Risk Assessment Procedure

Risk Register

Task	*Hazard	Arc Flash IE cal/cm2	**Equip Cond	(Se)	Po = (Fr + Pr + Av) (Fr)	(Pr)	(Av)	Total	Risk Score Se x Po
Voltage, current testing, trouble-shooting	ES		Acc	6	4	1	1	6	36
	ES		< Acc	6	4	3	3	10	60
	AF/AB	<1.2	Acc	1	4	1	1	6	6
	AF/AB	<1.2	<Acc	1	4	3	1	8	8
	AF/AB	>=1.2 to <=8	Acc	3	3	1	1	5	15
	AF/AB	>=1.2 to <=8	<Acc	3	3	4	3	10	30
	AF/AB	>8 to <=40	Acc	6	3	1	1	5	30
	AF/AB	>8 to <=40	<Acc	6	3	4	3	10	60
	AF/AB	>40	Acc	8	3	2	3	8	64
	AF/AB	>40	<Acc	8	3	5	3	11	88
Task	***Hazard**	**Arc Flash IE cal/cm2**	****Equip Cond**	**(Se)**	**Po = (Fr + Pr + Av) (Fr)**	**(Pr)**	**(Av)**	**Total**	**Risk Score Se x Po**
Infrared inspection	ES		Acc	6	3	1	1	5	30
	ES		< Acc	6	3	1	1	5	30
	AF/AB	<1.2	Acc	1	3	1	1	5	5
	AF/AB	<1.2	<Acc	1	3	3	1	7	7
	AF/AB	>=1.2 to <=8	Acc	3	3	1	1	5	15
	AF/AB	>=1.2 to <=8	<Acc	3	3	4	3	10	30
	AF/AB	>8 to <=40	Acc	6	3	1	1	5	30
	AF/AB	>8 to <=40	<Acc	6	3	4	3	10	60
	AF/AB	>40	Acc	8	3	1	3	7	56
	AF/AB	>40	<Acc	8	3	5	3	11	88
Task	***Hazard**	**Arc Flash IE cal/cm2**	****Equip Cond**	**(Se)**	**Po = (Fr + Pr + Av) (Fr)**	**(Pr)**	**(Av)**	**Total**	**Risk Score Se x Po**
Visual inspection, data collecting	ES		Acc	6	3	1	1	5	30
	ES		< Acc	6	3	1	1	5	30
	AF/AB	<1.2	Acc	1	3	1	1	5	5
	AF/AB	<1.2	<Acc	1	3	3	1	7	7
	AF/AB	>=1.2 to <=8	Acc	3	3	1	1	5	15
	AF/AB	>=1.2 to <=8	<Acc	3	3	4	3	10	30
	AF/AB	>8 to <=40	Acc	6	3	1	1	5	30
	AF/AB	>8 to <=40	<Acc	6	3	4	3	10	60
	AF/AB	>40	Acc	8	3	1	3	7	56
	AF/AB	>40	<Acc	8	3	5	3	11	88

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Task	*Hazard	Arc Flash IE cal/cm2	**Equip Cond	(Se)	Po = (Fr + Pr + Av)				Risk Score
					(Fr)	(Pr)	(Av)	Total	Se x Po
Cleaning, house-keeping	ES		Acc	6	4	1	1	6	36
	ES		< Acc	6	4	3	3	10	60
	AF/AB	<1.2	Acc	1	4	1	1	6	6
	AF/AB	<1.2	<Acc	1	4	3	1	8	8
	AF/AB	>=1.2 to <=8	Acc	3	3	1	1	5	15
	AF/AB	>=1.2 to <=8	<Acc	3	3	4	3	10	30
	AF/AB	>8 to <=40	Acc	6	3	1	1	5	30
	AF/AB	>8 to <=40	<Acc	6	3	4	3	10	60
	AF/AB	>40	Acc	8	3	2	3	8	64
	AF/AB	>40	<Acc	8	3	5	3	11	88
Task	*Hazard	Arc Flash IE cal/cm2	**Equip Cond	(Se)	Po = (Fr + Pr + Av)				Risk Score
					(Fr)	(Pr)	(Av)	Total	Se x Po
CB or switch operation with doors open	ES		Acc	3	4	1	1	6	18
	ES		< Acc	3	4	3	3	10	30
	AF/AB	<1.2	Acc	1	4	1	1	6	6
	AF/AB	<1.2	<Acc	1	4	3	1	8	8
	AF/AB	>=1.2 to <=8	Acc	3	3	1	1	5	15
	AF/AB	>=1.2 to <=8	<Acc	3	3	4	3	10	30
	AF/AB	>8 to <=40	Acc	6	3	1	1	5	30
	AF/AB	>8 to <=40	<Acc	6	3	4	3	10	60
	AF/AB	>40	Acc	8	3	2	3	8	64
	AF/AB	>40	<Acc	8	3	5	3	11	88
Task	*Hazard	Arc Flash IE cal/cm2	**Equip Cond	(Se)	Po = (Fr + Pr + Av)				Risk Score
					(Fr)	(Pr)	(Av)	Total	Se x Po
Making or tightening connections	ES		Acc	6	4	2	1	7	42
	ES		< Acc	6	4	3	3	10	60
	AF/AB	<1.2	Acc	1	4	2	1	7	7
	AF/AB	<1.2	<Acc	1	4	3	1	8	8
	AF/AB	>=1.2 to <=8	Acc	3	3	2	1	6	18
	AF/AB	>=1.2 to <=8	<Acc	3	3	4	3	10	30
	AF/AB	>8 to <=40	Acc	6	3	2	1	6	36
	AF/AB	>8 to <=40	<Acc	6	3	4	3	10	60
	AF/AB	>40	Acc	8	3	3	3	9	72
	AF/AB	>40	<Acc	8	3	5	3	11	88

