeguards that may be required such as delineating the boundary, allowing for an over swing and assigning radios to the spotter and the crane operator.

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Table 4A
Hazard/risk category classifications and use of rubber insulating gloves and insulated and insulating hand tools — AC equipment

(See Clauses 3, 4.3.1, 4.3.7.3.7, 4.3.7.3.15, 4.3.7.3.16, 4.3.7.4.2, and B.2, Table 5, and Annex H)

Task(s) performed on energized equipment	Hazard/ risk category	Rubber insulating gloves required?	Insulated and insulating hand tools required?
Panelboards or other equipment rated 240 V and below			
Parameters: Maximum of 25 kA short circuit current available Maximum of 0.03 s (2 cycle) fault clearing time Minimum 455 mm (18 in) working distance Potential arc flash boundary using above parameters: 470 mm (19 in)			
Perform infrared thermography and other non-contact inspections outside the restricted approach boundary	0	N	N
Circuit breaker (CB) or fused-switch operation with covers on	0	N	N
CB or fused-switch operation with covers off	0	N	N
Work on exposed energized electrical conductors and circuit parts, including voltage testing	1	Y	Y
Remove/install CBs or fused switches	1	Y	Y
Removal of bolted covers (to expose bare energized electrical conductors and circuit parts)	1	N	N
Opening hinged covers (to expose bare energized electrical conductors and circuit parts)	0	N	N
Work on exposed energized electrical conductors and circuit parts of utilization equipment fed directly by a branch circuit of the panelboard	1	Y	Y
Panelboards or other equipment rated more than 240 V and up to 600 V			
Parameters: Maximum of 25 kA short circuit current available Maximum of 0.03 s (2 cycle) fault clearing time Minimum 455 mm (18 in) working distance Potential arc flash boundary using above parameters: 755 mm (30 in)			
Perform infrared thermography and other non-contact inspections outside the restricted approach boundary	1	N	N
CB or fused-switch operation with covers on	0	N	N
CB or fused-switch operation with covers off	1	Y	N
Work on exposed energized electrical conductors and circuit parts, including voltage testing	2	Y	Y
Remove/install CBs or fused switches	2	Y	Y
Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	1	N	N

(Continued)

Table 4A (Continued)

Task(s) performed on energized equipment	Hazard/ risk category	Rubber insulating gloves required?	Insulated and insulating hand tools required?
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts)	0	N	N
Work on exposed energized electrical conductors and circuit parts of utilization equipment fed directly by a branch circuit of the panelboard or switchboard	2	Y	Y
600 V class motor control centres (MCCs)			
Parameters: Maximum of 65 kA short circuit current available Maximum of 0.03 s (2 cycle) fault clearing time Minimum 455 mm (18 in) working distance Potential arc flash boundary using above parameters: 1.35 m (53 in)			
Perform infrared thermography and other non-contact inspections outside the restricted approach boundary	1	N	N
CB, fused-switch, or starter operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB, fused-switch, or starter operation with enclosure doors open	1	N	N
Work on exposed energized electrical conductors and circuit parts, including voltage testing	2	Y	Y
Work on control circuits with exposed energized electrical conductors and circuit parts 120 V or below, exposed	0	Y	Y
Work on control circuits with exposed energized electrical conductors and circuit parts greater than 120 V, exposed	2	Y	Y
Application of temporary protective grounding equipment after voltage test	2	Y	N
Work on exposed energized electrical conductors and circuit parts of utilization equipment fed directly by a branch circuit of the panelboard or switchboard	2	Y	Y
600 V class motor control centres (MCCs)			
Parameters: Maximum of 42 kA short circuit current available Maximum of 0.33 s (20 cycle) fault clearing time Minimum 455 mm (18 in) working distance Potential arc flash boundary using above parameters: 4.20 m (165 in)			
Insertion or removal of individual starter "buckets" from MCC	4	Y	N
Removal of bolted covers (to expose bare energized electrical conductors and circuit parts)	4	N	N
Opening of hinged covers (to expose bare energized electrical conductors and circuit parts)	1	N	N

(Continued)

Table 4A (Continued)

Task(s) performed on energized equipment	Hazard/ risk category	Rubber insulating gloves required?	Insulated and insulating hand tools required?
600 V class switchgear (with power circuit breakers or fused switches) and 600 V Class switchboards			
Parameters: Maximum of 35 kA short circuit current available Maximum of 0.5 s (30 cycle) fault clearing time Minimum 455 mm (18 in) working distance Potential arc flash boundary using above parameters: 5.90 m (233 in)			
Perform infrared thermography and other non-contact inspections outside the restricted approach boundary	2	N	N
CB or fused-switch operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused-switch operation with enclosure doors open	1	N	N
Work on exposed energized electrical conductors and circuit parts, including voltage testing	2	Y	Y
Work on control circuits with exposed energized electrical conductors and circuit parts 120 V or below, exposed	0	Y	Y
Work on control circuits with exposed energized electrical conductors and circuit parts greater than 120 V, exposed	2	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open or closed	4	N	N
Application of temporary protective grounding equipment after voltage test	2	Y	N
Removal of bolted covers (to expose bare energized electrical conductors and circuit parts)	4	N	N
Opening of hinged covers (to expose bare energized electrical conductors and circuit parts)	2	N	N
Other 600 V class (277 to 600 V, nominal) equipment			
Parameters: Maximum of 65 kA short circuit current available Maximum of 0.03 s (2 cycle) fault clearing time Minimum 455 mm (18 in) working distance Potential arc flash boundary using above parameters: 1.35 m (53 in)			
Lighting or small power transformers (600 V, maximum)	—	—	—
Removal of bolted covers (to expose bare energized electrical conductors and circuit parts)	2	N	N
Opening to hinged covers (to expose bare energized electrical conductors and circuit parts)	1	N	N
Work on exposed energized electrical conductors and circuit parts, including voltage testing	2	Y	Y
Application of temporary protective grounding equipment after voltage test	2	Y	N

(Continued)

Table 4A (Continued)

