

# Succesful Case AES-COLON CMCE SERTEC

The most effective lightning protection system

www.sertec.com.py







# Information about AES

AES - COLÓN is the Natural Gas Power Plant that uses combined cycle technology for its efficiency and contribution to the environment. It reuses the heat from gas turbine exhaust gases to obtain steam, to be later used by steam turbines and saves on fuel consumption in the production of electricity.

It is the first Liquefied Natural Gas plant in Panama and the Central American region, it also has a 180,000 m<sup>3</sup> LNG storage tank.



Fuente: https://elcapitalfinanciero.com/wp-content/uploads/2018/02/AES.jpg

# **The Problem**

The plant was in a process of innovation and they made the decision to update the existing technology (FRANKLIN Rods) with the CMCE-SERTEC Electroatmospheric Protectors in view of the good results obtained.

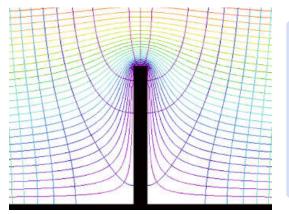


Imagen: Campo Eléctrico - Pararrayos Franklin Fuente: http://laplace.us.es





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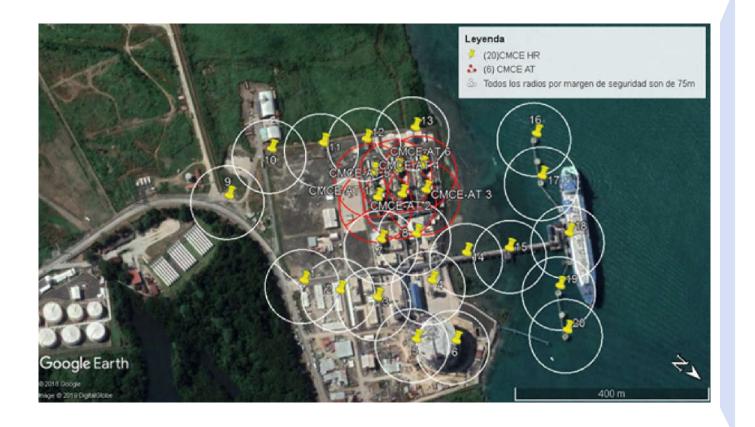




# Solution

### Protection radius and strategic location

By opting for the technology manufactured by SERTEC S.R.L.; AES seeks to solve the problem by avoiding the formation of atmospheric discharges. Previously, they had conventional technologies that discharged the lightning to the ground and in the way affected the most sensitive electronic components, such as PLC, CCTV, ETC



### How the protection area was defined

The project covers the total protection of the productive part of the plant. For which 26 CMCE SERTEC were used to replace the 120 Franklin rods.









The plant had a grounding system, it was measured and the following data were obtained;

- Chimney 01 A 0.283 Ω.
- Chimney 02 A 0.050 Ω.
- Chimney 03 A 0.044 Ω.
- Chimney 01 B 0.032  $\Omega$ .
- Chimney 02 B 0.047 Ω.
- Chimney 03 B 0.035 Ω.
- High Voltage Tower 001 0.218  $\Omega$ .
- High Voltage Tower 002 0.036  $\Omega$ .
- High Voltage Pole 003 0.059  $\Omega$ .
- Electrical Substation Gantry  $0.033 \Omega$ .
- Left end LNG tank 0.038  $\Omega$ .
- Center LNG tank 0.244  $\Omega$ .
- Right end LNG tank 0.277  $\Omega$ .
- Diesel tank 0.162 Ω.
- Water Tank 0.073 Ω.
- Dock 1 0.103 Ω. Dock
- 3 0.095 Ω. Dock
- 4 0.114 Ω. Dock
- 6 0.160 Ω.
- Crane on Dock  $0.082 \Omega$ .
- Bridge 1 0.049 Ω.
- Bridge 3 0.055 Ω.
- Administrative Building 0.028 Ω.
- Powerplant building  $0.221 \Omega$ .
- Entrance Light Post  $0.033 \Omega$ .
- Workshop Light Post 0.028 Ω.



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Left end of LNG tank

### Installation in Natural Gas tank

In it, 3 CMCE SERTEC devices were mounted, at both ends and in the center. This is due to the dimensions of the tank and to take advantage of the height and cover the bordering areas.

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Right end of LNG tank











### **Mounting the Device**



#### Chimneys

The plant has 6 chimneys which emit steam at 450 ° C. Each of them is protected with a HIGH TEMPERATURE CMCE prepared to work in extreme heat conditions of up to 900 ° C.

