Colbun

Chilean Power Plant Implements IRISS Custom Inspection Solutions

By Hugo Pereira, VP LATAM Business Development at IRISS, Inc.

Overview:

Forces of Globalization encourage virtually all industries to remain competitive through innovation and a quest for efficiency and reliability. Many have realized that the ability to conduct safe maintenance inspections of their electrical infrastructure assets can lead to competitive differentiation and the Power Generation sector is no exception. It is critical to detect potential equipment defects using technology so we can better understand asset health and schedule for Maintenance tasks accordingly.

Every year, many electricians are hospitalized, and some die as a result of work-related accidents often because they are assigned tasks that require them to access energized equipment. Regulatory Safety Organizations and End User Health and Safety Departments around the world are implementing standards where workers are not allowed to open electrical panels for maintenance activities unless they are in a safe working condition and personnel have been thoroughly trained on all risks and hazards involved in the work task.

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IRISS was created out of recognition of the needs of the global electrical maintenance industry. Our mission is to exceed client expectations by continuing to set the industry standard for products, design services and support for the reliability and maintenance industries through innovative solutions that leverage our unique industry experience.

IRISS is a company that is committed to the Power Generation industry, actively collaborating in the improvement and pursuit of global competitiveness. IRISS offers all the experience and technology required to perform a safe, efficient and reliable diagnosis of pneumatic, mechanical and electrical systems. We are pleased to have collaborated with the substantial improvement of processes for safe inspections of energized electrical assets with Colbún, a major Power Generation facility operator in Chile.

Colbún has over 3.8 Gigawatts of installed capacity in Chile and Peru generating over 16 GWh of electricity supply in 2017. Colbún's twenty-five Power plants are a combination of primarily hydroelectric and Thermoelectric sites with a complement of smaller solar and wind installations. The Neuhenco I powerplant is a thermoelectric site which is 368MW and went into operation in 1999. The complex also includes Neuhenco II (398MW) and Neuhenco III (108MW).

An initial meeting with the client allowed us to present our solutions for safe inspections of the energized electrical systems including LV Switchgear, Panelboards, Transformers, MV Substation Switchgear and high voltage lines at Neuhenco I. Our goal was to reduce inspection costs and manpower requirements while ensuring 100% personnel safety during Electrical Inspections. In addition, we recommended increasing the inspection frequency in order to detect potential failure warning signs earlier thus preventing unscheduled downtime. In short, the project goals were to:

- Provide opportunity for Better Maintenance Planning (reduce emergency repairs)
- Prevent Unscheduled Equipment Downtime via early defect detection of hot spots and loose connections via IR inspection, visual inspection for water / dust / pest issues, UV inspection for Corona and Ultrasound inspection for arcing, tracking and corona (Partial Discharge)
- Inspect the energized systems with safety and in accordance with the most stringent safety guidelines in the world (NFPA 70E – 2018 edition)
- Reduce the cost of labor for thermographic inspections (no panel removal, re-installation, no need to wear cumbersome PPE during inspections, single man inspection versus team inspections)
- Reduce the risk of Maintenance Induced Failures (by not physically disturbing equipment during inspection process)
- Reduce risk of accidents while performing maintenance inspection tasks (no panel removal means no exposure to energized components)

By walking the site and inspecting the equipment in question, we were able to come up with recommendations for custom IR windows for the critical electrical assets at the facility. This included the following:

- 4pc. CAP-ENV Custom size 20" x 16" with Partial Discharge Sensor for 2 Generators
- 4pc. CAP-CT Custom size 20" x 7" with Partial Discharge Sensor for critical Motor and Fan panels
- 6pc. CAP-ENV Custom size 12" x 8.5" with Partial Discharge Sensor for other Generators
- 1pc. CAP-ENV Custom size 24" x 10" with Partial Discharge Sensor for Excitation Transformer

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All of these units included Partial Discharge Sensors integrated in the Maintenance Inspection window that allow a handheld ultrasound detector to be plugged in and listen for signs of partial discharge within the equipment enclosure.

Custom sized windows were chosen to reduce the total installation cost and ensure that a single window would be sufficiently sized to see all the possible targets of interest in the equipment.

20”x16” CAP-ENV Windows installed on Generator Panels

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Windows were installed on lower portion of doors to give viewing of Incoming Connections

Windows installed on Equipment Doors before remounting to the Switchgear

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Switchgear door remounted with custom 20”x7” CAP-CT window fitted

Conclusion

The initial project implementation was done in 2018 and was well received by the maintenance team. According to Jorge Astudillo, Manager of Operational Support,

“The custom infrared and ultrasound inspection products from IRISS were exactly what we needed. Before, we had several pieces of our critical equipment where we were not comfortable performing energized inspections because of the risk of opening the doors. We had looked at other solutions but they were all too small to really see properly the connections and possible failure points. With the IRISS products, we were able to install a single large format solution on each piece of equipment and can now do the inspections any time we need without worrying about the safety of our personnel. Having the ability to connect our handheld ultrasound detector to the built-in sensor is an added bonus.”

Based on the initial success and customer satisfaction, further implementation of IRISS maintenance inspection windows was also done at Neuhenco II in February 2019 and other Colbún sites are currently in the planning stages.

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