Task(s) performed on energized equipment	Hazard/ risk category	Rubber insulating gloves required?	Insulated and insulating hand tools required?
Revenue meters (kW•h at primary voltage and current – Insertion or removal	2	Y	N
Cable trough or tray cover removal or installation	1	N	N
Miscellaneous equipment cover removal or installation	1	N	N
Work on energized electrical conductors and circuit parts, including voltage testing	2	Y	Y
Application of temporary protective grounding equipment after voltage test	2	Y	N
Insertion of or removal of plug-in devices into or from busways	2	N	N
NEMA E2 (fused contactor) motor starters, 2.3 to 7.2 kV			
Parameters: Maximum of 35 kA short circuit current available Maximum of up to 0.25 s (15 cycle) fault clearing time Minimum 910 mm (36 in) working distance Potential arc flash boundary using above parameters: 12.5 m (495 in)			
Perform infrared thermography and other non-contact inspections outside the restricted approach boundary	3	N	N
Contactor operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
Contactor operation with enclosure doors open	2	N	N
Work on exposed energized electrical conductors and circuit parts, including voltage testing	4	Y	Y
Work on control circuits with exposed energized electrical conductors and circuit parts 120 V or below, exposed	0	Y	Y
Work on control circuits with exposed energized electrical conductors and circuit parts greater than 120 V, exposed	3	Y	Y
Insertion or removal (racking) of starters from cubicles, doors open or closed	4	N	N
Application of temporary protective grounding equipment after voltage test	3	Y	N
Removal of bolted covers (to expose bare energized electrical conductors and circuit parts)	4	N	N
Opening of hinged covers (to expose bare energized electrical conductors and circuit parts)	3	N	N
Insertion or removal (racking) of starters from cubicles of arc-resistant construction, tested in accordance with IEEE C37.20.7, doors closed only	0	N	N

(Continued)

Table 4A (Continued)

Task(s) performed on energized equipment	Hazard/ risk category	Rubber insulating gloves required?	Insulated and insulating hand tools required?
Metal-clad switchgear, 1 to 15 kV			
Parameters: Maximum of 35 kA short circuit current available Maximum of up to 0.25 s (15 cycle) fault clearing time Minimum 910 mm (36 in) working distance Potential arc flash boundary using above parameters: 12.5 m (495 in)			
Perform infrared thermography and other non-contact inspections outside the restricted approach boundary	3	N	N
CB operation with enclosure doors closed	2	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB operation with enclosure doors open	4	N	N
Work on exposed energized electrical conductors and circuit parts, including voltage testing	4	Y	Y
Work on control circuits with exposed energized electrical conductors and circuit parts 120 V or below, exposed	2	Y	Y
Work on control circuits with exposed energized electrical conductors and circuit parts greater than 120 V, exposed	4	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open or closed	4	N	N
Application of temporary protective grounding equipment after voltage test	4	Y	N
Removal of bolted covers (to expose bare energized electrical conductors and circuit parts)	4	N	N
Opening of hinged covers (to expose bare energized electrical conductors and circuit parts)	3	N	N
Opening of voltage transformer or control power transformer compartments	4	N	N
Arc-resistant switchgear Type 1 or 2 up to 15 kV (for clearing times of less than 0.5 s, with a protective fault current not to exceed the arc-resistant rating of the equipment)			
Parameters: Maximum of 35 kA short circuit current available Maximum of up to 0.25 s (15 cycle) fault clearing time Minimum 910 mm (36 in) working distance Potential arc flash boundary using above parameters: 12.5 m (495 in)			
CB operation with enclosure door closed	0	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	0	N	N
Insertion or removal of CBs from cubicles with door open	4	N	N
Work on control circuits with energized conductors and circuit parts 120 V or below, exposed	2	Y	Y
Insertion or removal (racking) of ground and test device with door closed	0	N	N

(Continued)

Table 4A (Continued)

Task(s) performed on energized equipment	Hazard/ risk category	Rubber insulating gloves required?	Insulated and insulating hand tools required?
Insertion or removal (racking) of voltage transformers on or off the bus, door closed	0	N	N
Other equipment 1 to 15 kV			
Parameters: Maximum of 35 kA short circuit current available Maximum of up to 0.25 s (15 cycle) fault clearing time Minimum 910 mm (36 in) working distance Potential arc flash boundary using above parameters: 12.5 m (495 in)			
Metal-enclosed interrupter switchgear, fused or unfused	—	—	—
Switch operation of arc-resistant type construction, tested in accordance with IEEE C37.20.7, doors closed only	0	N	N
Switch operation, doors closed	2	N	N
Work on exposed energized electrical conductors and circuit parts, including voltage testing	4	Y	Y
Removal of bolted covers (to expose bare energized electrical conductors and circuit parts)	4	N	N
Opening of hinged covers (to expose bare energized electrical conductors and circuit parts)	3	N	N
Outdoor disconnect switch operation (hookstick operated)	3	Y	Y
Outdoor disconnect switch operation (gang-operated, from grade)	2	Y	N
Insulated cable examination, in manhole or other confined space	4	Y	N
Insulated cable examination, in open area	2	Y	N

Notes:

(1) *Rubber insulating gloves are gloves rated for the maximum line-to-line voltage on which work will be done.*

(2) *Insulated and insulating hand tools are tools*
- *(a) rated and tested for the maximum line-to-line voltage on which work will be done; and*
- *(b) manufactured and tested in accordance with CAN/ULC-D60900 or ASTM F1505.*

(3) *Y = yes (required), N = no (not required)*

(4) *The use of "N" does not indicate that rubber insulating gloves, and insulated and insulating hand tools are not required in all cases. Rubber insulating gloves, and insulated and insulating hand tools might be required by Clauses 4.3.4, 4.3.7.3.7, and 4.3.7.4.*

(5) *For equipment protected by upstream current-limiting fuses with arcing fault current in their current-limiting range (1/2 cycle fault-clearing time or less), the hazard/risk category required may be reduced by one level.*

(6) *For power systems up to 600 V, the arc flash boundary was determined by using the following information:*
- *(a) when 0.03 s trip time was used, that indicated MCC or panelboard-equipment protected by a moulded-case circuit breaker. Working distance used is 455 mm (18 in), arc gap used is 32 mm for switchgear, and 25 mm for MCC, protective device type 0 for all.*
- *(b) When 0.33 or 0.5 s trip time was used, that indicated a LVPCB (drawout circuit breaker) in switchgear. Working distance is 455 mm (18 in), arc gap used is 32 mm, protective device type 0 for all.*

All numbers were rounded up or down depending on closest multiple of "5".

Table 4A (Continued)

Notes: (Cont'd)

(7) *For power systems from* 1 kV to 15 kV, *the arc flash boundary was determined by using:*
- *(a) the maximum short circuit current available, the maximum fault clearing time, and the minimum working distance shown in the parameters in each section header;*
- *(b) a* 153 mm *(6 in) conductor gap; and*
- *(c) ungrounded system type.*

The calculated result was rounded up to the nearest multiple of 5.

