

# High Voltage & Arc Flash Conference



5th & 6th June, 2024  
Cordis, Auckland



## Booking Discounts



**Early Bird Offer!**

**10% Off**

Book on or before 30<sup>th</sup> April 2024



**Group Booking**

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For bookings of 2 or more delegates



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## Overview

# The High Voltage & Arc Flash Conference

This conference is tailored for engineers, technicians and other electrical professionals working in New Zealand's utilities, mining, manufacturing, industrial plants and oil and gas. Participants will receive practical insights into the latest developments and best practices in high voltage electrical systems and to manage arc flash hazards. The conference program includes discussions on design, installation, testing, maintenance, safety, assessments, standards and regulations.

Attendees will have the opportunity to hear from experienced industry experts, engage with speakers and discuss specific challenges. The conference serves as a valuable platform for those seeking technical solutions, staying abreast of industry trends, understanding standards developments, and learning new techniques to address challenges in both high-voltage electrical systems and arc flash hazards.

## What You'll Gain From Attending:

- › Techniques to extend the life of your HV (high voltage) assets
- › Strategies for enhancing safety and reliability of HV assets
- › Practical solutions to your HV design and installation issues
- › The most effective partial discharge detection techniques and testing regimes
- › Insight into the diagnostic power of insulating oil in transformers
- › Concepts and considerations for building centralised HV generation
- › Knowledge of various HV tests on generator stators
- › Innovative approaches to arc flash hazard reduction
- › Knowledge of the latest arc flash research coming out of North America and how this could accelerate improvements in electrical safety for in New Zealand
- › Understanding of the significant changes and updates in the 2024 Edition of NFPA 70E
- › Insights into arc flash assessment case studies
- › Enhanced awareness of arc flash hazards within HV contexts
- › An understanding of arc flash hazards associated with using fuses for transformer protection
- › Networking opportunities and collaboration with industry experts and peers



## Who Should Attend?

- › Electrical Engineers, Technicians, Technologists and Electricians
- › Engineering, Maintenance and Asset Managers
- › OH&S Managers and Professionals
- › Risk Assessors and Safety Facilitators
- › Substation Engineers and Technicians
- › Generation and Transmission Engineers
- › Plan, Project and Design Engineers
- › Renewable Energy Specialists
- › Network Protection and Distribution Engineers and Technicians

## Featuring Keynote Speaker



**Terry W. Becker, P.Eng., CESC, IEEE Senior Member, Electrical Safety Specialist, TW Becker Electrical Safety Consulting Inc**  
Presenting Live from Calgary, CANADA

- › One of North America's foremost subject matter experts in electrical safety
- › Voting Member of the IEEE 1584 Guide for Performing Arc-Flash Hazard Calculations Standard Technical Committee
- › Voting Member and the former Vice-Chair of the CSA Z462 Workplace Electrical Safety Standard Technical Committee
- › Voting Member on the CAN/ULC S801 Standard on Electrical Utility Workplace Electrical Safety for Generation, Transmission and Distribution
- › Voting and Founding Member of the CSA Z463 Maintenance of Electrical Systems Standard

## Plus International & Top Rated Presenters of the 2023 High Voltage Conference Australia



**Antony Giacomini, Engineer**  
TJ|H2b Analytical Services AUSTRALIA

- › Top rated presenter at IDC's High Voltage Conferences in Australia
- › Honours Degree in Chemical Engineering from the University of Melbourne
- › Over 30 years of experience in technical service and manufacturing industries



**Kin Yu Lam, Regional Application Engineering Leader, Power Systems**  
Cargill SINGAPORE

- › South East Asia and Pacific Regional Application Engineering Leader - Power Systems
- › Bachelor and Doctorate Degree in Chemistry from Newcastle University (UK)
- › Over 20 years of experience in the lubricants industry, holding various technical and managerial positions

After successful runs across Australia, this event is making its debut in New Zealand.