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#### **Drain Measurement**





Low-range current clamps are used for load drain measurements. The measurement fluctuated between 1,737 mA and 0.569 A.







### This solution was extended to several substations and transmission towers:

**Conclusion:** The AES-COLON Generating Plant was protected against lightning discharge with 99% effectiveness, no lightning to date.

- Chimney 01 A (9 ° 20'16.4 "N 79 ° 54'34.0" W)
- Chimney 02 A (9 ° 20'15.4 "N 79 ° 54'32.7" W)
- Chimney 03 A (9 ° 20'14.3 "N 79 ° 54'31.5" W)
- Chimney 01 B (9 ° 20'15.1 "N 79 ° 54'35.1" W)
- Chimney 02 B (9 ° 20'14.1 "N 79 ° 54'33.9" W)
- Chimney 03 B (9 ° 20'13.1 "N 79 ° 54'32.6" W)
- High Voltage Tower 001 (9 ° 20'08.7 "N 79 ° 54'32.2" W)
- High Voltage Tower 002 (9 ° 20'06.3 "N 79 ° 54'29.5" W)
- High Voltage Post 003 (9 ° 20'06.2 "N 79 ° 54'25.3" W)
- Electrical Substation Gantry (9 ° 20'11.0 "N 79 ° 54'34.2" W)
- Left end LNG tank (9 ° 20'22.0 "N 79 ° 54'28.7" W)
- Center LNG tank (9 ° 20'23.3 "N 79 ° 54'27.7" W)
- Right end LNG tank (9 ° 20'24.7 "N 79 ° 54'26.9" W)
- Diesel tank (9 ° 20'12.9 "N 79 ° 54'36.6" W)
- Water Tank (9 ° 20'16.1 "N 79 ° 54'30.0" W)
- Dock 1 (9 ° 20'29.6 "N 79 ° 54'33.4" W)
- Dock 3 (9 ° 20'27.4 "N 79 ° 54'35.4" W)
- Dock 4 (9 ° 20'21.6 "N 79 ° 54'40.2" W)
- Dock 6 (9 ° 20'19.3 "N 79 ° 54'42.1" W)
- Crane on Dock (9 ° 20'24.4 "N 79 ° 54'39.3" W)
- Bridge 1 (9 ° 20 20.5 "N 79 ° 54'32.4" W)
- Bridge 3 (9 ° 20'23.7 "N 79 ° 54'36.2" W)
- Administrative Building (9 ° 20'16.6 "N 79 ° 54'26.5" W)
- Powerplant Building (9 ° 20'16.6 "N 79 ° 54'31.6" W)











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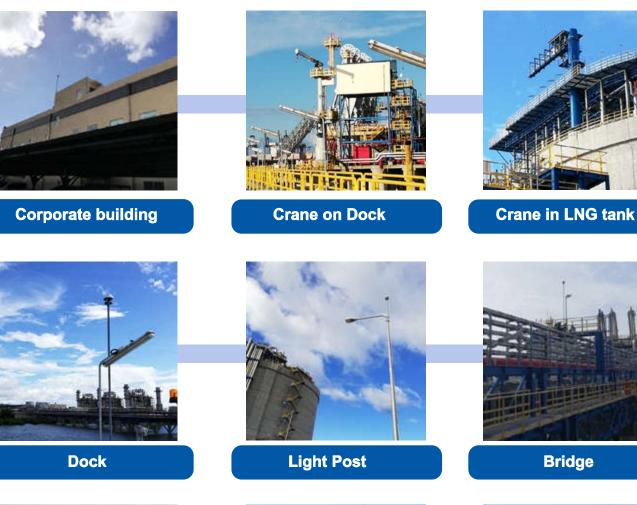
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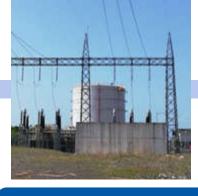


# **References of the work carried out**

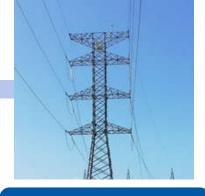




**Diesel Tank** 



**Substation Portico** 



**High Voltage Tower** 









# **The Final Client AES**

Below are the contact details for reference purposes: José A. Hernández B. I&C & Electrical Maintenance Coordinator Gas Natural Atlántico & Costa Norte LNG Terminal Office Phone: +507 206-2600, Ext. 6513 Cell Phone & WhatsApp: +507 6588-5657 IP Phone: 209-6513 Email: jose.batista@aes.com

# Panama Hardware Company

### Yoze Peter

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# Other references of similar application

