



CONFIDENTIAL CLIENT




THE NETHERLANDS

DATA CENTER UTILITY SUBSTATION

 Commissioning & Qualification


 Building Commissioning

 Asset Management & Reliability


 Quality, Compliance, & Regulatory

 Human Performance

 Process & Manufacturing Technology

 Program & Project Management

 Automation & Information Technology

 The Chemistry of Full-Scale Operations™

 Data Centers

WHEN YOU NEED TO MEET A HIGHER STANDARD™

PROJECT OVERVIEW

Greenfield build of a Utility Substation which will provide electrical power to a multi-phase, mega-data center. At the time of commissioning, portions of the new substation's switchgear were being used to power the first phase of the Data Center build, which was already operational. The balance of the Substation had to be installed, commissioned, and cut over without interruption of service to the on line systems. A team was assembled consisting of CAI as CxA (Commissioning Agent), equipment manufacturers and their technicians, the General Contractor (who was also the Electrical Contractor), Owner's Representatives, and Design Engineers.

OBJECTIVE

Commission the Utility Substation for the new enterprise Data Center within the assigned project schedule and without disruption of the functional data center. CAI provided third party commissioning services for the Client/Facility Owner.

EQUIPMENT

- 150 kV outdoor switchyard
- Utility Transformers – 150kV to 20kV
- Utility Substation switchgear and transfer switches
- Medium and Low Voltage Switchboards
- Automatic Transfer Switches (ATS)
- Uninterruptible Power Supply (UPS) – battery backup
- DC Rectifier
- Electrical Protective Relaying System
- Kirk (Cassell) Key Interlock System
- Power Quality Meters (PQMs)
- Electrical Power Monitoring System (EPMS)
- System Control and Data Acquisition (SCADA)

SERVICES PROVIDED

- Installation Verifications – conducted field inspections to verify all construction activities complied with project specifications and drawings
- Pre-Functional Checks (PFC) – all vendor startup testing was either directly observed or startup documentation was reviewed for accuracy and completeness


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SERVICES PROVIDED CONTINUED

- Functional Performance Tests (FPT) – for all electrical equipment within the Substation. This included development of equipment-specific test scripts, testing execution, test process management, and test data analysis
- Integrated Systems Tests (IST) - for all electrical and mechanical equipment

VALUE DELIVERED

Of greatest importance is the fact that this commissioning effort was accomplished safely, with no harm to personnel or equipment. All commissioning was conducted within the allotted time and without impact to the operational IT systems. Cx activities were coordinated with the installing contractors to minimize duplication of efforts. Many FPTs were able to be coordinated with the Vendor's PFCs, reducing overall testing time while still ensuring thorough system testing and expediting the final delivery of the substation to the owner. All testing issues were documented and tracked to satisfactory resolution. Below are some of the major issues identified and corrected due to the commissioning process:

- A tentative test sequence had been presented prior to commencement of Commissioning. System failures and other issues prevented us from following that sequence. As CxA, CAI remained flexible and constantly aware of what tests could be performed while waiting for other problems to be resolved. This way we were able to complete all tests without impacting the target completion date.
- The ATS installed was configured to select between a utility service and an emergency generator. In our case, it was sensing two independent utility feeders. The vendor's technicians had to reconfigure the controls to attain the desired sequence of operation.
- While verifying the accuracy of Power Quality Meters as displayed on the EPMS, we observed that KW readings were indicating a negative value. Subsequent troubleshooting revealed that this was due to operator error on the part of the technician performing the tests.
- Several PQMs were found to be scaled in KW instead of Watts. Those units were replaced.
- A circuit breaker's safety interlock solenoid failed, preventing re-closure of the breaker. The solenoid was replaced and re-tested.
- A noteworthy obstacle which CAI overcame was the fact that many documents and drawings were provided to us in Dutch. An instinctive knowledge of electrical distribution system components, configurations, and conventions allowed us to overcome the language barrier.