



Radiation Leak Detection

Semtech's LoRa® Technology Enables Radiation Leak Detection

Communities and nuclear power facilities can enhance safety by deploying radiation leak detection systems powered by Semtech's LoRa® Technology and the LoRaWAN® protocol. With long-range, low-power sensors and reliable network connectivity, facilities can continuously monitor radiation levels, detect leaks in real time and protect both employees and nearby residents through timely alerts and data-driven insights.

QUICKFACTS

Company

Nuclear power facilities

Customer Profile

Organizations responsible for operating and monitoring nuclear power facilities, as well as local communities located near these sites, seeking a reliable, long-range and energy-efficient solution to detect radiation leaks and ensure the safety of employees and residents.

Objectives

- Monitor radiation levels continuously across nuclear facilities and surrounding communities.
- Detect leaks quickly to protect employees and nearby residents.
- Enable long-range, low-power data transmission with reliable network connectivity.

Results

- Real-time radiation alerts delivered to facility managers.
- Extended battery life and low maintenance through LoRa®-based sensors.
- Improved safety and operational visibility using a LoRaWAN® network.

Products and Services

- [LoRa®](#)
- [LoRa Connect™](#), [LoRa Edge™](#) and [LoRa Core™](#)
- [LoRaWAN®](#) network connectivity.

INTRODUCTION

Nuclear power plants produce about 20 percent* of the nation's power and nearly three million Americans live within 10 miles of an operating nuclear power plant. These nuclear power plants pose a potential danger to those working in and/or living around the area, as radioactive materials can leak causing illness. Because radiation cannot be detected through human senses, communities must implement radiation leak detection sensors throughout the nuclear power plant and the community. The constant measure of radiation can ensure a safe environment for residents and employees.

By implementing a radiation leak detection solution comprised of sensors and gateways embedded with LoRa Technology and a low power wide area network based on the LoRaWAN® protocol, communities with nuclear power plants can measure radiation levels and detect leaks to ensure the safety of its employees and those living in surrounding areas.

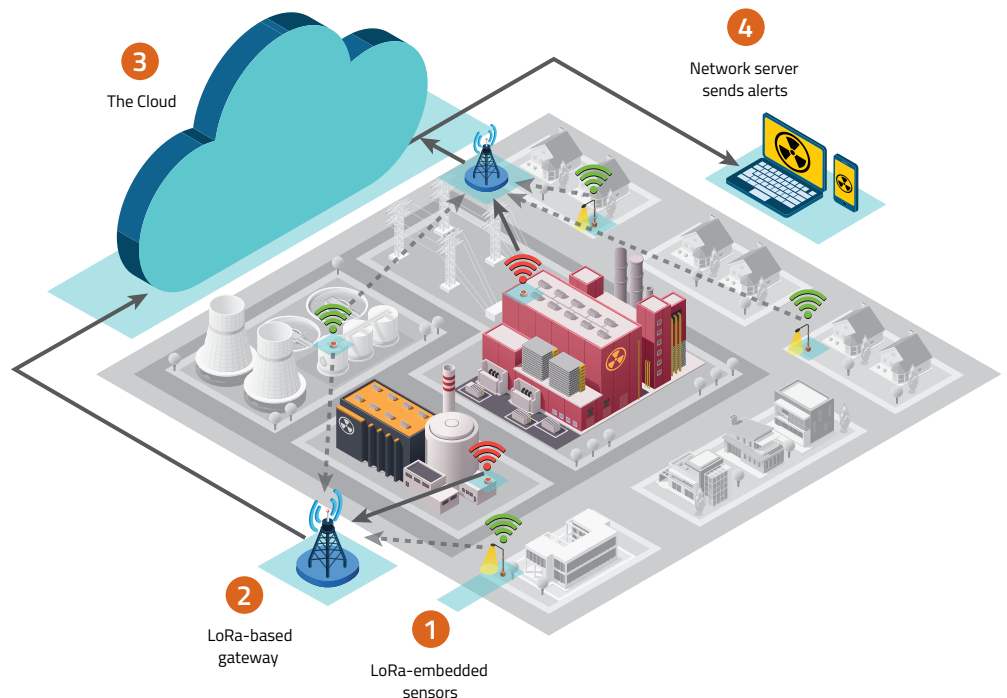
CHALLENGE

Nuclear power plants pose a potential danger to employees and nearby residents. Radiation cannot be detected through human senses, requiring continuous and reliable monitoring. Communities must implement radiation leak detection sensors throughout nuclear facilities and surrounding areas to ensure safety.

SOLUTION

How a LoraWAN-based Radiation Leak Detection System Works

Semtech LoRa Technology enables connectivity, real-time analytics, reporting and additional functions such as geolocation.





1. Radiation level data is collected by sensors embedded with LoRa Technology
2. Data from sensor is periodically sent to a LoRa gateway
3. Gateway sends information to network server where the data is analyzed by an application server
4. Application server sends alerts to facility managers via mobile device or computer.



KEY FEATURES OF SEMTECH'S LORA WIRELESS RF TECHNOLOGY

Long Range

Penetrates in dense urban and deep indoor environments, connecting to sensors 15-30 miles away in rural areas.

Low Power

Enables multi-year battery lifetime of up to 20 years or more.

High Capacity

Supports millions of messages per base station.

Geolocation

Enables tracking applications without GPS or additional power consumption.

Standardized

LoRaWAN® specification ensures interoperability among applications, IoT solution providers and telecom operators.

Secure

Embedded end-to-end AES-128 encryption of data ensuring optimal privacy and protection.

Low Cost

Reduces upfront infrastructure investments, as well as operating and end-node costs.



BENEFITS

Consistently measure radiation levels at nuclear power plant and in surrounding communities to ensure levels remain safe.

Low maintenance costs thanks to LoRa sensors low power operation, ensuring batteries can last 10 years.

Provides reliable RF communication link between sensing infrastructure and LoRaWAN-based network.

Jump-Start Your IoT Development Today:

Learn about Semtech's LoRa® Technology platform www.semtech.com/iot
Become a member of the LoRa Alliance® www.lora-alliance.org

* <https://www.ready.gov/radiation>

About Semtech

Semtech Corporation (Nasdaq: SMTC) is a high-performance semiconductor, IoT systems and cloud connectivity service provider dedicated to delivering high-quality technology solutions that enable a smarter, more connected and sustainable planet. Our global teams are committed to empowering solution architects and application developers to develop breakthrough products for the infrastructure, industrial and consumer markets.

To learn more about Semtech technology, visit us at Semtech.com or follow us on [LinkedIn](#) or [X](#).

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