

Waukesha Engine Case History Series

Backup power system meets critical needs of Satellite Tracking Station



Subject:

U.S. Satellite Tracking Station, Vandenberg Air Force Base, Southern California

Facility Profile:

Situated among 98,830 acres (40,026 hectares) of environmentally protected California wilderness, Vandenberg Air Force Base is one of the United States' premier aerospace and military installations. The focal point of the base is the Vandenberg Tracking Station, which collects data from upwards of 90 polar and lateral satellites orbiting the earth. Data are collected via three telemetry tracking and control antennae, each measuring between 33 and 60 feet (10m to 18m) in height. The base is also used to launch satellites for the government and private companies.

Installation Requirements:

The Vandenberg station is one of nine interconnected satellite operations strategically located around the world. Working together with the other stations, Vandenberg collects highly sensitive data for the U.S. Department of Defense. In 1990-91, Vandenberg played a key role in supporting reconnaissance satellites during Desert Shield and Desert Storm. For the private sector, a variety of companies rely on the station for critical information gathering.

Waukesha Equipment:

Providing backup electrical power to the Vandenberg Tracking Station are two 12-cylinder Waukesha VHP 7042GL engines. Each lean-combustion natural gas engine drives a 480 V synchronous generator rated 1000 kW at 1200 rpm. Transformers boost power from 480 V to 12 kV for distribution throughout the base.

Power Generation History:

Until recently, utility power was routed from Vandenberg Air Force Base to the tracking station via 12 miles (19 km) of overhead transmission and distribution lines. Backup power for the station was formerly provided by a diesel engine-gen set installed at the site in 1958. However, to meet emissions goals the diesel-powered gen set was replaced with Waukesha natural gas engine-gen set packages. Shortly thereafter, officials decided to replace the overhead lines with an underground system. During a utility power outage, the Waukesha engine-powered gen sets work in tandem with an Uninterruptible Power Supply (UPS) system. The UPS system carries the electrical load for two to three minutes until 100% of the load is gradually transferred to the generators, which power the operation until utility power is restored.

Why Waukesha:

Vandenberg relies heavily on engine-gen set backup power because high winds and other problems interrupt utility power an average of once per month. Additionally, Vandenberg is located in an area that is susceptible to brush fires and earthquakes, which can prevent delivery of utility-supplied power at any moment. At the same time, Vandenberg officials specified lean-burn Waukesha gas engines to meet emissions goals for the environmentally protected area.

Unique Characteristics:

As a precautionary measure against electrical power loss, Waukesha dual-fuel engines were installed. In the event that the natural gas dual-fuel supply is lost, the Waukesha generator sets can shift to HD-5 propane stored on-site. If sensors detect a drop in natural gas supply pressure, the power control system momentarily shuts the generator set(s) off, switches fuels, and resumes operation in a matter of minutes. At the same time, the low-emissions engines enable Vandenberg to meet environmental goals.

Cost Effectiveness:

Because the generator packages utilize low-emissions Waukesha VHP-GL drivers, permitting for the backup power installation is not required. As a result, Vandenberg Tracking Station saves an estimated \$50,000 annually in permit fees. Additionally, fuel-efficient GL engines are the best choice for low operating costs.

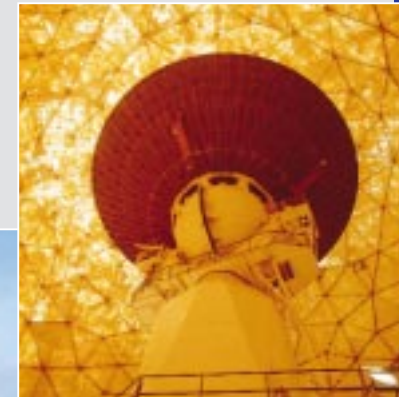
For more information on this Waukesha Engine installation, or Waukesha's low-emissions backup power capabilities, contact Waukesha Engine, A Halliburton Company, 1000 West St. Paul Ave., Waukesha, WI 53188-4999, (414) 547-3311, Fax: (414) 549-2795.



Left, two Waukesha VHP 7042GL engines supply backup electrical power to the tracking station. Below, the station collects data from upwards of 90 satellites.



Three telemetry tracking antennae collect satellite data.



Vandenberg is one of the premier U.S. aerospace installations.





Waukesha Engine
A Halliburton Company
1000 West St. Paul Ave.
Waukesha, WI 53188-4999
(414) 547-3311
Fax: (414) 549-2795

Waukesha Engine Division
Dresser International Products, b.v.
Farmsumerweg 43, Postbus 330,
9900 AH Appingedam
The Netherlands
(31) 596-652222
Fax: (31) 596-628111



“The No. 1 goal for us is to ensure we meet our emission standards. Using the Waukesha units, we not only meet our goals, but exceed them.”

*Patrick Gibson
Facility Manager
Vandenberg Tracking Station*



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