

## Utilities



# Standing Tall in the Aleutians

A Challenging Project in a Remote Location **Case Study**



Nothing is easy in the Aleutians. Thus a project to install necessary air handlers for a power station on Unalaska was a challenge for the engineer and the manufacturer, Governair Corporation. Unalaska, the 11th largest city in Alaska, is a bustling community of about 4,000 residents located on Unalaska Island in the Aleutian Chain, approximately 800 miles southwest of Anchorage.



### At a Glance

- City of Unalaska in the Aleutians is a remote location with a turbulent climate, requiring special engineering solutions.
- New city power plant had space limitations, requiring outdoor air handlers capable of withstanding winds up to 175 mph.
- Governair was chosen as project supplier because of its proven flexibility in design and its experience packaging air handlers for unique applications.
- All internal equipment and power systems were factory-installed.
- Two four-level units were barged to the site, assembled and erected.

## Rugged AHU design to withstand 175 MPH winds



**The growing need for electric power in Unalaska in the Aleutians demanded a new power house, and with it, two external air handlers to serve the building.**



**A custom steel skeleton was built by Governair for the air handlers, meeting the need to withstand winds up to 175 mph.**



**Top fan section with prop exhaust fan and vertical plenum supply fan. Fans, drives, power wiring and controls were all factory-installed, minimizing required site work.**

### Location Now World-Famous

The Aleutians separate the stormy North Pacific and the equally turbulent Bering Sea. The flavor of Unalaska has become familiar to viewers of the popular Discovery Channel® program "The Deadliest Catch," a reality TV program now in its sixth season and having a worldwide television following. The section of the city known as Dutch Harbor is the home port for the now-famous crab fishing fleet that takes high risks for high rewards in the stormy northern ocean waters.

In recent years, changes in federal fishing regulations have created an extended fishing season, and the City of Unalaska has felt the effect in construction of new commercial facilities, and with that, a growth in electrical demand. To meet that need, the city made plans to purchase two 5.2 megawatt diesel units and to begin an expansion of its power house, a \$48 million project. The project engineer was Electric Power Systems (EPS) of Anchorage. As part of the power plant project, EPS specified air handlers to supply the power house with combustion air, cooling, ventilation and comfort conditioning. This element was a requirement of the generator manufacturer, the Finnish firm Wartsila.

### Adequate Space a Challenge

Arrangements for the design, construction and installation of the air handlers were handled by Bob Heym of Alaska Winter Inc., manufacturer's representative in Anchorage. According to Heym, Wartsila had initially specified an indoor air handler system, but there was not adequate indoor space for such a system and its associated ductwork in the new power house. Instead, Heym suggested a modular outdoor system with openings in the building wall for the required supply and exhaust ducts.

He had previous experience using such systems built by Governair.

The project bid in late 2008 and Governair® was the successful bidder. According to Application Engineer David Lunow from Governair, "Our ability to tailor a custom design suited to these extreme conditions made it an easy match." Heym and a city representative went to the Governair factory in Oklahoma City to go over the submittals and to assure that the finished product would meet the owner's needs. A few changes were made at this point, including addition of a rail system in case it is ever necessary to remove a 300 lb motor. Another addition was installation of an aluminum tread plate floor.

### Surprise Wind Design Requirement

Late in the submittal process, it was mentioned that there was a requirement that the air handlers be able to withstand 175 mph winds. Somehow this had been missed in developing the initial spec. The levels of storm winds in the Aleutians are legendary. As recently as December, 2009, winter storm winds were officially recorded at 115 mph, and at Dutch Harbor, unofficial measurements reached 170 mph.

Coffman Engineering of Anchorage was familiar with Governair packages, and was able to revise the plans to meet the changed wind speed spec. According to Lunow, "Governair replaced standard 2" X 2" corner tubes with 6" X 6" tubes, and used additional 4" X 4" tubes for cross bracing support. This kind of steel support along with the stiff Governair panel construction made it easy to meet the 175 mph wind load and zone 4 seismic requirements." Lunow adds, "We have done vertically stacked units before this job, but nothing that had to meet such extreme requirements."

### Viewing Assembly Process at Factory

Heym and the contractor went to the Governair factory for a final walk-through and to watch the units being assembled in the factory before disassembly and shipping. Heym says, "Given the conditions at the site and the challenge even getting the product there, we didn't want there to be any mistakes. I wanted the contractor to observe the erection process."

After completion of the factory stage, the two units were each demounted into four stages and shipped by truck to Seattle. From there they were shipped by barge to Unalaska and trucked to the power house. The four sections are stacked vertically against the rear exterior wall of the power house. Each air handler is 20 feet wide, 12 feet deep and 40 feet high. Due to the climate conditions, there was not a need to provide either heating or cooling coils for the power house.

### Four Vertical Levels

Lunow points out, "Governair built the two complete units with all the components mounted. We stacked the sections on top of each other to ensure everything lined up." Each unit is able to supply 62,000 cfm of supply air, and is designed to be able to mix in return air, depending on outdoor conditions.



**David Lunow and Robert Heym during an inspection tour of the unit before shipping from the factory.**

The units are designed in four levels. The first floor is a three-sided louvered section to provide outside air, and access to the unit. The second floor contains the filters and is the location of the control panel. The third floor has one of the exhaust fan, with its VFD. The fourth floor contains the supply fan and the second exhaust fan, along with the two fan VFDs.

The supply fan for each unit is a vertical shaft plenum fan. These were assembled along with the fan frame at Governair. This type fan was selected because it fits the unit design and airflow requirement the best. The exhaust fans are prop fans. Governair performed the interior power wiring, with a single point power connection and a disconnect switch. At the site, the control contractor installed the control wiring.

### Project Nears Completion

The first unit is already up and operating and the second unit is nearing completion. Heym points out that because the unique characteristics and remoteness of this region, projects such as this often take longer than expected. "A single missing part, or a failed tool can bring the project to a halt for days. Add to that some very dynamic weather and a limited number of skilled workers and it is a challenge." These are some of the reasons that maximum factory assembly of the units was desired.

Nancy Peterson, Director of Public Works for the City of Unalaska states, "The City of Unalaska is pleased that Governair was able to meet the specifications required for this important project." The remote location and the strenuous wind and seismic requirements at Unalaska are unusual, but this project points out the importance being able to customize packaged air handler designs to meet specific local conditions. The key to success is the combination of local knowledge and a manufacturer able to deliver a package that meets those conditions. The Governair air handler package for Unalaska is just such a project.



**Two air handlers, each delivering 62,000 cfm, were designed to be stacked as four sections, simplifying transportation and site erection.**