(8) *See Table 5 for a list of protective clothing and PPE for each hazard/risk category.*

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Table 4B
Hazard/risk category classifications and use of rubber insulating gloves and insulated and insulating hand tools – DC equipment

(See Clauses 3, 4.3.1, 4.3.7.3.7, 4.3.7.3.15, 4.3.7.3.16, 4.3.7.4.2, and B.2, Table 5 and Annex H)

Tasks performed on energized equipment	Hazard/risk category*	Rubber insulating gloves required?	Insulated and insulating hand tools required?
Storage batteries, direct-current switchboards and other dc supply sources > 100 V < 250 V			
Parameters: Voltage: 250 V Maximum arc duration and working distance: 2 s at 455 mm (18 in)			
Work on energized electrical conductors and circuit parts, including voltage testing where arcing current is > 1 kA and < 4 kA Potential arc flash boundary using above parameters at 4 kA = 910 mm (36 in)	1	Y	Y
Work on energized electrical conductors and circuit parts, including voltage testing where arcing current is > 4 kA and < 7 kA Potential arc flash boundary using above parameters at 7 kA = 1.20 m (48 in)	2	Y	Y
Work on energized electrical conductors and circuit parts, including voltage testing where arcing current is > 7 kA and < 15 kA Potential arc flash boundary using above parameters at 15 kA = 1.85 m (72 in)	3	Y	Y
Storage batteries, direct-current switchboards and other dc supply sources > 250 V < 600 V			
Parameters: Voltage: 600 V Maximum arc duration and working distance: 2 s at 455 mm (18 in)			
Work on energized electrical conductors and circuit parts, including voltage testing where arcing current is > 1 kA and < 1.5 kA Potential arc flash boundary using above parameters at 1.5 kA = 910 mm (36 in)	1	Y	Y
Work on energized electrical conductors and circuit parts, including voltage testing where arcing current is > 1.5 kA and < 3 kA Potential arc flash boundary using above parameters at 3 kA = 1.20 m (48 in)	2	Y	Y
Work on energized electrical conductors and circuit parts, including voltage testing where arcing current is > 3 kA and < 7 kA Potential arc flash boundary using above parameters at 7 kA = 1.85 m (72 in)	3	Y	Y
Work on energized electrical conductors and circuit parts, including voltage testing where arcing current is > 7 kA and < 10 kA Potential arc flash boundary using above parameters at 10 kA = 2.45 m (96 in)	4	Y	Y

**If acid exposure is possible, the clothing shall be protective from acid and arc rated to the hazard in accordance with ASTM F1891 or equivalent and evaluated by ASTM F1296 for acid protection.*
Note: *See Table 5 for a list of protective clothing and PPE for each hazard/risk category.*

Selection of Personal Protective Equipment for Various Tasks

Alternating Current (AC) Equipment

When the arc flash PPE category method is selected in lieu of the incident energy analysis method CSA Z462 and NFPA 70E Table Method shall be used to identify when arc flash PPE is required.

When arc flash PPE is required, CSA Z462 and NFPA 70E Table Method shall be used to determine the hazards and risks for the selection of arc flash PPE category.

The **estimated maximum** available short-circuit current, maximum fault clearing times and minimum working distances for various AC equipment types or classifications are listed in the CSA Z462 and NFPA 70E Table Method.

The Tables have limitations and shall not be a substitute for an eventual Incident energy Analysis. The Tables may not be a viable solution for the optimum protection for workers. An incident energy analysis shall be required in accordance with CSA Z462 and NFPA 70E standards for the following:

1. Tasks not listed in the Tables;
2. Power systems with greater than the estimated maximum available short-circuit current;
3. Power systems with longer than the maximum fault clearing times;
4. Tasks with less than the minimum working distance.

Direct Current (DC) Equipment

When the arc flash PPE category method is selected in lieu of the incident energy analysis method CSA Z462 and NFPA 70E Table Method shall be used to identify when arc flash PPE is required.

When arc flash PPE is required, Table 4C shall be used to determine the arc flash PPE category.

For Canada the estimated maximum available short circuit current, maximum arc duration and working distances for DC equipment are listed in Table 4C. The NFPA 70 E requirements are the same as CSA Z462 as these documents are ostensibly harmonized.

An incident energy analysis shall be required in accordance with CSA Z462 Clause 4.3.5.3.2 for the following:

1. Tasks not listed in Table 4A;
2. Power systems with greater than the estimated maximum available short circuit current;
3. Power systems with longer than the maximum arc duration; or
4. Tasks with less than the minimum working distance.

Notes:
(1) *The arc flash PPE category, work tasks, and protective equipment provided in Tables 4A, were identified and selected based on the collective experience of the NFPA 70E technical committee. The arc flash PPE category of the protective clothing and equipment is generally based on a determination of the estimated exposure levels level.*

(2) *Collective experience NFPA 70E technical committee indicates that in most cases closed doors do not provide enough protection to eliminate the need for PPE in situations in which the state of the equipment is known to change frequently, e.g., doors open or closed, rack in or rack out.*

(3) *The premise used by the NFPA 70E technical committee in developing the criteria discussed in Notes (1) and (2) is considered to be reasonable, based on the consensus judgment of the Committee.*

- Are your Arc Flash Hazard analyses documented and have the results been reviewed by your team?
- Does the documentation include the results of the arc flash analysis, updated single-line diagrams, signs and labels on equipment and at hazardous areas?
- Do the Warning Labels include the date, type, and name identification, incident energy at safe working distances, flash protection boundary, hazard/risk category, PPE requirements and voltage limits of approach?
- Are all single-line diagrams up-to-date reflecting the current conditions?
- Does your Work Plan include the identification of hazards, risk evaluation and risk reduction control procedures, electrical safe work isolation procedures, lockout, insulated tools, PPE, and electrical safety principles?
- Do you have appropriate safety procedures in place to minimize electrical dangers where exposure cannot be avoided during live work on energized systems?
- Does all electrical equipment that may remain energized during maintenance or repair have a warning label in compliance with local requirements?
- Did the worker review the arc flash and voltage warning label information on the equipment and visually inspect the area to identify any potential hazards and risks?
- Does the equipment being accessed have a voltage level warning label on exterior?
- Does the main disconnect used for isolation have a "Lockout Here" label?
- Has the PPE been identified and available for the work activity?
- Does the PPE conform to requirements as detailed in Appendix D?
- Should the workers confirm the Category Incident Energy Calories/cm^2?
- Should the workers inspect the PPE for damage and or contamination prior to use?
- Should the workers use all buttons on the garment particularly to protect neck?
- Should the workers confirm correct glove voltage class re Class 0 1000 Volt?
- Should the workers have non-melting undergarments?
- Should the workers remove all conductive objects from clothing and pockets?
- Should the workers stand on Class 0 1000 volt-rated insulating mats?
- Should the workers wear safety glasses?
- Should the workers wear hearing protection?
- Should the workers wear insulating footwear re Omega rated symbol on footwear Ω?

