

# PERIMETER PROTECTION IN A CRITICAL INFRASTRUCTURE UTILITY ENVIRONMENT

Case Study: Power Substation



## CLIENT SITE INFORMATION

**No. of Sites:** > 40

**Site Perimeter Length:** 150-2600 Meters

**Type of Fence:** Chain-Link

**Height of Fence:** 2.2-2.5 Meters

## INTRODUCTION

Substations play a major role in the functioning of the electric grid system. Electrical power substations are one the most important elements in any electrical generation, transmission and distribution system. These sites play an important role in ensuring effective distribution of electricity to cities, homes and businesses. Some electrical substations are in remote isolated locations, as well as populated urban areas, and the 24/7 surveillance of these substations is vital. Early detection is the key to preventing potential attacks on electrical substations from theft, vandalism, accidents and other activities that could disrupt the stability of the power grid. Innovation-driven and objective-led AgilFence suite of state-of-the-art Perimeter Intrusion Protection Systems (PIDS) specializes in the security of which provides a multitude of intelligent and surveillance solutions that will help safeguard crucial installations and assets. These highly advanced, reliable and effective solutions are designed to deliver optimum protection that is fully customizable to address any client's unique concerns and objectives.

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## CHALLENGES

### ■ Differing Environments

This portfolio has a vast array of Substations that are located in both remote rural and densely populated urban city areas. This presents two different problems, communicating with each of the sites and adjusting and calibrating the systems so they match each of the distinct environments.

### ■ Wildlife Nuisances and Damage

Remote areas have an abundant of wildlife and that presents two potential issues with securing the site. First one being the wildlife encountering the fences create nuisance alarms. Eventually, security teams will stop responding to these thinking it is not an actual threat. The second is animals can get into the sites and end up damaging the equipment and/or harming themselves.

### ■ Copper Theft and Liability

Copper wire thefts occur almost daily from substations, particularly in urban areas. Thieves trespass into substations and remove valuable copper cables, resulting in a loss of power. Utility companies will then need to replace the cables and every second in a power loss situation means that the utility company loses revenue. On top of that, potential copper thieves have been injured or killed from contact with high-voltage lines. A person injured while on-site can pose a liability issue for the customer.

### ■ Challenges of Inclement Environment

Weather issues such as wind, rain, snow and extreme weather poses increasing threat to power grid creating nuisance alarms that give false positives. A trade-off is usually made by decreasing the sensitivity of the PIDS system. When this was done, using a different technology, the system would not detect intrusions such as ladder climbs or free climbs.

## CLIENT'S REQUIREMENTS

### ■ High Probability of Intrusion Detection

Client wanted AgilFence be able to perform with greater than 95% detection rate for all intrusion/tamper scenarios.

### ■ Low Nuisance Alarm without Trade-off to Security

Maintain low nuisance alarm rates (NAR) at all locations while preserving high probability of detection (PD).

### ■ Pinpoint Accuracy

To achieve pinpoint accuracy of less than 2.5 meters.

### ■ System Flexibility & Robustness

One PIDS solution can be deployable on a variety of perimeter infrastructures, including temporary ones. Because of the unique set up of our cable system, we have the ability to minimize system down time when the perimeter line is being expanded or constructed.

### ■ Seamless Integration to Existing Systems

Integrate to existing Integrated Security Management System. Client was able to remotely monitor the fence and cameras from three sites they had chosen.



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## AGILFENCE'S SOLUTION

**AgilFence PIDS uses advanced fiber Bragg sensors, which are embedded in fiber optic cables and mounted on existing fences. Intrusions that include climbing, cutting of fence, tampering of cable, and unnatural disturbance of the fence will be detected by the system and immediately conveyed to the security personnel.**

### ■ Adaptability

AgilFence PIDS can be implemented on a variety of fence types; chain-link, welded-mesh, palisade and solid wall.

### ■ Easy Deployment

It is a one-step deployment of securing a single pass of AgilFence PIDS sensor cables with high-grade PVC cable ties onto perimeter fencing. There is no electronics and power supply in the field, so there is no fear for any sort of electromagnetic and radio frequency interference.

### ■ Secure Architecture

An open-loop system coupled with the flexibility of the sensor cables deployment, segregates the sensor cables into 240 m channels. Each channel acts independently without affecting others. This addressed the scenario of perimeter expansion, where the user may remove or disarm a singular channel for fence construction or removal without fully compromising the power substation's entire perimeter security.

### ■ Low Nuisance Alarm Rate

The proprietary signal processing software has the ability to adapt and adjust automatically to different environmental factors and weather elements, reducing nuisance alarm rates without compromising the integrity of the system's intrusion sensitivity.

### ■ Accurate Pinpointing

Fiber sensor spacing is customized to the perimeter length and type of perimeter infrastructure. The sensor accuracy for pinpointing an intrusion location range is typically less than 5 meters. Paired with the PIDS solution was AgilFence Integrated Alarm Management System (iPAMS) which is capable of interacting with the power substation's existing CCTV and Integrated Security Management Systems.



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### **SUMMARY**

**After the implementation of AgilFence on these PIDS applications, the client had successful results. The customer was able to increase the probability of detection, react to any intrusions more quickly, and set up a comprehensive monitoring system. These systems are now connected to one another and additional sites are being planned.**

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