Get a glimpse of the event - watch the video from the recent High Voltage Conference Brisbane:

## Day One | Wednesday 5<sup>th</sup> June, 2024

8:00am Registration Opens

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8:30am Welcome Address

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8:45am Session One

### Condition Assessment of HV Equipment via Oil Testing

**Antony Giacomini: Engineer, TJ/H2b Analytical Services**

When it comes to transformers and tap changers, the insulating oil is a very powerful diagnostic tool as it essentially contains a record of all of the events that have occurred to the system. This presentation will provide an insight into the key aspects of testing, involving Dissolved Gas Analysis (DGA) and assessing how various faults lead to gas formation. Furthermore, processes that cause degradation of both oil and paper will be detailed, and some measures for minimising and addressing these issues will be discussed. Several case studies will be presented where the diagnostic testing of insulating fluids has successfully identified all of the above.



10:00am Morning Tea

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10:30am Session Two

### Principals of Centralised High Voltage Generator Selection and Earthing

**Jason Mayer: Principal Electrical Engineer, Aurecon**

Private high voltage networks typically employ standby generation to manage loss of electricity supply. The two most common ways of achieving this are via distributed low voltage generation or centralised high voltage generation. This paper describes a broad range of concepts and considerations which need to be made if building centralised high voltage generation on a large campus or site. Aspects such as winding pitch selection, earthing arrangements, circulating currents, load shedding schemes and operating modes are discussed, to assist prospective owners and operators to make informed design decisions.



11:15am Session Three

### High Voltage Testing of Generator Stators

**Dr Andrew Laphorn: Senior Lecturer, Above the Bar, University of Canterbury**

This paper presents examples and experiences where various high voltage tests using resonant transformers at 50 Hz on large generator stators have been performed throughout New Zealand and Australia. The design of the transformers involves a variable inductance, which can be manipulated in order to establish resonance with the capacitance of the generator stator insulation. This resonance allows a limited amount of test equipment and limited local supply, to energise substantial pieces of plant. Tests covered include AC withstand, dielectric dissipation (tan delta), and offline partial discharge investigations. Various configurations including single phase, three-phase and cascaded transformers are presented.



12:00pm Lunch



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## 1:00pm Session Four

### PD Testing of HV Assets: How Often Should We Test?

**Thomas Whyte: Senior Engineer, EA Technology**

Designing an appropriate Partial Discharge (PD) testing regime is critical for managing HV assets which may be at risk of failure. But what factors need to be taken into consideration when designing the testing regime and how can we best apply both periodic and permanent testing? This presentation will discuss the most effective online PD testing frequency for HV assets. It will present the P to F curve and discuss how to relate your network and asset risks to develop a custom PD testing scheme for each asset. Real life case studies will be used to demonstrate the effectiveness of different test regimes on asset failure scenarios.



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## 1:45pm Session Five

### Sheath Bonding Design Guide for High Voltage Cables

**Jayson Patrick: Technical Director, Electrotechnik**

High-voltage power cables are provided with an outer concentric conductor in the form of a metal screen and/or a metal sheath that surrounds the main conductor and insulation layer. Metal screens and metal sheaths are collectively referred to as the sheath. The sheath also includes any metallic armour layer(s) in the cable. The purposes of a cable metal sheath include providing a fault current return path, a return path for the induced capacitive charge currents, earth (zero-touch voltage or thereabouts) potential for human safety, and a moisture barrier for cable insulation. For high voltage cable circuits carrying more than about 500 A, sheath bonding arrangements are implemented to reduce (often significantly) sheath current losses. Whilst the bonding arrangements come with an additional cost for equipment and maintenance, they will often result in considerably smaller cable sizes to be used for supplying the same load currents. In this presentation, we explain the following types: solid-bonded, single-point bonded, and cross-bonded sheath bonding systems.



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## 2:30pm Afternoon Tea

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## 3:00pm Session Six

### Enhancing Safety and Reliability of Transformer Fleet by Retrofilling with Natural Ester Dielectric Fluid

**Kin Yu Lam: Regional Application Engineering Leader, Power Systems, South East Asia & Pacific, Cargill**

The operation and maintenance of ageing HV equipment is increasingly a critical issue for industry. This presentation, will explore one of the most effective strategies to enhance safety and reliability of transformers: retrofilling with natural ester dielectric fluid. By analysing relevant research and case studies, the presentation will delve into the benefits of retrofilling. These benefits include reducing fire and environmental hazards, extending equipment life, and improving resilience against overloading and premature failure. Additionally, the critical criteria and important steps involved in the appraisal, preparation, execution, and aftercare of retrofilling work will be discussed. This presentation aims to provide valuable insights and practical knowledge to industry professionals seeking to improve the safety and reliability of their HV equipment.