Maximum Working Voltage: Maximum Working Amps:

Shock Hazard		**Arc Flash Hazard**	
Determine *Shock Approach Boundaries:*		**Maximum *Incident Energy Level:***	**Cal/cm^2**
Limited Approach Boundary:	**inches**	***Arc Flash Protection Boundary:***	**inches**
Restricted Approach Boundary:	**inches**	***Working Distance for Work Task:***	**inches**
Prohibited Approach Boundary:	**inches**	***Electrical Work Zone*** **barricading established at what distance:**	**inches**
Note: Unqualified Person to remain outside the Limited Approach Boundary		***Note: Establish the Electrical Work Zone barrier at the Arc Flash Protection Boundary or Limited Approach Boundary, whichever is***	

Section 6: Hazard Analysis - Other

Signatures:

Originator	Date
PM	Date
QTPR	Date

Electrical Safe Work Practice Checklist

- Are your Arc Flash Hazard analyses documented and have the results been reviewed by your team?
- Does the documentation include the results of the arc flash analysis, updated single-line diagrams, signs and labels on equipment and at hazardous areas?
- Do the Warning Labels include the date, type, and name identification, incident energy at safe working distances, flash protection boundary, hazard/risk category, PPE requirements and voltage limits of approach?
- Are all single-line diagrams up-to-date reflecting the current conditions?
- Does your Work Plan include the identification of hazards, risk evaluation and risk reduction control procedures, electrical safe work isolation procedures, lockout, insulated tools, PPE, and electrical safety principles?
- Do you have appropriate safety procedures in place to minimize electrical dangers where exposure cannot be avoided during live work on energized systems?
- Does all electrical equipment that may remain energized during maintenance or repair have a warning label in compliance with local requirements?
- Did the worker review the arc flash and voltage warning label information on the equipment and visually inspect the area to identify any potential hazards and risks?
- Does the equipment being accessed have a voltage level warning label on exterior?
- Does the main disconnect used for isolation have a "Lockout Here" label?
- Has the PPE been identified and available for the work activity?
- Does the PPE conform to requirements as detailed in Appendix D?
- Should the workers confirm the Category Incident Energy Calories/cm^2?
- Should the workers inspect the PPE for damage and or contamination prior to use?
- Should the workers use all buttons on the garment particularly to protect neck?
- Should the workers confirm correct glove voltage class re Class 0 1000 Volt?
- Should the workers have non-melting undergarments?
- Should the workers remove all conductive objects from clothing and pockets?
- Should the workers stand on Class 0 1000 volt-rated insulating mats?
- Should the workers wear safety glasses?
- Should the workers wear hearing protection?
- Should the workers wear insulating footwear re Omega rated symbol on footwear Ω?
- Should the worker review the arc flash label information on the equipment and visually inspect area to identify any potential hazards and risks?
- Should a design review be conducted to identify potential areas to reduce hazards including fault levels, exposure times, remote operations, remote racking, and system grounding?
- Should protective devices be tested and checked to verify performance per study?
- Should risk reduction strategies be implemented?
- Should the upstream isolation device be located by the worker?

- Should the worker use barricade methods to establish a boundary area?
- Ensure the surface that the worker is standing on is dry prior to working on live energized systems and use 1000 volt insulating mat.
- Ensure adequate/appropriate lighting is available.
- Select, inspect and use test instruments in compliance with Appendix B.
- Will workers review available drawings and documents?
- Will diagnostic checks be performed on load side of protective device only (not on the line side)?
- Consider, "Who is qualified to cross the barricade into the boundary area?"
- Are all conductive materials kept clear from exposed energized electrical systems?
- Are line and load guard covers in place?
- Are open front devices protected with non-conductive covers?
- Only qualified workers can cross into the Arc Flash or Shock Hazard Boundary?
- Has a qualified attendant remained at the boundary area to warn people away from the hazard?
- Are enclosure doors closed when unattended?
- At the completion of work, will the work area be left in a safe condition?

Arc-flash hazard identification for alternating current (ac) and direct current (dc) systems
(See Clauses 3, 4.3.1, 4.3.7.3.7, 4.3.7.3.15, 4.3.7.3.16, 4.3.7.4.2, and B.2, Table 5 and Annex H)

Task	Equipment Condition *	Arc Flash PPE Required
Reading a panel meter while operating a meter switch	Any	No
Normal operation of a circuit breaker (CB)k switch, contactor or starter	All of the following: • The equipment is properly installed; • The equipment is properly maintained; • All equipment doors are closed and secured; • All equipment covers are in place and secured; and • There is no evidence of impending failure.	No
	One or more of the following: • The equipment is not properly installed; • The equipment is not properly maintained; • Equipment doors are open or not secured • Equipment covers are off or not secured; or • There is evidence of impending failure.	Yes
For ac systems: Work on energized electrical conductors and circuit parts, including voltage testing	Any	Yes
For dc systems: Work on energized electrical conductors and circuit parts of series-connected cells, including voltage testing	Any	Yes
Voltage testing on individual battery cells or individual multi-cell units	All of the following: • The equipment is properly installed; • The equipment is properly maintained; • Covers for all equipment are in place and secured; and • There is no evidence of impending failure.	No
	One or more of the following: • The equipment is not properly installed; • The equipment is not properly maintained; • Equipment doors are open or not secured • Equipment covers are off or not secured; or • There is evidence of impending failure.	Yes
Removal or installation of CBs or switches	Any	Yes
Removal of installation of covers for equipment such as wire ways, junction boxes and cable trays that does not expose bare, energized electrical conductors and circuit parts	All of the following: • The equipment is properly installed; • The equipment is properly maintained; and • There is no evidence of impending failure.	No
	One or more of the following: • The equipment is not properly installed; • The equipment is not properly maintained; or • There is evidence of impending failure.	Yes
Removal of bolted covers (to expose bare energized electrical conductors and circuit parts); For dc systems, this includes bolted covers, such as battery terminal covers	Any	Yes

