



SOUTH FEATHER WATER & POWER AGENCY

TO: Board of Directors

FROM: Scott Alcantara, Environmental & Safety Manager

DATE: May 13, 2008

**RE: Contract to Complete Arc Flash Study at All Powerhouses
Agenda Item for 5/27/08 Board of Directors Meeting**

By January 1, 2009 we are required by recent changes in both Federal and State Health and Safety Regulations, to begin performing assessments of potential exposure to electric arc flash for employees who work near energized parts or equipment. Initially, these assessments were going to be performed by PG&E at an estimated cost of \$13,000 per powerhouse and would have been limited to arc flash potential only.

Given that PG&E's assessments would not have included recommendations to alleviate hazardous conditions or identify associated electrical arc hazards, a quote for services was requested from Lewellyn Technology Inc. to conduct these studies, including recommendations to alleviate hazardous conditions and identify associated arc-flash hazards for all four powerhouses. Lewellyn is a leader in the field of conducting arc-flash studies and its response was a price of \$13,500. For an additional charge of \$2,800 they can also provide the training needed to ensure that our employees understand the dangers associated with work near energized parts or equipment.

Recommended action is:

"I move acceptance of the proposal from Lewellyn Technology Inc. to conduct the required arc-flash study, together with authorization for the General Manager to execute a consulting services agreement for same, including employee training."

CONSULTING SERVICES AGREEMENT

THIS AGREEMENT is entered into effective as of May 27, 2008 by Lewellyn Technology, Inc. ("Consultant") and South Feather Water and Power Agency ("Agency").

ARTICLE 1 SCOPE

Consultant shall perform the services (the "Services") described generally in the Consultant's Technical Proposal (Statement of Qualifications) attached hereto as Appendix A. This Agreement shall become effective as of the date shown above and shall remain in effect unless amended in writing or terminated pursuant to Article 8 herein. This Agreement shall not be considered an exclusive engagement by Agency of Consultant for Agency's requirements.

ARTICLE 2 COMPENSATION

For performance of the Services, Agency shall pay Consultant the compensation specified in Appendix A, which is also attached hereto. Prior to the commencement of work, a final estimate will be prepared by the Consultant which will include additional anticipated costs, such as training identified in Appendix A, Alternate Price #1, and the inclusion of facilities not covered in the initial Arc Flash study quote. This compensation shall be billed to Agency at monthly intervals and shall be due and payable upon receipt of the bill. If for any reason Agency fails to pay Consultant in full within 45 days from the date of a bill, Agency shall pay Consultant a late payment charge each month equal to one percent of unpaid balance or the highest rate permitted by law, whichever is the lesser. If Agency fails to pay Consultant in full within 60 days from receipt of a bill, Consultant may suspend its performance of the Services until all outstanding bills have been paid in full by Agency.

Consultant's accounts shall be kept in accordance with generally accepted accounting principles in the industry and shall be kept in such a manner and in sufficient detail to clearly disclose the nature and amounts of the different items of service and cost pertaining to this Agreement and the basis of charges or allocations to it.

ARTICLE 3 REPRESENTATIVES

Consultant will function in cooperation with and subject always to the direction and control of Agency's authorized officers or designated representatives. Consultant shall also designate a representative for the execution of the Services. Consultants and Agency's representatives are:

Consultant: Lewellyn Technology, Inc.	Agency: South Feather Water and Power Agency
Jay Smith Jr,	Scott Alcantara
Vice President Business Development	Environmental & Safety Manager
P.O. Box 618	2310 Oro-Quincy Highway
Linton, IN 47441	Oroville, CA 95965
Telephone: (800) 242-6673, ext. 34	Telephone: (530) 533-4578, ext. 215
Fax: (812) 847-3535	Fax: (530) 533-9700

Additional contact information can be found under Article 15.

