PROPOSAL FOR ARC FLASH HAZARD STUDY, RELAY SETTING AND COORDINATION STUDY.

Proposal

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CISAT

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PROPOSAL FOR COMPREHENSIVE

ARC FLASH HAZARD STUDY & ELECTRICAL SAFETY PROGRAM

Executive Summary:

Uncontrolled arc-flash events expose personnel and assets to life-threatening incident energy, protracted downtime and regulatory non-compliance. In line with recognized requirements and guidance—NFPA 70E (electrical safety–related work practices and risk assessment), IEEE 1584-2018 (arc-flash calculation methods), OSHA 29 CFR 1910 Subpart S (U.S. reference for employer duty of care) and where applicable in India, the CEA Safety Regulations under the Electricity Act (mandating hazard identification, safe work procedures, and appropriate PPE)—organizations are expected to perform formal electrical risk assessments, determine incident energy/approach boundaries, label equipment and train the workers, with periodic review whenever the system or operating modes change.

CISAT proposes a turnkey Arc Flash Hazard Study for your facilities to quantify risk (incident energy and boundaries), optimize protective device coordination (Relay Coordination) and implement practical mitigation—culminating in compliant labeling, PPE selection and hands-on training for operations teams. Our approach blends field data, digital system modeling and standards-aligned analysis to deliver measurable risk reduction and audit-ready documentation.

Who We Are?

Centre for Industrial Solutions and Advanced Training (CISAT) is an ISO 9001:2015–certified organization delivering end-to-end industrial capability building and Engineering services under one roof. We combine complete HR solutions (outsourcing and behavioral profiling) with technical training across Electrical/Mechanical/Automation/Chemical domains, soft-skills and safety programs and business-excellence deployments (TPM, 5S, Six Sigma, productivity improvement, time-and-motion studies).

Our audit and advisory portfolio spans Safety Audits, Energy Audits, Skill-Gap Analysis and Automation Solutions with PLC/Drives sales & service and technicians' upskilling.

Importantly, CISAT fields a dedicated Arc-Flash Studies team with deep protection engineering experience and multi-tool proficiency—ETAP, PSSE, DIgSILENT, PSCAD (and equivalent platforms)—to model complex networks, optimize protection coordination and deliver compliant, audit-ready outcomes aligned to IEEE 1584 and NFPA 70E.

Standards-Aligned Objectives & Scope:

CISAT will deliver a comprehensive, standards-based arc-flash program that begins by establishing a verified electrical baseline—reviewing SLDs, protection settings, equipment nameplates and credible operating modes—and then formally identifying and documenting arc-flash hazards at all defined working locations.

Using IEEE 1584-2018 calculation methods, we will compute incident energy (IE) and arc-flash boundaries (AFB) and translate results into clear, equipment-specific requirements for arc-rated PPE (ATPV ratings) and safe work practices. In parallel, we will assess and where feasible, optimize protective-device coordination so that clearing times are reduced without sacrificing selectivity, thereby lowering IE at the source rather than merely labeling the hazard. The entire engagement is structured to achieve compliance with NFPA 70E and traceability to IEEE 1584-2018, while aligning with OSHA 29 CFR 1910 Subpart S as a reference, IEC 61482-1-1/-1-2 for arc-rated PPE selection, and applicable local statutory frameworks such as CEA/State Electrical Inspectorate requirements, together with the client's internal Electrical Safety Rules and OEM manuals. Outputs include audit-ready documentation and methodology, compliant equipment labeling with shock and approach boundaries, an implementable PPE matrix, and a concise set of settings and procedural recommendations; we also provide change-management guidance (when to re-study after system modifications or DER additions) so the program remains accurate, defensible, and practical over the asset lifecycle.

Applicable Standards & References:

- IEEE 1584-2018: Guide for Performing Arc-Flash Hazard Calculations
- NFPA 70E: Standard for Electrical Safety in the Workplace
- OSHA 29 CFR 1910 Subpart S (as reference)
- IEC 61482-1-1/-1-2 (Arc-rated PPE, as applicable)
- Client's internal Electrical Safety Rules, OEM manuals, and local statutory requirements (CEA/State Inspectorate where applicable)

Project Scope:

A. Data Collection & Site Verification:

CISAT will begin with a structured data-gathering phase to establish a verified "as-operated" electrical baseline. This includes a detailed review of single-line diagrams (SLDs), protection schemes, relay and trip-unit settings, equipment nameplates (transformers, switchgear, MCCs, breakers, fuses), cable schedules (sizes, lengths, impedances), earthing/grounding arrangements, and available fault levels from the utility and any on-site sources (DG, PV, BESS). We will also document operating modes (tie breakers open/closed, generator or solar on/off, UPS normal/bypass) that materially affect clearing times and incident energy. A targeted site walkdown will validate critical datapoints, reconcile drawing/equipment ID mismatches, capture photos of rating plates and panel interiors where safe and permitted, and identify labeling locations and physical access constraints. Any data gaps or uncertainties are logged in a data-quality register for resolution or sensitivity treatment in calculations.

B. System Modelling

Using an agreed platform—ETAP / PSSE / DIgSILENT / PSCAD—we will build (or sanitize and validate) a digital model of the network, ensuring consistency of base kV, kVA/MVA ratings, %Z, X/R ratios, frequency, and grounding. A short-circuit study (IEC/IEEE methods) will be run to establish bolted three-phase and line-to-ground fault currents and X/R at all study buses under normal and credible alternate configurations. We will develop Time-Current Characteristic (TCC) curves for key protective devices (incoming breakers, feeders, transformer HV/LV protection, MCC feeders, UPS/PV protection) to confirm the actual clearing times used later in arc-flash computation. Where settings are missing, we will propose reasonable engineering assumptions (clearly flagged) and, where feasible, validate them in consultation with your team or OEM manuals.