Task	Equipment Condition *	Arc Flash PPE Required
Removal of battery inter cell connector covers	All of the following: • The equipment is properly installed; • The equipment is properly maintained; • Covers for all equipment are in place and secured; and • There is no evidence of impending failure.	No
	One or more of the following: • The equipment is not properly installed; • The equipment is not properly maintained; • Equipment doors are open or not secured • Equipment covers are off or not secured; or • There is evidence of impending failure.	Yes
Opening hinged door(s) or cover(s) (to expose bare energized electrical conductors and circuit parts)	Any	Yes
Perform infrared thermography and other non-contact inspections outside the restricted approach boundary. This activity does not include opening of doors or covers.	Any	No
Application of temporary protective grounding equipment, after voltage test	Any	Yes
Work on control circuits with exposed energized electrical conductors and circuit parts, 120 volts or below without any other exposed energized equipment over 120 volts including opening of hinged covers to gain access	Any	No
Work on control circuits with exposed energized electrical conductors and circuit parts, greater than 120 volts	Any	Yes
Insertion or removal of individual starter buckets from MCC	Any	Yes
Insertion or removal (racking) of CBs of starters from cubicles, doors open or closed	Any	Yes
Insertion or removal of plug-in devices into or from busways	Any	Yes
Insulated cable examination with no manipulation of cable	Any	No
Insulated cable examination with manipulation of cables	Any	Yes
Work on exposed energized electrical conductors and circuit parts of equipment directly supplied by a panelboard or motor control center	Any	Yes
Insertion or removal of revenue meters (kW-hour, at primary voltage and current)	Any	Yes

Arc-Flash PPE categories for alternating current (ac) systems

Equipment	Arc-Flash PPE Category	Arc-Flash Boundary
Panelboards or other equipment rated 240 V and below Parameters: Maximum of 25 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 18 inches	1	485 mm (19 in.)
Panelboards or other equipment rated > 240 V and up to 600 V Parameters: Maximum of 25 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 18 inches	2	900 mm (3 ft)
600-V class motor control centers (MCCs) Parameters: Maximum of 6 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 18 inches	2	1.5 m (5 ft)
600-V class motor control centers (MCCs) Parameters: Maximum of 42 kA short-circuit current available; maximum of 0.33 sec (20 cycles) fault clearing time; working distance 18 inches	4	4.3 m (14 ft)
600-V class switchgear (with power circuit breakers or fused switches) and 600 V class switchboards Parameters: Maximum of 35 kA short-circuit current available; maximum of 0.5 sec (30 cycles) fault clearing time; working distance 18 inches	4	6 m (20 ft)
Other 600-V class (277 V through 600 V nominal) equipment Parameters: Maximum of 65 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 18 inches	2	1.5 m (5 ft)
NEMA E2 (fused contactor) motor starters, 2.3 kV through 7.2 kV Parameters: Maximum of 35 kA short-circuit current available; maximum of 0.24 sec (15 cycles) fault clearing time; working distance 36 inches	4	12 m (40 ft)
Metal-clad switchgear, 1 kV through 15 kV Parameters: Maximum of 35 kA short-circuit current available; maximum of 0.24 sec (15 cycles) fault clearing time; working distance 36 inches	4	12 m (40 ft)
Arc-resistant switchgear Type 1 or 2 (for clearing times of <0.5 sec (30 cycles) with a perspective fault current not to exceed the arc-resistant rating of the equipment), and metal-enclosed interrupter switchgear, fused or unfused of arc-resistant-type construction, tested in accordance with IEEE C37.20.7, 1 kV through 15 kV)	N/A (doors closed)	N/A (doors closed)
Parameters: Maximum of 35 kA short-circuit current available; maximum of 0.24 sec (15 cycles) fault clearing time; working distance 36 inches	4 (doors open)	12 m (40 ft)
Other equipment 1 kV through 15 kV Parameters: Maximum of 35 kA short-circuit current available; maximum of 0.24 sec (15 cycles) fault clearing time; working distance 36 inches	4	12 m (40 ft)

Note: For equipment rated 600 volt and below and protected by upstream current limiting fuses or current limiting circuit breakers sized at 200 amperes or less, the arc flash PPE category can be reduced by one number, but not below arc flash PPE category 1.

Arc-Flash PPE categories for direct current (dc) systems

(See Clauses 3, 4.3.1, 4.3.2.2.2, 4.3.7.3.7, 4.3.7.3.15, 4.3.7.3.16, 4.3.7.4.2, and B.2, Table 5 and Annex H)

Equipment	Arc-Flash PPE Category	Arc-Flash Boundary
Storage batteries, direct-current switchboards and other dc supply sources 100 V > Voltage < 250 V Parameters: Voltage: 250 V Maximum arc duration and working distance: 2 s at 455 mm (18 in)		
Short-circuit current < 4 kA	1	900 mm (3 ft)
4 kA ≤ short-circuit current < 7 kA	2	1.2 m (4 ft)
7 kA ≤ short-circuit current < 15 kA	3	1.8 m (6 ft)
Storage batteries, direct-current switchboards and other dc supply sources 250 V ≤ Voltage ≤ 600 V Parameters: Voltage: 600 V Maximum arc duration and working distance: 2 s at 455 mm (18 in)		
Short-circuit current < 1.5 kA	1	900 mm (3 ft)
1.5 kA ≤ short-circuit current < 3 kA	2	1.2 m (4 ft)
3 kA ≤ short-circuit current < 7 kA	3	1.8 m (6 ft)
7 kA ≤ short-circuit current < 10 kA	4	2.5 m (8 ft)

Personal Protective Equipment

(See Clauses 4.3.1, 4.3.7.3.12, and 4.3.7.3.16, and Tables 4A and 4B, and Annex H)