ARTICLE 4 PERSONNEL

All Consultant's staff, and its subcontractors' staff, assigned to these Services shall be approved by the Agency prior to their assignment to task activities. Consultant shall confirm that the technical qualifications of all personnel assigned to these tasks meet the applicable industry standards. In the event that the individuals who are initially assigned by Consultant to perform Services under this Agreement are removed, replaced or reassigned by Consultant, such removal, replacement or reassignment may result in harm and costs to Agency. Consultant agrees not to remove, replace or reassign any such individuals without the approval of Agency. Such approval shall not be unreasonably withheld or delayed. Consultant shall make reasonable efforts to maintain continuity in its staffing and will provide Agency ample notification if any such changes are made. Notwithstanding the foregoing, it is agreed by Consultant that Agency is relying on the expertise and experience of Consultant as well as Consultant's subcontractors, and therefore Consultant shall not terminate the services of a subcontractor employed for the benefit of Agency without the prior approval of Agency, which approval shall not be unreasonably withheld. Agency may, in its discretion, direct Consultant to replace subcontractors that Agency reasonably believes are not performing in a satisfactory manner. Consultant shall ensure that subcontracts contain express acknowledgement by subcontractors of Agency's right to replace them and shall require the subcontractors to waive any claims or damages in connection therewith, save and except for costs and fees incurred to the date of said termination, plus reasonable costs incurred as a result of said termination.

ARTICLE 5 RECORDS

To the extent Agency does not otherwise specifically request delivery of records or results; Consultant agrees to retain all records and results of Services performed under this Agreement for a period of not less than two years after completion of the Services. At Agency's request Consultant will deliver a copy of any or all original field notes, investigative notes, tests, photographs, records, calculations, summaries and reports produced and collected in the course of Services performed under this Agreement.

ARTICLE 6 OWNERSHIP OF DOCUMENTS

Agency shall own all data, reports, information, manuals, drawings, or other written, recorded, photographic or visual materials, or other deliverables produced in the performance of this Agreement for use by Agency. Consultant shall retain no ownership interest in any of the foregoing described deliverables except as may be described herein, and such deliverables, including those retained by Consultant in the normal course of Consultant's business, may not be reused, sold, transferred or conveyed without Agency's permission. Any reuse of Consultant prepared documents, except for the specific purpose intended hereunder, will be at Agency's sole risk and without liability or legal exposure to Consultant or its subconsultants.

ARTICLE 7 CONFLICT OF INTEREST/BUSINESS ETHICS

Consultant shall exercise reasonable care and diligence to prevent any actions or conditions that would result in a conflict with Agency's interest. During the term of this Agreement, neither Consultant nor its subcontractors shall accept employment or engage in any work that creates a conflict of interest between Consultant and Agency, or in any way compromises the interest of Agency for which Contractor's services are being retained. Consultant shall immediately notify Agency of any and all such violations of this clause, by Consultant, its agents or subcontractors, immediately upon becoming aware of such violations. Failure

of such notification or lack of knowledge of a violation by Consultant or its subcontractors shall not excuse the performance hereunder.

ARTICLE 8 TERMINATION

Agency may suspend or terminate this Agreement by giving thirty days prior written notice to Consultant, but such termination shall not relieve Agency of its obligation to pay Consultant for expenses incurred and Services performed up to the date of termination and all reasonable expenses that Consultant incurs by reason of such termination. Any reports, drawings or other documents prepared for Agency prior to the effective date of such termination shall be delivered to Agency by Consultant prior to Agency's release of its final payment to Consultant.

ARTICLE 9 WARRANTY

Consultant warrants that its Services are performed with the degree of skill and care that is required by current, good and sound professional procedures and practices, and in conformance with generally accepted professional standards prevailing at the time the Services are performed so as to ensure that the Services performed are correct and appropriate for the purposes contemplated in this Agreement.

ARTICLE 10 LIMITATION OF LIABILITY

Consultant's total cumulative liability for any claims of any kind, whether based on contract, tort (including negligence and strict liability), under any warranty or otherwise, for any loss or damage relating to this Agreement or the performance of the Services, shall not exceed the insurance coverage specified in this Agreement, and Agency hereby releases Consultant from any liability in excess of such amount. This monetary limitation shall survive the failure of any exclusive remedy.

Neither Agency nor Consultant shall be liable, whether based on contract, tort (including negligence and strict liability), under any warranty or otherwise relating to the Services or this Agreement, for any consequential, indirect, special, punitive or incidental loss or damage, any damage or loss of any property or equipment, or any loss of use of property or equipment, and Agency and Consultant mutually release the other from any liability for all such losses and damages.

All of the provisions of this Agreement providing for limitation or protection against liability of Consultant and Agency shall also protect their directors, officers and employees, and affiliated entities of Consultant and their directors, officers, employees and affiliates, and shall apply regardless of the fault, negligence or strict liability of Consultant, its directors, officers, employees or affiliates.