## 3:45pm Session Seven

### Arc Flash Hazards in HV Contexts

**Ryan Hudson: Principal, BSA Power System Engineering**

Developing an awareness of Arc Flash Hazard (AFH) assessment and mitigation allows for improvements in worker safety and supports industry in addressing PCBU obligations. While local interest in assessment and management of AFH is growing, delivering compliance certainty remains ambiguous. Using AS 2067 as the starting point for understanding AFH management in HV contexts, an Antipodean perspective is developed, with a literature review and case studies to support observations. Results demonstrate that work needs to be done on alignment of methodologies. However, the application of good engineering practices shows that the informed HV industry participant is better placed to safely manage this hazard.



## 4:30pm Day One Q&A and Panel Discussion



## 5:00-6:00pm Networking Drinks



## Day Two | Thursday 6<sup>th</sup> June, 2024

### 8.30am Session Eight | Live Stream Keynote Presentation

#### Arc Flash Hazard Change Management - How Advancements in North America will Accelerate Breakthrough Improvements in New Zealand

**Terry W. Becker, P.Eng., CESP, IEEE Senior Member,**  
**Electrical Safety Specialist, TW Becker Electrical Safety Consulting Inc**

In this presentation, delegates will gain insight into the most recent arc flash research in North America, specifically focusing on abnormal arcing fault physics, and its impact on electrical hazard classification. New information is available related to electric shock, arc blast pressure, and arcing fault sustainability for dc electrical equipment and capacitors.



Both the NFPA 70E 2024 Edition and Canada's CSA Z462 2024 Edition have been published within the last 12 months and feature significant changes from their previous editions in 2018 and 2021. The key changes and updates will be highlighted. Additionally, the IEEE 1584 Guide for Performing Arc-Flash Calculation was published in 2018, with the supplemental IEEE 1584.1 published in 2022, and the new IEEE 1584.2 will be published later in 2024 or early 2025 as the second supplement.

Electrical equipment maintenance standards for North America, specifically NFPA 70B is now the "Standard for Electrical Equipment Maintenance" was previously a guide since its initial publication in 1973. Information presented will highlight the content in NFPA 70B and how that information can be used to develop an electrical maintenance program. NFPA 70B now prescriptively advises electrical equipment maintenance requirements related to electrical safety.

The latest advancements in arc flash personal protective equipment (PPE) in North America will also be discussed. These advancements are providing increased worker comfort with higher levels of protection and enhanced features that not only improve protection, but also reduce likelihood of occurrence. Notably, emergency rescue can be accommodated with a non-conductive "escape strap," and new insulating hand tools not only offer electric shock protection but also decrease incident energy by increasing the working distance. These innovations in PPE may be considered for adoption in New Zealand.

Additionally, this presentation will offer recent research and expert insights on electrical safety related to human factors, technology, innovation, safety culture, and management systems, all aimed at catalyzing breakthrough improvements in electrical safety within New Zealand.

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### 10:00am Morning Tea

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### 10:30am Session Nine

#### Arc Fault Protection

**Howard Wardley: Engineer, HV Power**

The presentation will provide an introduction to arc faults, covering their causes and consequences. It will then look at mitigation strategies through the use of protection. It will discuss arc flash detection strategies as well as arc flash spectra characteristics and sensor operating requirements. Participants will gain the knowledge required to confidently select effective arc fault protection for their electrical systems, thereby enhancing the overall safety and reliability of equipment.



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### 11:15am Session Ten

#### Arc Flash Hazard – Practical Risk Management

**Mark Lockwood: Manager, Powerplan Engineers Pty Ltd**

The recent rise in awareness of switchboard arc flash hazards has resulted in a range of risk management approaches that aim to improve the safety of personnel. It is however, not uncommon for some risk mitigation measures to be considered either overly conservative or naively optimistic. Frequent criticisms include: impractical protective clothing requirements; unjustified switchboard replacement expenses; and over reliance on innovative active protection schemes. This presentation aims to provide insights and methods that may be used to deliver more practical arc flash hazard risk management to improve the safety of electrical personnel.