Arc Flash PPE Category	Personal Protective Equipment (PPE)
1	Arc rated clothing, minimum arc rating of 4 Cal/cm^2 (Note 3) Arc rated long-sleeve shirt and pants or arc rated coverall Arc rated face shield or arc flash suit hood (Note 2) Arc rated jacket, parka, rainwear, or hard hat liner (AN) Protective equipment: Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Heavy duty leather gloves (AN) (Note 1) Leather footwear (AN)
2	Arc rated clothing, minimum arc rating of 8 Cal/cm^2 (Note 3) Arc rated long-sleeve shirt and pants or arc rated coverall Arc rated arc flash suit hood; or Arc rated face shield (Note 2) and arc rated balaclava Arc rated jacket, parka, rainwear, or hard hat liner (AN) Protective equipment: Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Heavy duty leather gloves (AN) (Note 1) Leather footwear (AN)
3	Arc rated clothing, selected so that the system arc rating meets the required minimum arc rating of 25 Cal/cm^2 (Note 3) Arc rated long-sleeve shirt (AR) Arc rated pants (AR) Arc rated coverall (AR) Arc rated arc flash suit jacket (AR) Arc rated arc flash suit pants (AR Arc rated arc flash suit hood Arc rated gloves (Note 1) Arc rated jacket, parka, rainwear, or hard hat liner (AN) Protective equipment: Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Leather footwear (AN)
4	Arc rated clothing, selected so that the system arc rating meets the required minimum arc rating of 40 Cal/cm^2 (Note 3) Arc rated long-sleeve shirt (AR) Arc rated pants (AR) Arc rated coverall (AR) Arc rated arc flash suit jacket (AR) Arc rated arc flash suit pants (AR Arc rated arc flash suit hood Arc rated gloves (Note 1) Arc rated jacket, parka, rainwear, or hard hat liner (AN) Protective equipment: Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Leather footwear (AN)

Legend:

AN = as needed (optional); AR = as required; SR = selection required

Notes

(1) Arc rating is defined in Clause 3

(2) Face shields shall meet the requirements of Clause 4.3.7.3.10(c). An arc flash suit hood may be worn in lieu of a face shield.

(3) If rubber insulating gloves with leather protectors are used, additional leather or arc-rated gloves shall not be required. The combination of rubber insulating gloves with leather protectors satisfies the arc flash protection requirement. [FR-69; PI-263 and SR-66 revises all of Clause 4.3.7.3.16, including Table 5]

Energized Electrical Permit

Date: / / GHD Office:
Site Name:

Project Number: Project Manager:

Section 1: To Be Completed By the Requestor

Project description:

Description of energized work to be done:

Proposed dates and duration of energized work:

Anticipated number of workers and their qualifications (including subcontractors):

Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage (attach client's written refusal of shut down request):

Requestor/Title Date

Section 2: To Be Completed By the Electrically Qualified Person *Doing* the Work

(1) Work Plan attached? ☐

(2) Does the work plan address Safe Work Practices as required by NFPA 70E or CSA Z462? ☐

(3) Shock Hazard Analysis attached? ☐

(4) Arc Flash Hazard Analysis attached? ☐

(5) Do you agree the above described work can be done safely? ☐ Yes ☐ No If *no*, return to requestor

Qualified Technical Lead Date

Section 3: Approval(s) To Perform the Work While Electrically Energized

Project Manager	Date
Qualified Senior Electrical Reviewer	Date
SRSHM or Corporate HSE Manager	Date
Principal in charge of project	Date
Principal in charge of HSE	Date

Note: Once the energized work is complete, forward this form to the project file and RSHM for retention

Extension Cords and Power Strips

Employees must be aware of the hazards associated with the misuse of extension cords and power strips. All power strips must be UL listed and used according to the manufacture's guidelines.

Choosing an Appropriate Extension Cord. A.F. Smith Electric, Inc. has a variety of extension cords available for employee use. Employees will select an extension cord that can handle the electricity requirement for any connected tools or equipment. All employees will adhere to the following guidelines when choosing an appropriate extension cord.

- **Lights and fans (1-13 amperage rating).** Employees may use a 25-100 foot long extension cord with 16 gauge wire, or a 150 foot cord with 14 gauge wire.
- **Small electrical hand-held tools, such as drills and sanders (14-15 amperage rating).** May use a 25-100 foot long extension cord with 14 gauge wire, or a 150 foot cord with 12-10 gauge wire.
- **Large electrical tools such as shop vacuums, circular saws, table saw and space heaters (16-20 amperage rating).** May use a 25-100 foot long extension cord with 12-10 gauge wire. Do not use an extension cord longer than 100 feet with large electrical tools.

* All extension cords used for construction or outdoor maintenance work will be equipped with, or connected to, a ground fault circuit interrupter (GFCI).

If an employee is unsure which size of extension cord he/she should use, contact a supervisor or the Program Administrator.

Safe Work Practices for Extension Cords and Power Strips. The following safe work practices will be followed at all times by all employees when using an extension cord or power strip.

- No employee will plug in or unplug a power strip or extension cord with wet hands.
- Power strips will only be used in office settings.
- Grounding prongs will never be removed from the end of any extension cord or power strip. No strip or cord with a missing grounding prong shall be plugged into outlets.
- All extension cords and power strips will be inspected before use. If any defects are found, the cord or strip will be removed from service.
- All power strips and extension cords will be tested using an ohm meter every 3 months.
- If and when extension cords or power strips are used, they will not be:
    - Run through holes in walls, ceilings or floors
    - Run through doorways or windows without appropriate protection
    - Used in areas where vehicles, forklifts or other equipment could drive over the cord
    - Fastened with staples or hung in a way that could damage the insulation
    - Used for more than 30 days

If it is necessary to run an extension cord through a doorway (for example, work completed outdoors with no outlet), the cord will be protected using high contrast tape or coverings and will not be left out overnight. Employees must get approval from the Program Administrator before an extension cord can be used in this manner.

Repairing and Replacing Electrical Cords

If a cord is damaged, the following guidelines will be followed:

- All repairs will be completed by A.F. Smith Electric, Inc.
- Electrical shrink wrap will be used to repair the cord. One shrink wrap repair can be used per cord. The cord will be replaced if a second repair is needed.
- The electrical shrink wrap will cover no more than 12 inches of the cord.
- After the repair, the cord must retain its original flexibility and integrity.
- If the inner insulation is damaged, the cord must be replaced.
- Damaged cords used in wet areas shall be immediately replaced.

Circuit Overload

To reduce the possibility of overloaded circuits, A.F. Smith Electric, Inc. employees will only plug in one device per outlet. Employees will not use splitters, multi-plug adapters, etc. without direct permission from the Program Administrator. If you have a concern that a circuit may be overloaded, you are to contact your supervisor or the Program Administrator as soon as possible.