ARTICLE 11 INSURANCE

Consultant shall provide and continue to maintain during the performance of this Agreement insurance coverage as follows:

- i. Workers' Compensation insurance in compliance with statutory limits.
- ii. Employers' Liability with the following limits:

Each Accident	\$1,000,000
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- iii. Business Automobile Liability with the following limits:

Combined Single Limit	\$1,000,000
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- iv. Commercial General Liability with the following limits:

Each Occurrence	\$500,000
General Aggregate	\$1,000,000
- v. Professional Liability Insurance with the following limits:

Any One Claim	\$500,000
Policy Aggregate	\$1,000,000

ARTICLE 12 SAFETY

Consultant shall plan and conduct its work to safeguard persons and property from injury. Consultant shall direct performance of the work in compliance with reasonable safety and work practices and applicable federal, state and local laws, rules and regulations. Agency may designate safety precautions in addition to those in use or proposed by Consultant. Agency reserves the right to inspect the work and to halt work to ensure compliance with reasonable and safe work practices and with applicable federal, state, and local laws, rules and regulations.

ARTICLE 13 DELAYS

Neither party shall be considered in default in the performance of its obligations hereunder, except obligations to make payments for Services previously performed, to the extent that the performance of any such obligation is prevented or delayed by any cause that is beyond the reasonable control of the affected party. In the event either party claims that such performance of its obligations was prevented or delayed by any such cause, that party shall promptly notify the other party of that fact, and of the circumstances preventing or delaying performance. Such party claiming a cause-delayed performance shall endeavor, to the extent reasonable, to remove the obstacles which preclude performance.

ARTICLE 14 DISPUTES

Any dispute, controversy or claim arising out of or relating to this Agreement or the breach thereof, shall be subject to mediation under the guidelines of the American Arbitration Association in Sacramento, California, as a condition precedent to the institution of arbitration. If any dispute, controversy or claim cannot be resolved through mediation, it shall be resolved through binding arbitration under the commercial arbitration rules of the American Arbitration Association in Sacramento, California. The Arbitrator shall give full effect to Articles 8 and 9 and shall not deviate therefrom.

ARTICLE 15 NOTICES

Any notice related to this Agreement shall be in writing and shall be considered duly made if delivered to the other party at the following addresses:

Consultant: Lewellyn Technology, Inc. Agency: South Feather Water and Power Agency
Jay Smith Jr, Scott Alcantara
Vice President Business Development Environmental & Safety Manager
P.O. Box 618 2310 Oro-Quincy Highway
Linton, IN 47441 Oroville, CA 95965
Telephone: (800) 242-6673, ext. 34 Telephone: (530) 533-4578, ext. 215
Fax: (812) 847-3535 Fax: (530) 533-9700

Either party may change its address or numbers for receiving notices by giving written notice of such change to the other party.

ARTICLE 16 SURVIVAL

The provisions of this Agreement which by their nature should survive expiration, cancellation or termination of this Agreement, including but not limited to provisions regarding warranty and liability, shall survive such expiration, cancellation or other termination.

ARTICLE 17 LAW

This Agreement shall be governed by and interpreted in accordance with the laws of the State of California, excluding its conflicts of law principles.

ARTICLE 18 INTEGRATION

These terms and conditions are intended by Consultant and Agency to constitute the final and complete statement of their agreement, and all prior proposals, communications and understandings related to the subject matter of this Agreement are hereby superseded. No modification or amendment of this Agreement shall be effective unless the same is in writing and signed by both parties.

CONSULTANT: LEWELLYN TECHNOLOGY, INC.

SOUTH FEATHER WATER AND POWER AGENCY

By: _____

(Typed) _____

Michael C. Glaze

Title: _____

General Manager

Date: _____

May 27, 2008



ARC FLASH STUDY



4/17/2008

To: Scott Alcantara
South Feather Water & Power Agency
*Kelly Ridge Power House, Woodleaf Powerhouse, Forbestown Powerhouse, Sly
Creek
Powerhouse*
4/17/2008

From: Jay Smith Jr.

Thank you for giving us the opportunity to review your project and provide a proposal. Our study will be completed per the current IEEE 1584 standard and will comply with all applicable codes and standards. It will be a complete study that will encompass all equipment from the utility connection(s) to the facility through to the equipment on the plant floor as required by IEEE 1584. The study will include recommendations on mitigating the arc flash hazards we find that are at category 2 and above.