C. Arc-Flash Calculations (IEEE 1584-2018)

For each defined working location (e.g., HV/MV/LV switchgear, MCCs, distribution panels, UPS boards, PCC/LV boards, PV inverter terminals), we will compute Incident Energy (IE, cal/cm²) and Arc-Flash Boundary (AFB) in accordance with IEEE 1584-2018, including electrode configurations, enclosure dimensions, and gap distances appropriate to the equipment type. Calculations will explicitly consider operating scenarios that influence arcing current and clearing time—such as tie status, generator/solar/BESS back-feed, and utility fault-level variations (minimum/maximum). Where input uncertainty exists (e.g., unverified cable lengths or legacy trip curves), we will run sensitivity checks to bracket risk and highlight the parameters with the greatest impact on IE.

D. Mitigation & Recommendations:

Beyond quantifying risk, our goal is to reduce IE at source without compromising selectivity. Recommendations will be practical and prioritized (risk reduction vs. cost/downtime), including:

- Protection optimization: enabling Zone-Selective Interlocking (ZSI), using maintenance/test mode during energized work, refining relay/trip-unit settings, introducing fast bus differential where justified, or deploying energy-reducing active solutions.
- Hardware strategies: current-limiting devices (where applicable), improved segregation, or remote racking/operation for high-risk equipment.
- Procedural controls: energized work permitting aligned with NFPA 70E, job safety planning (JSP/JSA), lockout-tagout (LOTO) reinforcement, and PPE selection discipline. Each option will show the before/after IE where quantifiable, any operational implications, and an implementation roadmap that favors settings/configuration changes first, reserving CAPEX for clear, high-impact cases.

E. Deliverables:

- Arc-Flash Report (audit-ready): A complete methodology and assumptions section; verified one-line extracts; short-circuit results; bus-wise IE/AFB tables; TCC plots; and before/after comparisons for selected mitigations. The report will include a prioritized action list with responsibilities and suggested timelines.
- Arc-Flash Labels: ANSI/NFPA-compliant labels (PDF + print-ready batch) for each equipment location, showing equipment ID, nominal voltage, IE, AFB, PPE class, and shock/approach boundaries. A label index spreadsheet will support field rollout and future audits.
- Updated SLDs (PDF): Clean diagrams reflecting verified equipment IDs, study buses, and any boundary notes necessary for safe work planning.
- Awareness Training (2–3 hours): Focused session for O&M teams on reading labels, selecting PPE, understanding shock/approach boundaries, and safe work practices tied to your procedures.
- Executive Brief: A 1–2-page management summary highlighting top-risk locations, quick wins, and CAPEX/OPEX implications, enabling leadership to sequence actions for maximum risk reduction with minimal disruption.

Project Timeline:

Estimated duration: 3–4 weeks total (subject to timely data access).

- Week 1: Data collection, site verification, model baseline.
- Week 2: Short-circuit + coordination + initial arc-flash run.
- Week 3: Mitigation iterations, labels, draft report.
- Week 4 (if needed): Final report, training, handover.

Critical path dependencies: Data completeness, outage windows for tests and review turnarounds.

Requirement from Company:

- Latest SLDs,
- Equipment lists,
- Operating modes.

Commercial Terms and Conditions

Pricing:

Professional fees are scope-dependent and will be submitted after the scoping and receipt of the latest SLDs, equipment lists, and operating modes. Upon confirmation of scope, CISAT will submit a firm, itemized quotation (base scope + optional add-ons, if any) for client's approval.

What the professional fee covers:

Engineering effort for data review and model build/validation; Short-circuit and Protection coordination studies; IEEE 1584-2018 Arc-flash calculations; draft/final report preparation; compliant label files; and a standard awareness session for O&M staff (as defined in the scope).

Add-ons (if selected):

Any optional services—e.g., Relay settings implementation support, additional operating scenarios beyond the agreed baseline, extra site days or training—will be quoted separately once confirmed.

Travel, boarding & out-of-pocket (OPE):

Actuals at cost for travel, local transport, lodging, statutory site PPE (if site-specific), printing of labels (if requested) and site-test consumables (if required). These will be pre-approved by the client where practical.

Taxes:

GST extra as applicable. Any withholding tax/TDS deductions should follow statutory norms; corresponding certificates to be provided by the client.

Invoicing & payments:

Invoicing will be as per proposal and issued PO/WO.

Validity:

The commercial offer (once issued) will remain valid for 30 days from the date of quotation; beyond this, CISAT may revalidate based on any scope or market changes.

Change control:

If new equipment, additional operating modes or significant data gaps are discovered after award, CISAT will issue a Change Note describing the impact on effort/timeline. Work on such items will proceed only after written client`s approval.

Client responsibilities.

Timely data access, site permits and availability of knowledgeable personnel are assumed. Delays outside CISAT's control may require timeline and commercial re-alignment.

Confidentiality & IP:

All client data will remain confidential. The final report, labels and customized settings files prepared for the client constitute client-use deliverables; CISAT retains rights to its underlying tools/templates and general know-how.

Looking forward to further communication from you soon.

With Best Regards and Thanks,

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