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## 12:00pm Lunch

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### 1:00pm Session Eleven

#### Arc Flash Hazard Reduction - A SafeByDesign Approach

**Brad Gradwell: Managing Director Executive Engineer, Hudson McKay**

This presentation details the arc flash mitigation strategy being deployed by a large food producer. The innovative approach was designed to reduce exposure levels and to secure the integrity of this Human Life Protection System. It covers:

- › The critical issues that were identified
- › The solutions implemented
- › The design integrity and resultant considerations
- › How the Pragmatic Residual Risk Assessment, based on NFPA 70E Article 130A (4) Normal Operation, drove additional controls.



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### 1:45pm Session Twelve

#### Bridging the Gap: From Arc Flash Assessments to Practical Implementation

**Mark Armstrong: Engineer, ElectroNet**

The significance of completing arc flash assessments often remains underestimated, leaving critical gaps in the understanding of potential hazards. The purpose of performing an arc flash assessment is to quantify the associated hazard level, so that the people interacting with the equipment can make informed decisions to apply appropriate mitigation measures.

This presentation focuses on the role of engineers in summarising the arc flash assessment results, to provide asset owners with clear information and specific ways to manage the associated hazards.

Highlighting the importance of a holistic approach, this presentation will delve into several case studies involving arc flash assessments conducted at heavy industry sites. Within this context, it will outline an approach to delivering information that is easily digestible and holds significant meaning for participants.



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## 2:30pm Afternoon Tea

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### 3:00pm Session Thirteen

#### Arc Flash Hazards Associated with Using Fuses to Protect Distribution Transformers

**Jason Mayer: Principle Electrical Engineer, Aurecon**

This presentation describes a study undertaken to quantify arc flash hazards on fuse protected distribution transformers. In many industries, including solar, medium voltage fuses are used to protect distribution transformers of varying sizes. This presentation demonstrates the resulting arc flash hazards that exist when using fuses rather than circuit breakers. Recommendations have been made on the maximum transformer rating and feasible fuse protection whilst controlling arc flash risk.





3:45pm Day Two Q&A and Panel Discussion



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4:15pm Conference Close



# General Information

## Conference Venue & Accommodation

Cordis Auckland  
83 Symonds Street, Auckland 1010  
**Hotel:** +64 9379 5132  
**Email:** [cdakl.info@cordishotels.com](mailto:cdakl.info@cordishotels.com)  
**Web:** [www.cordishotels.com/en/auckland](http://www.cordishotels.com/en/auckland)



## Accommodation

Accommodation is not included in the conference ticket and should be booked if required. For fully flexible bookings including breakfast and club lounge benefits use [this booking link](#).

For all other booking types including non refundable 'prepay & save' rates, book via the [Cordis website](#).

Alternatively, [Mercure Auckland Queen Street](#) is a short walk from the venue.

## Food and Beverages

All lunches, and morning and afternoon refreshments are part of your delegate registration. The networking session is also included.

## Cancellation Policy

A 20% cancellation fee will apply for cancellations received 7–14 days prior to the start date of the conference. Cancellations received less than 7 days prior to the start date of the conference are not refundable, however substitutes are welcome.

## If you are unable to attend the full conference

Please contact us at [conferences@idc-online.com](mailto:conferences@idc-online.com) for details to attend individual sessions or to purchase the Conference Resource Kit.

# Tickets & Registration

## Early Bird Offer - 10% Off

Single ticket  
**\$1,080.00\*** per person  
*\*Save 10% when you book on or before 30 April, 2024*

Group Booking  
**\$972.00\*** per person  
*\*When you book for 2 or more people on or before 30 April, 2024*

Reserved Table of 8  
**\$864.00\*** per person  
*\*When you book for 8 people on or before 30 April, 2024*

## Standard Pricing

Single ticket  
**\$1,200.00\*** per person  
*\*When you book after 30 April, 2024*

Group Booking  
**\$1,080.00\*** per person  
*\*When you book for 2 or more people after 30 April, 2024*

Reserved Table of 8  
**\$960.00\*** per person  
*\*When you book for 8 people after 30 April, 2024*

*NB: Group bookings must be made in one transaction.*