PHASE I - Data Collection

Lewellyn Technology Field Technicians will visit your facility to collect the necessary electrical data to perform an Arc Flash Hazard Analysis. Electrical information will be gathered and the systems analyzed from the utility connection point to the equipment in the plant. We will be looking for enclosures that present potential exposures to an Arc Flash. We will gather wire size, wire length, transformer data, circuit over-current protection information, among other data. We will gather data on all equipment necessary per IEEE 1584. We will not stop at an arbitrary or convenient point on your system.

To accomplish this work our Field Technicians will be required to open hinged or bolted panel enclosures. In most cases data collection can be accomplished without interruption of facility operations. In the rare case where the data cannot be gathered due to our inability to access panels due to operational needs, panels located in areas requiring special security clearance, panels located in clean rooms, panels located in hazardous areas requiring specialized training, or other situations beyond our control, it would be necessary for the facility to gather that data and forward it to us.

Your facility's panelboards, bus ducts, motor control centers, disconnects, switchgear, etc, should be properly labeled per the National Electrical Code prior to our arrival. These labels should indicate, among other things, the name of the enclosure and what each of the fuses or circuit breakers are feeding. If there are unlabeled or mislabeled over-current protective devices it is the responsibility of the facility to rectify these if they are to be included in the analysis. We may be able to provide some assistance in tracing circuits.

To Be Provided By Facility

- Simple floor plan drawn to scale if available

- Man-Lift and/or ladders unless otherwise arranged.
- Someone familiar with the plant, such as an electrician, to assist in identifying equipment, opening panels, operating lift, etc.
- Fault Current Data Supplied by your Utility Service Provider

\$5,700.00

ANTP, a 20% pre-payment of Phase I will be required to reserve a start date

PHASE II - Engineering Analysis

Data collected by our Field Technicians during Phase I and/or provided by the facility will be used to build a computer model of your facility's electrical distribution system. This model will be used to complete the Engineering Analyses, which includes a Short Circuit Analysis, Protective Device Coordination Analysis, Protective Device Interrupt Rating Analysis, and the Arc Flash Hazard Analysis.

Short Circuit Study

The PTW computer program, using the method of symmetrical components and the procedures of IEEE Standard 399-1986, will calculate the potential fault currents. The method of symmetrical components has been the accepted method for calculating unbalanced fault currents since the mid 1920's. Data required for the calculations is derived from the physical construction of the power system and has been documented in the feeder and transformer schedules included in the study. Although it is not required to have exact numbers, it is wise to be within roughly 5%. The one exception is the electrical impedance associated with the grounding system since the ground paths are nearly impossible to ascertain. Ground path numbers are derived from historical test results, and normally applied through the judicious use of experience.

The information provided in our report will include tabulated input data for the utility, generators, transformers, motors, and cables, as well as a summary of the calculated fault currents at every major bus modeled in the computer program. The three-phase to ground and single-phase to ground currents are reported. These two currents typically bracket the other possible fault currents, and are sufficient for the analyses being conducted at your facility.

The applications for conducting a short circuit study are as follows:

- Arc Flash Hazard Analysis
- Protective Device Coordination Study
- Interrupt Rating Study

Arc Flash Hazard Analysis

The arc-flash hazard analysis is done to conform to OSHA recommendations described in 29CFR 1910.333. Procedures for arc-flash hazard analyses are described in both NFPA Standard 70E-2004 and IEEE Standard 1584-2002. IEEE Standard 1584-2002 describes a method for calculating the potential arc-flash energy based on the anticipated "bolted" fault current. The reported results will be calculated using the more conservative, interpreted as more rigid, IEEE Standard 1584-2002.

IEEE Standard 1584-2002 states that equipment rated below 240V need not be considered unless it involves a low-impedance transformer larger than 125 kVA in its immediate supply. The reason

for this exclusion is the inability of such small capacity systems to initiate and support arcing conditions. NFPA Standard 70E-2004 applies the same reasoning to equipment rated 240V and less. Since NFPA Standard 70E is recognized as the guiding document, Lewellyn Technology will apply the limits from NFPA Standard 70E-2004.

