

# International Antagrade look for the shade in Venezuela

Testing of 115KV VT; The umbrella was essential as the previous day the test gear shut down because it was too hot. Daytime temperatures are currently over 40°C.



The Venezuelan city of Valencia, population 1.3 m, celebrated the inaugural journey on its new light rail transport system on the 18th November. Located 120 km to the South West of the capital Caracas, Valencia is an economic hub for Venezuela's top industries and manufacturing companies. The Metro de Valencia will be the country's third light

rail system.

Attended by President Hugo Chavez the inauguration marks a key stage on the project first researched some 30 years ago and only now being brought to fruition after an investment of over \$700 million US dollars from the Mayor of Valencia and the National Government.

The seven stations making up the 6.3

km first stage are all underground with the route beginning in the South of the industrial city at Plaza de Toros (The Bullring) at Monumental Station and extending to Avenue Cedeno. The other stations which form the first stage are Las Ferias, Palotal, Santa Rosa, Michelena and Lara. Each station is to have platforms 120m long with the system's maintenance facility located next to the southern Talmenos Monumental Station. The 4.7 km stretch between Las Ferias and Cedeno will be underground through bored tunnel.

Construction commenced several years ago but was suspended for local political reasons. As some operating equipment had been installed by local labour prior to the suspension, monthly train running has been kept in force from the depot to Monumental station in order to ensure the maintenance and operational service of all equipment installed up to that point.

#### Siemens Involvement

The trams were built by Siemens Transportation Systems in California and the design is based on the vehicles used in St. Louis, Missouri, USA. The permanently coupled pairs are planned to



## VALENCIA Metro



Bulk Power Substation  
115 kV-13.8 kV step-down site.

run every 4 minutes with an anticipated initial running capacity of 8,000 passengers per hour per direction. The trams can operate as single units or be coupled further to make four unit train sets at peak times. The rail cars represent the first fully assembled light rail vehicles to be exported from the United States since the 1930s.

Siemens have also provided the train control equipment, track work and electrification plant for the system including a Bulk Power Substation (STP), 115 kV-13.8 kV, a five mile Overhead Contact System (OCS) and five traction substations.

### Antagrade Electrical

UK-based Electrical Engineering contractor Antagrade Electrical Ltd have been working with Siemens to provide expertise in the commissioning of the systems' AC 115kV to 13.8kV DC substations. Together with professional project management skills, Antagrade's engineers are applying their electrical distribution and infrastructure expertise to support the integration of the new 750 V DC transit system using knowledge and experience gained on other major projects.

Antagrade initially concentrated on commissioning the High Voltage equipment at the main substation 115 kV A.C. (STP) supply point near the Plaza de Tores. This site is similar to those found in UK electricity utilities' bulk substations.

The main intake supply point has two 115/13.8kV (16-24MVA) Auto Transformers which feed the network using two feeders 'T' connected at each traction substation and at intermediate substations. After the successful energisation of the 13.8kV network, attention was focused upon the equipment supplying the traction and station supplies and their protection systems.

Antagrade are also helping to coordinate the design and installation works, developing test plans and carrying out commissioning testing for all the system's major components including high voltage switchboards, traction transformers, rectifiers, DC circuit breakers and their interfaces to the SCADA and control equipment.

The SCADA system is made up of Siemens S5 relays communicating to a S7 relay connected via the Profibus wire system. A PLC (OP 27 Relay) will allow operations to the switchgear and mimic indication of the switchgear status. The S5 relays are located in the AC switchgear at each substation. The SCADA systems are connected to the S7 Relays by means of optical fibres and on to the control room.

Live testing including section proving, operation of the system's standby generators and short circuit testing to demonstrate the system's capability under fault conditions is also planned.

Local challenges which have been met

include weather conditions as daytime temperatures soar above 40°C. Engineers have added umbrellas to their test kits to help protect equipment from malfunction in such extreme conditions. The successful delivery of the project relies upon building good relationships with both local contract labour and Siemens engineers from the EU and within South America.

After completion of the initial section it is planned to extend Line 1 by 4.5 km northwards from Cedeño to Guaparo where the University of Carabobo is found. This will include a further five stations. Longer term plans include a second line extending from La Florida to Bomberos with an interchange at Lara which is scheduled for completion in 2020. ■

A pair of Infeed 115kV/13.8kV 24MVA transformers, HVCB(SF6).