Tools

The following requirements shall be adhered to at all times:

- All electrical tools will be stored in a clean, dry place when not in use.
- Employees will not carry electrical tools by the cord or yank cords from the wall.
- If a tool is unintentionally deenergized due to a circuit breaker or GFCI, it must be removed from service until the cause of deenergization is discovered.
- All electrical tools will be tested using an ohm meter every 3 months.
- All tools will have grounding prongs. Any tool without a grounding prong will be removed from service.
- All electrical tools will be inspected before use. If any defects are found, the tool will be removed from service until it can be repaired or replaced.
- Fiberglass ladders will be used when working around or on electrical equipment or wires.

Guarding

All electrical systems must be guarded to prevent contact with live conductors. The following requirements will be adhered to at all times:

- All electrical distribution panels, breakers, disconnects, switches and junction boxes will be completely enclosed.
- Live parts to electrical equipment operating at 50 volts or more must be guarded to prevent contact and prevent damage.
- All electrical receptacles and cover plates will be kept intact and in good condition.
- All electrical panels will be easily accessible at all times and a minimum of three feet of clearance shall be maintained on all sides.

High Voltage Electrical Rooms and Closets

The following requirements for electrical rooms and closets shall be adhered to at all times:

- High voltage rooms and closets must be locked at all times.
- Only qualified employees are allowed into high voltage rooms and closets.
- No A.F. Smith Electric, Inc. employee will open or remove covers or access panels of high voltage electrical distribution panels or transformers.
- Nothing will be stored in rooms or closets designated for electrical equipment.
- Safety signs which warn employees about any electrical hazards shall be displayed prominently on the door of the room or closet. ***(Appendix D)***

Ground Fault Circuit Interrupters

Ground fault circuit interrupters (GFCIs) protect A.F. Smith Electric employees who use electrically-powered tools and equipment from electrical shocks, especially when working in wet environments. GFCIs are required for electrically-powered equipment and tools in the following conditions:

- When used at locations where employees are likely to contact water or conductive liquids, such as outdoors, bathrooms, kitchens or any other area with potential exposure to water
- When used at construction or renovation sites
- When used for portable lighting in wet or other conductive locations (such as inside boilers or tanks)

Working near Power Lines

Both overhead and underground power lines present electrical hazards. The following procedures shall be adhered to when working near power lines.

- Remain at least 10 feet away from overhead power lines.
- If the voltage is greater than 50,000 volts, add 4 more inches of safe distance for each 10,000 volts beyond 50,000.
- When working around high voltage lines, ground all equipment that may become energized.
- Call Miss Dig locate service before you dig 1-800-482-7171 a minimum of 48 hours before any digging. Once underground power lines have been identified, add an additional 18 inch clearance on either side of the marking or flag. Do not dig in this clearance area. If it is required to dig within the clearance area A.F. Smith Electric, Inc. will use an outside contractor to perform the work.

Additional Safety Precautions

The following additional safety precautions shall be adhered to at all times.

- If a circuit breaker trips or blows a fuse more than once, it shall be investigated and corrected by a qualified employee or contractor before being cleared for continued use.
- All areas with electrical equipment shall be properly illuminated.

- Housekeeping duties will not be performed in an area if there is a possibility of contact with an electrical hazard unless there are protective shields, barriers or if insulated materials are used to protect the employee.
- Safety signs that warn employees about any electrical hazards shall be displayed prominently when a hazard is present. ***(Appendix C)***

Personal Protective Equipment (PPE)

Employees working in areas where electrical hazards are present will be provided with and shall use PPE that is designed for the specific part of the body to be protected and for the work being performed. Employees are required to adhere to the following procedures for PPE use:

- All PPE must be inspected prior to each day's use and immediately following any incident.
- Non-conductive head protection will be worn if there is danger of electrical burns or shock from contact with electricity.
- When working on electrical equipment or wiring, employees will:
    - Not wear conductive articles of clothing or jewelry
    - Wear non-melting clothing such as cotton
    - Wear electrical-rated boots
    - Wear non-conductive gloves

Employee Training

Qualified Workers. At a minimum, qualified workers must be trained on the following:

- The hazards associated with electrical equipment
- Electrical safety practices and procedures (lockout/tagout) for doing deenergized work
- Safe work practices that must be followed when working around or with electrical tools or equipment
- How to distinguish exposed live parts from other parts of electrical equipment
- How to properly inspect and use the appropriate PPE
- The location of the electrical breaker panels and fuse boxes

Unqualified Workers. Unqualified workers will receive general electrical safety awareness training on how to recognize, evaluate and avoid electrical hazards and training on all A.F. Smith Electric, Inc. electrical safety practices.

Training will occur before an employee begins work in a new area and when an employee does not comply with safe work practices. Retraining will occur every 3 years & the training will be documented and retained.

Periodic Program Review

The Program Administrator will review the Electrical Safety Program and procedures annually. The review will be documented on the form located in ***Appendix F.***

Appendix A—Electrical Safety Program Training Record

The following individuals received training on A.F. Smith electric, Inc. Electrical Safety Program.

Print Name	Sign Name

The undersigned conducted training in accordance with A.F. Smith Electric, Inc. Electrical Safety Program.

Print Instructor's Name	
Instructor's Signature	
Instructor's Title	
Date of Training	

Appendix B – Electrical Hazards Inspection

Supervisors at A.F. Smith Electric, Inc. will use this form to periodically inspect their employees' work practices. Any issues found during these inspections shall be addressed immediately.

Is lockout/tagout used before performing any maintenance on electrical equipment?	Yes	No	N/A
Have all employees received training and has it been documented?	Yes	No	N/A
Do all cords have the grounding prong?	Yes	No	N/A
Are tools being stored in a clean, dry place?	Yes	No	N/A
Are employees using and carrying tools properly?	Yes	No	N/A
Are insulated tools used?	Yes	No	N/A
Do all electrical tools have a grounding prong?	Yes	No	N/A
Are tools and power cords inspected prior to use?	Yes	No	N/A
Is the correct extension cord used?	Yes	No	N/A
Do extension cords remain in use for less than 30 days?	Yes	No	N/A
Are all extension cords and equipment cords run or protected so as to prevent damage to the cord's insulation?	Yes	No	N/A
Is the area around electrical panels and boxes kept clear?	Yes	No	N/A
Are all electrical receptacles and cover plates kept in good condition?	Yes	No	N/A
Are areas with electrical equipment properly illuminated?	Yes	No	N/A
Are all electrical control devices properly labeled?	Yes	No	N/A
Are there safety signs warning employees about electrical hazards?	Yes	No	N/A
Are employees wearing proper clothing? (Non-conductive, no jewelry, etc.)	Yes	No	N/A
Are GFCIs used in wet locations?	Yes	No	N/A