The report will present findings describing dangerous or disruptive conditions within the facility. The calculated arc-flash hazards are compared to the criteria in NFPA Standard 70E, and hazards requiring personal protection equipment (PPE) greater than Category 1 are reported. Corresponding recommendations for correcting the findings reported are presented as alternatives to requiring personnel to wear Category 2 or higher PPE. The facility must decide what category PPE it is comfortable with. The table included in the report will show the arc-flash data calculated for the existing system. Included in the table are the critical distances, the incident energies, the fault currents, and the PPE level required for the indicated working distance. Arc-flash hazard warning labels for the equipment will be created from this table. Label colors are: Yellow for Category 0, Orange for Category 1, and Red for Categories 2 and higher.

Protective Device Coordination Study

A properly coordinated system will minimize the impact of equipment failures within a system if a fault were to occur. To achieve this, the largest over-current protective devices in each location are analyzed for adequate coordination with upstream protective devices, and those needing attention to avoid disruption of production are reported. Individual recommendations are made for correcting each coordination issue found, and are directed at increasing the reliability of the electrical distributions system by minimizing the part of the system shut down due to faults. All recommendations made are also verified to not negatively affect the arc-flash hazard at the points of interest.

If additional coordination problems are found while examining each largest over-current protective device, it is not beyond the scope of this study to provide additional recommendations to improve this situation. The more common coordination problems are listed below:

- Protection of transformers
- Protection of conductors
- Coordination with motor starting characteristics

In addition to detailed recommendations of replacement protective devices and/or settings to improve coordination, the coordination study report will also include time-current coordination curves for the largest over-current protective devices at each examined location, and the tabulated settings for those devices. The curves present a graphical representation of the device characteristics, while the tabulated data outlines the descriptive information for each device shown on the curve as well as the settings for each over-current protective device shown.

Interrupt Rating Study

An interrupt rating study is necessary to conform to the requirements of the National Electric Code as described in 2005 NEC Article 110.9. This study is performed to identify any protective devices in the facility that appears to have inadequate interrupting capacity. If these breakers are required to interrupt a fault, they can explode, potentially causing a fire and/or injury to personnel. Protective devices are examined to see if the calculated fault current exceeds 90% of the rated interrupting capacity, at which point they are considered to have inadequate interrupting capacity. Suitable replacement devices are recommended for correcting each interrupting capacity failure.

From these analyses a report will be created which includes:

- Findings which indicate problems discovered in interrupt ratings, coordination, and arc flash hazard
- Recommendations to:
 - mitigate arc flash hazards above Category Two
 - to correct circuit protective devices with insufficient interrupt ratings
 - correct circuits not properly coordinated
- One Line Drawing of the equipment surveyed
- Table of Calculated Arc Flash Data
- Coordination Curves

Labels will be printed based on the data calculated. The labels will indicate the Arc Flash Boundary, Incident Energy, Flash Hazard Category, Voltage, Limited Approach Distance, Restricted Approach Distance, and the Prohibited Approach Distance. For Category 1 and above the labels will also indicate the device name and the over-current protective device which feeds it. This is no indicator of all devices of various voltages that might be feeding an enclosure. We list the device with the greatest impact on arc and shock hazard. This label is not a substitute for proper Lockout Tagout labeling which would indicate all power sources feeding an enclosure.

\$4,800.00

Phase III – Report Presentation and Labeling

The results from phase II will be documented and provided to the facility in a report format. The report will include a binder as well as a CD-ROM containing electronic files of the report. We will also retain copies of the report and data. A presentation meeting will be held with our representative and key people from the facility to go over the report and discuss recommendations. We will assist you in affixing labels Category 1 and above.

\$3,000.00

ALTERNATE PRICE #1: Electrical Safe Work Practices Training

Arguably the most important phase of the project. Training should be done first, or at least coincide with the study followed by a short refresher and update once the labeling and study are in place. The study will be of no use unless the facility personnel are trained in the methods spelled out in NFPA 70E. The training is designed for all personnel who work on or near exposed energized equipment. Electrical hazards, proper practices and procedures, and PPE use and care will be among the many topics covered. You will be introduced to the rules and regulations as required by OSHA and NFPA 70E and you will see how the two work together. The program is designed to keep workers safe and provide them with life saving information. This class is taught with passion by instructors who have been there and believe in what they are saying.

