Marcelo E. Valdes, PE BS EE, 1977, Cornell University, NY. IEEE SM. Currently Mr. Valdes is global Applications Leader for GE Industrials Solutions, based in Plainville CT, USA. Mr. Valdes has been with GE since 1977 in various assignments in field engineering, sales, application engineering, product management, standards & IEEE representative and as GE Industrial Solutions Product Management liaison to GE global Research.

Mr. Valdes holds 17 US patents, has over 10 applications still pending and has published over 20 papers in various IEEE conferences, IEEE publications and other industry journals in the US and outside the US. Several of his papers have received awards from IEEE Conferences and have been published in IEEE IAS Transactions and IEEE IAS Magazine. Mr. Valdes regularly participates in IEEE conferences (PCIC, PPIC, I&CPS, IAS Annual Meeting and the IEEE Electrical Safety Workshop). Marcelo is chair of the IEEE Electrical workshop for 2014 to be held in San Diego California. Mr. Valdes also participates in various working groups such as IEEE 1584 "*Guide for Arc Flash Calculations*", IEEE 1458 "*Guide for Molded Case Circuit Breaker Application*", IEEE 1814 "*Recommended Practice for Electrical System Design Techniques to Improve Electrical Safety*", various IEEE dot standards and is chair of the working group writing IEEE 1683 "*Guide for Motor Control Centers Rated Up To and Including 600 Vac or 1000 Vdc with Requirements Intended to Reduce Electrical Hazards While Performing Defined Operations*". Marcelo has serves on various conference committees and subcommittees. Currently Mr. Valdes is secretary of the Industrial and Commercial Power Systems Department Codes and Standards Committee. Past chair of the Industrial and Commercial Power Systems Department PSE Safety, Operations, and Maintenance (SOM) Sub-committee, as well as past chair of the San Francisco (CA) IEEE IAS Chapter and the San Jose (CA) Joint PES/IAS chapters.

Mr. Valdes's main are of concentration is low voltage electrical protection for improved system protection and safety, particularly as related to arc flash incident energy. Most of Mr. Valdes's patents and papers deal with electrical protection for low voltage systems and modeling low voltage protection devices for better understanding of their protection and selective capabilities.

An abbreviated list of Mr. Valdes's related presentations and papers (2012-2013) presentations at various IEEE and other venues, in Spanish and English are:

- IEEE Petroleum & Industry Conference, September 2012; "*IEC & IEEE MEDIUM VOLTAGE DISTRIBUTION EQUIPMENT STANDARDS, REVIEW & ANALYSIS"*
- IEEE Petroleum & Chemical Industry Conference, September 2012; "*ADAPTING FAILURE MODE AND EFFECTS ANALYSIS (FMEA) TO SELECT HAZARD MITIGATION MEASURES"*
- IEEE IAS Chapter Arc Flash & Electrical Safety course, February 2013, San Jose, Costa Rica; "*PROTECCIÓN DE EMPLEADOS Y PRODUCCIÓN, COMO MEJORAR PROTECCIÓN DE EMPLEADOS, SIN SACRIFICAR PRODUCTIVIDAD*"
- College of Electrical, Mechanical & Industrial Engineering, San Jose, Costa Rica, February 2013; "*CÓDIGOS DE SEGURIDAD ELÉCTRICA, ARC FLASH E INNOVACIÓN PARA PROTECCIÓN DE EQUIPOS Y PERSONAL*".
- IEEE IAS San Francisco chapter meeting, San Francisco, CA, May 2012; "*MODERN INSTANTANEOUS SELECTIVITY, THE CODE, ARC FLASH AND SYSTEM RELIABILITY*"
- IEEE IAS East Bay Chapter Meeting, Concord, CA, May 2013; "*KEY CHANGES INCLUDED IN THE FIRST DRAFT OF NFPA 70E- 2015*", "*FMEA APPLIED TO HAZARD-CONTROL-MEASURE SELECTION, IMPLEMENTATION & DECISION MAKING…*"
- Saudi Aramco Global Reliability Forum, Houston, Texas, June 2013; "*ADVANCES IN PROTECTIVE DEVICE INTERLOCKING FOR IMPROVED PROTECTION AND SELECTIVITY"*
- IEEE Petroleum & Industry Conference, September 2013; "*ADVANCES IN PROTECTIVE DEVICE INTERLOCKING FOR IMPROVED PROTECTION AND SELECTIVITY*"
- IEEE Petroleum & Industry Conference, planned September 2014; "*ARC FLASH HAZARD REDUCTION AT INCOMING TERMINALS OF LV EQUIPMENT*"

- IEEE Concapan 2013, Guatemala, *“Principales cambios incluidos en el primer borrador de NFPA 70E-2015”, “Una perspectiva en como mitigar riesgo y peligro en equipo de distribución”, “Que es Arc Flash”*

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Lecture topics:

1. **Low Voltage (LV) Protection for improved coordination and protection simultaneously**
    - How to design LV systems with 100% instantaneous protection at arcing current levels, and 100% selectivity at bolted fault current levels simultaneously
    - Arc Flash Protection in Low voltage Power Distribution Systems
    - Optimal use of Zone Selective Interlocking in LV systems
    - Modeling methods for optimizing Zone Selective Interlocking between Low and Medium Voltage Devices
    - How to implement Zone Selective Interlocking in systems employing Overcurrent and Light based protection simultaneously for improved protection reliability

Based on various IEEE papers, most recently: **"***Low Voltage (LV) Protection for improved coordination & protection simultaneously" & "Advances in Protective Device Interlocking for Improved Protection & Selectivity" presented at IEEE PCIC 2013.*

This lecture would cover uses of advanced low voltage coordination techniques. Recently developed algorithms and advanced selectivity analysis within the industry to achieve better protection without sacrificing selectivity would be covered. Discussion on how to used zone-selective-interlocking for optimized protection, including several recently developed capabilities and new modeling techniques than can be used to interconnect systems made up of devices from multiple manufacturers at multiple voltages simultaneously. New developed techniques for creating protection systems using low voltage overcurrent protection and newer technology such as arc flash relays will also be covered. Material would reference IEEE papers presented at various IEEE forums over the last few years by this author and others.

Estimated at 1-2 hours or more, depending on depth desired.

2. **Introduction to Arc Flash and Electrical Safety review for Engineers and non-safety professionals**
    - Arc Flash hazards explanations and definitions
    - Arc Flash calculations, sources of error, future trends
    - Understanding labels, boundaries
    - Understanding hazard mitigation considerations
    - System Design considerations for minimizing exposure to electrical hazards

Overview of Arc Flash related standards

- Overview of NFPA 70E for application engineers and systems designers
- Overview of IEEE 1584 for application engineers and systems designers

Safety by Design topics for Low Voltage Equipment and circuit Protection

- IEEE Standard 1683 (in ballot) and motor control center selection for improved electrical safety
- IEEE Standard 1814 (in process) and system design for improved electrical safety

"Introduction to Arc Flash and Electrical Safety review for Engineers and non-safety professionals", "Overview of Arc Flash related standards" & "Safety by Design topics for Low Voltage Equipment and circuit Protection"

These presentations would be tuned to the audience and would reflect the audience's need for familiarity with these topics. Safety by Design is an often discussed topic in modern times. However it means different things to different people. The author is chair of a working group working on a new IEEE guide on this topic (P1683) for selection and application of low voltage motor controls and is Task Group Chair for the Working Group writing a guide for safer electrical systems design (P1814). Marcelo also has

several patents and papers in the area of low voltage protection as well as extensive experience in application of low voltage distribution equipment and components.

Presentations would discuss how to think about electrical hazards and gauge the appropriate application of hazard mitigation measures based on the hazard within specific system designs. Overview of the various measures, products, and design concepts available in modern low voltage electrical system design would be covered as suitable for the audience and venue.

The presentation can include an overview of NFPA 70E and IEEE 1584 and how it relates to safety by design concepts that can be applied in new designs and existing equipment modernization programs.

Estimated at 1-2 hours or more, depending on depth desired.

3. Using FMEA techniques to evaluate Safety Control Measures

- How to implement FMEA as a prioritization tool to evaluate multiple safety related investments for a facility.

Using FMEA techniques to evaluate Safety Control Measures

FMEA is a common analytical tool used in product development, manufacturing and operations management to understand potential failure modes inclusive of the severity and likelihood of those failures. FMEA helps a practitioner identify potential failure modes based on past experience and analysis. Once potential failures are understood, design changes or practices can be put in place to optimally deal with the expected failure mode. An incident that causes injury or loss of production within any production facility can be considered a failure within that system. Current standards and engineering practices exist to identify and even quantify hazard to some extent. This presentation would be based on an IEEE paper presented at IEEE PCIC in 2012 that describes an adaptation of FMEA methodology to rank multiple hazard mitigation solutions versus the effect they have on the various hazardous tasks that those solutions address. The intent is to provide an objective analytical tool to rank potential investments, or actions with respect to derived benefit in terms of overall facility hazard reduction. Feedback received by safety and risk management professionals from several organizations has indicated this method could be very useful in driving safety investment decisions.
Estimated at less than 1 hour.

4. Introduction to North American Standard organizations and the North American Standards process *(lecture aimed at South American Organizations using North American Standards within the Electrical Industry)*

- Review of North American Electrical Standard organization in the Electrical Industry
- Review of North American Electrical Safety and Safety standards

This presentation would be targeted at audiences outside of North America that have limited familiarity with North American Standards, Standard Organizations, how standards are written, validated, used and enforced.

The author is a member of a NFPA NEC code making panel, member of the IEEE SCC18 committee that directs IEEE votes in NFPA standard committees, has participated in NEMA statistical committees and in NEMA technical committees, and has participated in various IEEE working groups as an active member, vice chair and chair. Currently secretary of the Industrial and Commercial Power Systems Department Codes and Standards Committee.

Estimated at less than 1 hour.