Are all electrical distribution panels, breakers, disconnects, switches and junction boxes completely enclosed?	**Yes**	**No**	**N/A**
Are all live parts of electrical equipment operating at 50 volts or more guarded to prevent contact?	**Yes**	**No**	**N/A**
Are fiberglass ladders used when working near electrical hazards?	**Yes**	**No**	**N/A**
Are safe work distances maintained when working around power lines?	**Yes**	**No**	**N/A**
Is the One Call Center called at least 48 hours before any digging?	**Yes**	**No**	**N/A**
Is an 18 inch clearance maintained on either side of paint or flags indicating underground power lines?	**Yes**	**No**	**N/A**
What was done to address issues?			

Supervisor Name:	
Supervisor Signature:	
Date:	

Appendix C– Electrical Hazard Sign One

Appendix D – Electrical Hazard Sign Two

ELECTRICAL SUPPLY STATION

ALL UNAUTHORIZED PERSONS ARE FORBIDDEN TO ENTER

count on EMC INSURANCE

DS0102

Appendix E – List of Qualified Employees

Name of Qualified Employee	Date of Qualification

Appendix F – Annual Evaluation Report

Date of Evaluation:	Evaluated By (list all present):
Written Program Reviewed: Yes No	
Comments on Written Program:	
The following specific procedures have been reviewed:	
The following specific procedures were modified:	
The following specific procedures were added:	
A review of the accident reports and injury and illness reports were made: Yes No	
The following additional expense(s) resulted from failure to use correct electrical safety procedures:	
Comments:	

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GENERAL LOCKOUT/TAGOUT PROCEDURE

Purpose:
This procedure establishes the minimum requirements for lockout of energy sources that could cause injury to personnel. All employees shall comply with the procedure.

Responsibility:
The responsibility for seeing that this procedure is followed is binding upon all employees. All employees shall be instructed in the safety significance of the lockout procedure by (designated individual). Each new or transferred affected employee shall be instructed by (designated individuals) in the purpose and use of the lockout procedure.

Preparation for Lockout:
Employees authorized to perform lockout shall be certain as to which switch, valve, or other energy isolating devices apply to the equipment being locked out. More than one energy source (electrical, mechanical, or others) may be involved. Any questionable identification of sources shall be cleared by the employees with their supervisors. Before lockout commences, job authorization should be obtained.

Sequence of Lockout Procedure:

1. Notify all affected employees that a lockout is required and the reason therefor.

2. If the equipment is operating, shut it down by the normal stopping procedure (such as: depress stop button, open toggle switch).

3. Operate the switch, valve, or other energy isolating devices so that the energy source(s) (electrical, mechanical, hydraulic, other) is disconnected or isolated from the equipment.

4. Lockout energy isolating devices with an assigned individual lock.

5. Stored energy, such as that in capacitors, springs, elevated machine members, rotating fly wheels, hydraulic systems, and air, gas, steam or water pressure, must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down.

6. After ensuring that no personnel are exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate. CAUTION: Return operating controls to neutral position after the test.

7. The equipment is now locked out.

Restoring Equipment to Service:

1. When the job is complete and equipment is ready for testing or normal service, check the equipment area to see that no one is exposed.

2. When equipment is clear, remove all locks. The energy isolating devices may be operated to restore energy to equipment.

Procedure Involving More Than One Person:

In the preceding steps, if more than one individual is required to lock out equipment, each shall place his/her own personal lock on the energy isolating device(s). One designated individual of a work crew or a supervisor, with the knowledge of the crew, may lock out equipment for the whole crew. In such cases, it may be the responsibility of the individual to carry out all steps of the lockout procedure and inform the crew when it is safe to work on the equipment. Additionally, the designated individual shall not remove a crew lock until it has been verified that all individuals are clear.

Rules for Using Lockout Procedure:

All equipment shall be locked out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy isolating device bearing a lock.

EQUIPMENT LOCKOUT/TAGOUT PROCEDURE

Equipment Number | Equipment Type | Equipment Location | Department

Equipment Name

Potential Hazards:	☐ Electrical	☐ Pneumatic	☐ Mechanical	☐ Multiple Lockouts
	☐ Hydraulic	☐ Chemical	☐ Combustables	☐ Confined Space
Methods of Neutralizing Energy:	☐ Relieve Pressure	☐ Block/Bleed	☐ Lockout/Tagout	
	☐ Disconnect Lines	☐ Set Fire Watch	☐ Confined Space Permit	
Permits Required:	☐ Safe Work	☐ Hot Work	☐ Line Blanking	☐ Confined Space

Lockout Procedure:

1. Notify Production Supervisor and ALL affected personnel.
2. After completing Step 1, Shut down equipment, if running, as trained. If you are not sure how, contact your supervisor for instructions.
3. Lockout the equipment following the lockout procedure at the WET TRANSFER ON ROLLS cabinet local disconnect on the north wall. This equipment can also be locked out at MCC 19 ROW B bucket 01 in the OLD BOILER ROOM.

   Note: Turn off the MAIN Air supply on the North wall to right of the ON ROLL control cabinet and lock the cover. Then isolate both of the surge tanks under the crossover walkway. Close and tag the ball valves before each tank. Push and lock out Dump Valves numbers 4 and 5. LOCK OUT the CROSSBELT #1 at the Crossover walkway local disconnect.

   Test the equipment at the "WET END Control Panel" located on the North wall by pushing the "Green Board Transfer start" pushbutton. You can also test this equipment from the crossover pushbutton station at the WET Transfer station by pushing the START SYSTEM pushbuton.

4. After ALL previous steps have been completed, begin your work assignment.
5. After completion of the work, assure that your work area is clean, clear of ALL debris and that ALL guards are secured in place.
6. Notify the Production Supervisor and ALL affected personnel that the equipment is operational and that removal of the lock-outs will occur.
7. Remove ALL locks and tags following the Lock-Out I Tag-Out Program instructions.
8. Prior to start-up of the equipment, inspect the area to ensure that ALL employees, contractors and any other personnel are safely positioned.
9. When production is ready, verify that equipment is operating correctly.
10. Close out any applicable permit/s and return them to your supervisor.