



MAGNUM CONSTRUCTION SERVICES INC.

ELECTRICAL SAFETY PROGRAM (LOTO, ARC-FLASH, NFPA 70E)

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1. PURPOSE

To establish standardized procedures and controls to protect Magnum Construction Services Inc. employees, subcontractors, and the public from electrical hazards including shock, arc flash, burns, and electrocution.

This program integrates **Lockout/Tagout (LOTO)**, **Arc-Flash Hazard Analysis**, and **Safe Work Practices** in accordance with OSHA and NFPA 70E.

2. SCOPE

Applies to all field and shop operations involving:

- Temporary or permanent electrical systems up to 15 kV.
 - Construction power distribution, generators, panels, and tools.
 - Energized testing, troubleshooting, and maintenance work.
 - Subcontractors performing electrical installation or maintenance under MCS control.
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3. REFERENCES

- OSHA 29 CFR 1910.333–335 – Electrical Safety-Related Work Practices
 - OSHA 29 CFR 1926 Subpart K – Electrical Standards for Construction
 - NFPA 70E (2024) – Electrical Safety in the Workplace
 - NFPA 70 – National Electrical Code (NEC)
 - ANSI Z244.1 – Control of Hazardous Energy
 - Magnum Permit-to-Work System (MCS-QHSE-10)
 - Magnum Field Safety Program (MCS-QHSE-02)
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4. POLICY STATEMENT

Magnum Construction Services Inc. will not permit energized work unless:

1. De-energizing the equipment introduces a greater hazard, or
2. System integrity requires live testing authorized by the Project Manager and Corporate EHS Director.

All electrical work must follow the “**De-Energize-Verify-Protect**” hierarchy.

5. RESPONSIBILITIES

Role	Responsibilities
Executive Director / CEO	Endorses electrical safety policy and ensures corporate resources for qualified electricians and PPE.
Corporate EHS Director	Maintains this program, audits compliance, and approves energized-work permits.
Project Manager	Implements site-specific electrical safety plan and verifies that LOTO/arc-flash procedures are followed.
Qualified Electrician	Performs hazard assessment, lockout/tagout, testing, and installs protective devices.
Competent Person / Foreman	Ensures barricades, warning signs, and PPE are in place; stops unsafe acts immediately.
All Employees / Subcontractors	Follow LOTO rules, maintain safe distances, and report electrical hazards immediately.

6. ELECTRICAL HAZARD IDENTIFICATION

Common field hazards include:

- Contact with live conductors or energized parts.
- Arc-flash or arc-blast during switching, racking, or testing.



- Damaged cords, tools, or defective insulation.
 - Overloaded circuits and improper grounding.
 - Use of non-GFCI temporary power or daisy-chained extensions.
 - Work in wet or confined locations.
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7. LOCKOUT / TAGOUT (LOTO) PROCEDURE

All electrical sources must be **isolated, locked, and tagged** before work begins.

7.1 Steps

- 1 Notify affected employees.
- 2 Identify all energy sources.
- 3 De-energize and open disconnects/breakers.
- 4 Apply personal locks and tags.
- 5 Verify zero energy using an approved tester (test the tester).
- 6 Perform work.
- 7 Remove locks/tags only after verification by the person who applied them.

7.2 Requirements

- Only “Qualified Persons” per NFPA 70E may perform LOTO.
 - Locks and tags must be durable, unique, and identify the employee by name.
 - Group LOTO requires a lead person to control a key lock box system.
 - LOTO records shall be retained for one year minimum.
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8. ARC-FLASH AND SHOCK PROTECTION

8.1 Arc-Flash Risk Assessment

- Conducted by a qualified engineer using NFPA 70E Annex D calculations.
- Arc-flash boundary identified and labeled on equipment.
- Energized Work Permit required when crossing the Restricted Approach Boundary.



8.2 Approach Boundaries

Voltage Range Limited Restricted Prohibited

50 – 150 V	3 ft 6 in	Avoid contact	Not applicable
151 – 750 V	3 ft 6 in	1 ft 0 in	Not applicable
751 – 15 kV	10 ft 0 in	2 ft 2 in	1 ft 0 in

(Values per NFPA 70E Table 130.4(D)(a))

8.3 PPE Requirements

Hazard Category	Minimum Arc Rating (cal/cm ²)	Typical PPE
1	4	Arc-rated shirt/pants, face shield, leather gloves
2	8	Arc-rated coveralls, arc hood or balaclava
3	25	Arc flash suit + gloves + hood
4	40	Multi-layer arc flash suit with respiratory protection

9. TEMPORARY POWER & TOOLS

- All temporary power must use GFCI protection.
 - No multi-plug adapters or daisy chains.
 - Inspect cords daily; remove damaged equipment immediately.
 - Maintain minimum 20 ft clearance from overhead lines $\leq$ 350 kV.
 - Generators must be grounded and bonded per NEC 250.34.
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10. INSPECTION AND MAINTENANCE

Inspection Type	Frequency	Responsible Person
Electrical Tool Inspection	Before each use	User / Foreman
Temporary Power Distribution Audit	Weekly	Site Electrician
Panel and Cord Inspection	Monthly	Qualified Person
Arc-Flash Label Verification	Annual	EHS Director
LOTO Audit	Quarterly	Corporate EHS

11. TRAINING REQUIREMENTS

- **Qualified Electrical Workers:** NFPA 70E Arc-Flash and LOTO certification renewed every 3 years.
 - **Unqualified Workers:** Annual electrical awareness training covering shock hazards and safe distances.
 - **LOTO Authorized Personnel:** Initial and annual refresher training.
 - Training records retained for 5 years.
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12. SIGNAGE AND LABELING

- “Danger – High Voltage” or “Energized Work Authorized Personnel Only” signs posted at entry points.
 - Equipment with arc-flash hazards must display:
 - Nominal system voltage,
 - Arc-flash boundary, and
 - PPE category requirements per NFPA 70E 130.5(H).
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13. EMERGENCY RESPONSE

- Call 911 and on-site EHS immediately for any electrical incident.
- Do not touch the victim until power is verified off.



- Provide CPR/AED if trained.
- Preserve scene for investigation and photographic documentation.

14. DOCUMENT CONTROL

- Maintain LOTO logs, training records, arc-flash studies, and inspection forms for a minimum of five (5) years.
- Digital copies stored in Magnum's Corporate EHS database.
- Each project must keep a current copy of this plan in the Field Safety Binder.

15. PERFORMANCE METRICS

- Zero electrical incidents per 1 million work hours.
- 100 % LOTO compliance verified through quarterly audits.
- 100 % qualified personnel certification documentation.
- All arc-flash labels verified annually.

16. PROGRAM REVIEW

Reviewed annually or after any electrical incident by the Corporate EHS Director.
All revisions approved by Executive Leadership and distributed to Project Managers and Site Superintendents.

17. APPROVAL SIGNATURES

Approved By	Title	Signature	Date
Michael Gaya	Executive Director / CEO	_____	_____
Anthony Magadino	President / Managing Partner	_____	_____
Corporate EHS Director		_____	_____