\$2,800.00 per day of training for up to 25 attendees

-- Recommended Training for Qualified Personnel is 2-day Electrical Safe Work Practices

-- Recommended Training for Unqualified Personnel is 4-hour Electrical Safety - 1 day of Unqualified Training may consist of up to

(2) 4-hour sessions for up to 25 attendees per session

SAFETY POLICY DEVELOPMENT

Compliance with NFPA 70E and OSHA Regulations requires protecting your employees from the hazards associated with working on or around energized equipment. The Arc Flash Analysis is just a small part of this compliance. Implementation of the study is the next step. Your Safety Policy will need to be updated to reflect these changes. Lewellyn Technology will review and revise your Safety Policy making the necessary revisions needed to comply with OSHA and NFPA 70E regulations. We will update your policy for implementation based on the findings of your Arc Flash Analysis and current maintenance procedures or develop a new policy for you.

NO CHARGE

Total Investment Phases I-III:

\$13,500.00

Lewellyn Requirements

-The pricing included herein is based upon data provided to Lewellyn Technology. If the information provided is found to be incomplete or inaccurate, Lewellyn Technology will honor the attached price for the information we were provided.

*If a Lewellyn Representative physically visited your facility and gathered the data needed to provide this quote, the quoted price will be honored.

-A 20% pre-payment of Phase I will be required to reserve a start date.

-This quote is valid for 60 days.

-Payment terms are NET 30 days.

Lewellyn Technology will provide the following at no additional costs:

- All travel related expenses



If you are entertaining proposals for having an Arc Flash Analysis conducted at your facility and the proposal doesn't follow the below procedures, forget it, you're not getting what you need!

Lewellyn Technology

Procedure For

ARC FLASH HAZARD ASSESSMENT

1. Analysis methods conform to NFPA 70E 2004 Edition and/or current IEEE 1584. All calculations will be performed using Power Tools software provided by SKM Systems Analysis Inc.
2. On-site data gathering will be conducted with proper PPE being worn at all times. Lewellyn Technology data collectors will wear FR coveralls rated to 8 cal/cm² at all times. They will also wear steel-toed safety shoes, safety glasses and/or a Category 2 protective shield, and hearing protection. Category 4 Suits are used as needed for higher exposure areas.

There are NO planned power outages at the facility for the purpose of conducting the Arc Flash Hazard Assessment.

3. Create an accurate detailed ONE-LINE electrical diagram of the system surveyed. Information on the One-Line Diagrams will include but not be limited to:
 - a. Electrical structure
 - b. Voltage at each point (e.g. 480/277, 120/240, 120/208, etc.).
 - c. Bolted short circuit available at each point in the system
 - d. h.p. of major motors connected to the system
 - e. Plant "standard" names of all panels and equipment to within a maximum 18-character limit for the device name.
4. Gather on-site data, including:
 - a. Fuses - mfg., type, amp rating, short circuit rating, etc.
 - b. Circuit Breakers - mfg., type, amp rating, short circuit rating, settings, etc.
 - c. Panels and Switchboards - mfg., type, amp rating, short circuit rating, ratings of circuit breakers / fuses in the panel / switchboard, etc
 - d. Primary to 480/240/208-volt Transformers - size, impedance, fusing, short

- e. circuit available (obtain from power company with plant assistance), etc.
 - e. Wire / Cable - size, type, length, etc. We assume all cables are insulated with THHN or THWN insulation.
 - f. Secondary Transformers (480 / 120/240 & 480 / 120/208, etc.) - size, impedance, fusing, etc.
 - g. SCR and/or Isolation Transformers - size, impedance, fusing, etc.
 - h. Disconnects / Combination Motor Starters (e.g. on equipment, connected into duct / gutters, etc.) - size, short circuit ratings, fusing, etc.
 - i. Bus Duct - size, short circuit rating, and all buckets / disconnects on the duct, fusing, length, etc.
 - j. Equipment Panels - ALL exposures that are on the “end” of the line fed by the above panels, wire, fusing/circuit breakers, etc. Include all short circuit ratings, fusing / circuit breakers in the panels, etc.
 - k. All motors and other equipment that will contribute to the short circuit available current value in the system(s). We collect all motor data for motors 50hp and above. These motors contribute significantly to the fault current.
 - l. The above information is assessed in accordance with IEEE1584.
 - m. If the plant / facility owns the primary electrical equipment; include all primary (12.4 kV / 13.8 kV volts, etc.) wire, fusing, switchgear, etc. in this assessment.
5. Perform a system Short Circuit Analysis.
 6. Perform system Overcurrent Protection Coordination.
 7. Interrupt Rating Analysis
 8. Calculate the Arc Flash Incident Energy for each point in the system(s).
 9. Calculate the Arc Flash Boundary distances for each point in the system(s).
 10. Determine the PPE requirements for the Arc Flash I.E. determined above.
 11. Perform “modeling” with circuit breaker settings being changed and/or fusing being replaced to lower the Arc Flash Incident Energy to its lowest value.
 12. Re-calculate the Arc Flash I.E., Boundary distances, and PPE requirements for points in the system that “modeling” has identified can have a reduced Arc Flash class if the work is performed. We do this, but we do not currently provide the actual results of the calculations, without the purchase of our service agreement.
 13. Provide a self-adhesive label, approximately 3” x 4” (Brady multi-color) for EVERY point in the system as identified above that falls under the definitions in NEC 110.16. Labels are to include the following information for the point on which it will be applied:
 - a. Large “WARNING” at the top
 - b. “Arc Flash and Shock Hazard” “Appropriate PPE Required”