Risk Assessment Procedure

Risk Register									
Task	*Hazard	Arc Flash IE cal/cm2	**Equip Cond	(Se)	Po = (Fr + Pr + Av)				Risk Score
					(Fr)	(Pr)	(Av)	Total	Se x Po
Removal or replacing components	ES		Acc	6	4	2	1	7	42
	ES		< Acc	6	4	3	3	10	60
	AF/AB	<1.2	Acc	1	4	2	1	7	7
	AF/AB	<1.2	<Acc	1	4	4	1	9	9
	AF/AB	>=1.2 to <=8	Acc	3	3	2	1	6	18
	AF/AB	>=1.2 to <=8	<Acc	3	3	5	3	11	33
	AF/AB	>8 to <=40	Acc	6	3	2	1	6	36
	AF/AB	>8 to <=40	<Acc	6	3	5	3	11	66
	AF/AB	>40	Acc	8	3	3	3	9	72
	AF/AB	>40	<Acc	8	3	5	3	11	88
Task	*Hazard	Arc Flash IE cal/cm2	**Equip Cond	(Se)	Po = (Fr + Pr + Av)				Risk Score
					(Fr)	(Pr)	(Av)	Total	Se x Po
CB or switch operation with doors closed	ES		Acc	1	4	1	1	6	6
	ES		< Acc	1	4	1	1	6	6
	AF/AB	<1.2	Acc	1	4	1	1	6	6
	AF/AB	<1.2	<Acc	1	4	3	1	8	8
	AF/AB	>=1.2 to <=8	Acc	1	3	1	1	5	5
	AF/AB	>=1.2 to <=8	<Acc	3	3	4	3	10	30
	AF/AB	>8 to <=40	Acc	1	3	1	1	5	5
	AF/AB	>8 to <=40	<Acc	3	3	4	3	10	30
	AF/AB	>40	Acc	1	3	2	3	8	8
	AF/AB	>40	<Acc	3	3	5	3	11	33

Risk Assessment Procedure

Risk Register
***Hazard**
ES = Electric Shock
AF/AB = Arc Flash/ Arc Blast
****Equipment Condition Assessment**
Acceptable Equipment Condition is defined as all of the following:
The equipment is properly installed
The equipment is properly maintained
There is no evidence of impending failure
All equipment doors are closed and secured (applies only to closed door switch operation)
All equipment covers are in place and secured (applies only to closed door switch operation)
< Acceptable Equipment Condition is defined as one or more of the following:
The equipment is not properly installed
The equipment is not properly maintained
There is evidence of impending failure
Equipment doors are open or not secured (applies only to closed door switch operation)
Equipment covers are off or not secured (applies only to closed door switch operation)
Risk Classification
Se - Severity
Fr - Frequency
Pr - Probability
Av - Avoidability
Po - Probability of Occurrence of Harm

Risk Assessment Procedure

Risk Score		
Risk	**Score**	**Level**
Red	**>=60**	**Extreme**
Intolerable Risk - Do not proceed		
De-energize Equipment		
Orange	**37-59**	**High**
High Risk - Energized Work Permit Required		
Consider de-energizing equipment		
Implement Risk Reduction Protective Measures		
Yellow	**15-36**	**Moderate**
Implement Risk Reduction Protective Measures		
Green	**0-14**	**Low**
Implement Risk Reduction Protective Measures		