# CAL Y CEMENTO SUR S.A. - PERÚ

- Installation date: September 23, 2019
- Type of structure protected: 22.9 KV transmission line
- Location of installed CMCE: Caracoto, San Román, Puno

# **GERSA INTERCONEXIÓN ENEE - HONDURAS**

- Installation date: April 8, 2016
- Type of structure protected: Interconnection towers
- Location of the installed CMCE: Chiquila, Santa Bárbara

# **GERSA INTERCONEXIÓN ENEE - HONDURAS**

- Installation date: April 8, 2016
- Type of structure protected: Interconnection posts
- Location of the installed CMCE: Chiquila, Santa Bárbara







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# **CEPM - Dominican Republic**

-Installation date: January - 2014

-Type of structure protected: private company in the electricity sector of the Dominican Republic

-CMCE installed: 24

### PARESA S.A. - Paraguay

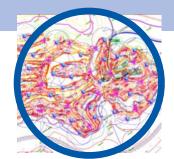
-Installation date: February - 2014

-Type of structure protected: Company dedicated to the manufacture and sale of carbonated beverages from the Coca-Cola line.

-CMCE installed: 14

# LPS PACIFICA - VIETNAM

- -Installation date: In progress at this time
- -Type of structure protected: GOLF COURSE
- -CMCE installed: 50













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# **Evidence of Success**

Sertec S.R.L. issues a warranty certificate for each installation when it meets the requirements and protocols, as a document of conformity and certainty of operation, providing an insurance policy in cases of direct impact. The different warranties issued over the years, where the same policy has not been used for asset replacement costs due to damage caused by discharges, demonstrating that all projects have been optimally protected without lightning until date.



**CERTIFICADO DE GARANTIA** Barninia Técritres resources. Per vende del presente serblicado, se de la generate el protoco restatori regio les essecilizaciones minimas del Mercante e restatoria segun el menori de festococores de predatio. Entry presents have una contract annual y said represents costs and goodfaquests PRODUCTS ADDRESS DIS. United St. D. A. Farring and use District & Proc. 2.4 Fore, come "District, do Managard," (Set In price, 3PTo 175-175, care do Adres and Sector and a Sector A. St. 275-285. THE OF PRIME STATE AND ADDRESS BELIEVE ADDRESS. IN ADDRESS OF THE ADDRESS ADDR ANTIA DE PRODUCTO orbarbande. agets CATER DOTON 6 CERTIFICADO DE GARANTIA Barrisia Tauriani annone. Ceantaradh fá sa athabilin ann Per reale de presente calificato, se de la generia el producto iniciado engin de espectroaccese (activas de laterante e realesio) argin d tille gerantite timme unter relitiene insankonstituenti prisonetten. NUTE GARANTISTS AN ANALYSIS AN ORDERS & PARS A NUMBER OF COME AND AND AND AND AND AND AN AN AND AND AND NAME OF COMPANY OF TAXABLE PARTY AND A DESCRIPTION OF TAXABLE PARTY AND TAXABLE PARTY. OCTO Sector 5 Bud RENOVACIÓN DE GARANTIA GARANTIA DEL PRODUCT MANTENIMIENTOANUAL REALIZADO Per replici del preserte cartificado, se da lo gerardo al presente regionale respecticamentes finanzas da fabricante o intestado según el presual de relaciones del preducto o interne de medidante aprobato por el fabricante aproprior de preducto e interne de medidante aprobato por el fabricante aproprior de presente a una constitución por el fabricante presente en original de la constitución de la constit Edu garante tendet una velatar anual y oricamente podels sur recordate sierpers cruando ad dante complexito e recenterenzato, pervendente a ante realizable decentada presis conflicador y associativo per parte de SENTEE. EN L. PRODUCTO ASEGURADO EN: ALIANZA CARANTIA - Reseaucodo por Barcare & Pors - A.H. Bail, acrista "barcare da barcarea", con la palas el transmismo da barca camato camato da barcarea en la camato el transmismo de CalCE (Concernante), con la calcarea el camato da calcarea camato da barcarea da camato da camato da calcarea el camato da calcarea da camato da cam 100.00000-GARRANTIA DE PRODUCTIO 10.XREE du pareirá ao visitos la facilitado, altergra-y pareirá en deras participar entretar para entretar Sontas F.H., Anereka. Carrilas, Exercisa, Antou. DesainsyAten. DesainsyAten. Esta pareirá par poducto en que par au confidenses espociales de colorenza y esclusiones. Antemportan La Converse Antemportan La Converse Antemportan Antemp 💿 stats 🛞 zzez. 🏠 🗄



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