- c. Identify the Flash Hazard Boundary distance
 - d. Identify the cal/cm² Flash Hazard at XX inches
 - e. Identify the PPE level Class required
 - f. Identify the Glove Class requirement
 - g. Identify the voltage at the point
 - h. Identify the Limited Approach distance
 - i. Identify the Restricted Approach distance
 - j. Identify the Prohibited Approach distance
 - k. Identify the plant “standard” Equipment name on bottom line (excluding Cat 0)
 - l. List the date of the assessment on the label on bottom line
 - m. Identify company and telephone number on each label for future reference should a concern arise
14. Provide a Final Report listing the following:
- a. Brief Summary of the study, who / what / where / when / why, etc.
 - b. One-line diagram - data sources
 - c. Arc Flash Hazard Assessment - data sources
 - d. Results of “modeling” to lower the I.E. / PPE Class, with items identified, existing class, new class if work is performed, recommended fuse replacements to lower the class, recommended circuit breaker settings to lower the class.
 - e. Hard copy of the One-Line diagrams
 - f. Electronic copy of the One-Line diagrams (CD)
 - g. Hard & Soft copy of the Fault Analysis input data
 - h. Hard & Soft copy of the Fault Coordination input data
 - i. Hard & Soft copy printout of the coordination curves for each major electrical equipment/circuit breaker/fuse/cable, etc.
 - j. Hard & Soft copy printout of the Arc Flash Evaluation showing the bus name, protective device name, bus kV, bus bolted fault (kA), protective device arcing fault (kA), trip/delay time (sec.), duration of arc (sec.), arc type, arc flash boundary (in.), working distance (in.), incident energy (cal/cm²), and required protective FR clothing class.
 - k. Arc Flash Warning label produced for the equipment.
15. Provide PPE and Insulated Tool recommendations for plant / facility personnel to comply with the arc flash hazards as identified and labeled. This is done in Phase IV of the arc-flash analysis. Lewellyn Technology Inc. has unique “Non-monetary” relationships with several clothing and tool manufacturers to provide recommendations on implementation of both Purchase and Rental Programs.
16. Provide Training recommendations for plant / facility personnel for arc flash hazard awareness.

Annual Report Update and Changes

The one constant in most facilities is change. Moving equipment, changing the size of equipment, adding equipment, plant upgrades and expansions all generally result in changes to your electrical system. These electrical changes may affect the arc-flash hazards in your facility. Changes in fuses, circuit breakers, and the size or length of conductors can affect arc-flash boundaries and PPE (personal protective equipment) requirements. Maintaining compliance with OSHA regulation 29CFR 1910.132 requirement for hazard assessments and 1910.335 requirement that employees be protected from electrical hazards requires updating your Arc-Flash Hazard Analysis after additions or modifications to your electrical system.

Lewellyn Technology has been in your facility and we're familiar with your equipment. When the time comes to update your report, make sure you contact us for assistance.

- Lewellyn Technology will update the facility's one-diagrams, short circuit, protective device coordination and arc-flash hazard analyses.
- Lewellyn Technology will provide a new Arc-Flash Hazard Analysis Report, updated one-line diagrams and new or replacement arc-flash warning labels as needed.
- Lewellyn Technology will apply the new warning labels and present the new report as needed.

Thank you,

Jay Smith Jr
Vice President of Bus. Development
Lewellyn Technology Inc
800-242-6673 ext. 34

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Linton, IN 47441
800-242-6673
Fax 812-847-3535
www.Lewellyn.com