Parameters Used in Risk Estimation

Severity of the Possible Injury or Damage to Health (Se) Classification		**Se Value**
Irreversible	trauma, death	8
Permanent	skeletal damage, blindness, hearing loss, third degree burns	6
Reversible	minor impact, hearing damage, second degree burns	3
Reversible	minor laceration, bruises, first degree burns	1

Frequency and Duration of Exposure (Fr) Classification	**Fr Value**
<= 1 per day	5
> 1 per day to <= 1 every 2 weeks	4
> 1 every two weeks to <= 1 per year	3
> 1 per year	2

Likelihood of a Hazardous Event (Pr) Classification	**Pr Value**
Very High	5
Likely	4
Possible	3
Rare	2
Negligible	1

Liklihood of Avoiding or Limiting Injury (Av) Classification	**Av Value**
Impossible	5

Risk Assessment Procedure

Rare	3
Probable	1

Risk Reduction Protective Measures	
Electric Shock, Arc Flash and Arc Blast Hazards	
Risk	**Risk Reduction Protective Measure**
Inadvertent contact with energized part	Use Class 00 (500V) rated gloves and 1000V rated tools in all cases. For circuits >600V, use voltage rated gloves appropriate for the voltage level.
	De-energize the equipment whenever possible
	Work with one hand when possible to avoid current path through body,
	Always use insulated tools
	Maintain a high level of awareness at all times
	Secure hinged panels
	Ensure there is proper illumination
	Consider environmental hazard such as fork truck traffic, slip hazards, etc.
Equipment failure while replacing components	De-energize the equipment whenever possible
	Ensure breaker is in open position and perform insulation
	Use and follow the Electrical Energized Work Permit Process
Equipment failure	Perform visual inspection and avoid exposure to suspect
	Properly install and maintain electrical equipment
Equipment failure while operating breaker or disconnect with doors open.	De-energize equipment, correct issue with door/ disconnect and operate disconnect with door closed
	Wear AF PPE listed on label for open door operation and position body away from device and turn head away while operating

Risk Assessment Procedure

Risk Reduction Protective Measures	
Electric Shock Hazards	
Risk	**Risk Reduction Protective Measure**
Meter does not show correct reading due to meter malfunction	Test meter on live circuit before and after use for circuits rated 480V and below.
Voltage rating of meter exceeded	Ensure use of meter rated at a minimum of 600V for circuits rated 480V and below. Use adequately rated voltage detector for circuits > 600V.
Short Circuit rating of meter exceeded	Ensure use of meter rated at a minimum of CAT III
Damaged test leads	Inspect test leads before each use.
Damage to voltage rated gloves	Test gloves for leaks before use.
	Test gloves every six months.
Failure to properly distinguish energized parts from de-energized parts	Ensure electricians are audited to demonstrate proficiency
	Ensure only qualified electricians are allowed to perform electrical work.
	Ensure employees are properly trained
	Inform supervision if you lack the knowledge to make
Inability to release oneself from energized parts resulting from inadvertent contact.	Inform a backup person of location of power source and how to open breaker in case of emergency
	Do not touch the person. Release victim with non-conductive object.

Risk Assessment Procedure

Risk Reduction Protective Measures	
Arc Flash/ Blast Hazards	
Risk	**Risk Reduction Protective Measure**
Burns resulting from Arc Flash incident	Do not operate equipment rated > 40cal/cm2 (de-energize before operating)
	Wear AF PPE appropriate for incident energy level
	Consider reducing trip settings, or evaluating equipment changes to reduce AFH incident energy level
High pressure, sound and shrapnel resulting from Arc Blast incident	Do not operate equipment rated > 40cal/cm2 (de-energize before operating)
	Wear AF PPE appropriate for incident energy level
	Consider reducing trip settings, or evaluating equipment changes to reduce AFH incident energy level
Increased AF energy level at 12"	Follow PPE instructions on Label, leather protectors <=8cal, AF gloves for 8cal to 40cal.
Increased AF energy level at 4"	Follow PPE instructions on Label, leather protectors <=8cal, AF gloves for 8cal to 40cal, use 8" test lead extenders as needed.
Equipment failure while operating breaker or disconnect with doors closed.	Position body away from device and turn head away while operating
	Ensure all of the following are true before operating disconnect:
	The equipment is properly installed
	The equipment is properly maintained
	There is no evidence of impending failure
	All equipment doors are closed and secured
	All equipment covers are in place and secured