

MUCKLESHOOT CASINO

“AirReps has been an amazing partner to work with. [Our Partners at AirReps] have been involved in the project since inception and they have stayed involved throughout. They have helped make this complex transformation very smooth for my team.”

– Jason Mezzano, Sr. Facilities Manager, Muckleshoot Casino

Overview:

Opened in 1995 by the Muckleshoot Indian Tribe, the Muckleshoot Casino was experiencing the challenges of an aging HVAC system. The existing packaged rooftop equipment contained hundreds of compressors and belt-driven fans. Failures were frequent and it became a guessing game as to which unit would fail next. Maintenance became overwhelming for staff and repair costs — provided by outside contractors — were in excess of \$1M annually. To reduce operational costs and accommodate future expansion, the Muckleshoot Indian tribe partnered with AirReps. Other key partners included Marnell Consulting and IMEG Engineering who helped design a brand new 3,600-ton chiller plant to provide enough capacity for the existing facilities as well as a new hotel and resort. AirReps had formed an agreement with the tribe to provide Daikin equipment on the project and the first part of the project was to provide additional packaged rooftop units for the upcoming facility expansion.

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**LOCATION:**

Auburn, WA, USA

**AREA SERVED:**

Existing Casino: (2 Levels):
400,000 Square Feet
Resort Low-rise: (3 Levels):
160,000 Square Feet
Resort Tower: (13 Levels of
Guestroom + 1 Restaurant Level):
330,000 Square Feet

**CHALLENGE:**

Replace HVAC system to reduce operational costs and accommodate future expansion while keeping the establishment open

**SOLUTIONS:**

Daikin Skyline® and Rebel® air handlers and Magnitude® WME Magnetic Bearing Chillers housed in Daikin Modular Central Plant

MUCKLESHOOT INDIAN CASINO AND HOTEL



Overview (Continued):

Representatives from Marnell Consulting and IMEG Engineering were contracted through the tribe to provide an HVAC assessment of the existing system. Following the assessment, and in view of the pending hotel project (Four-Diamond) and overall long-term lifecycle costs, the representatives from both Marnell Consulting and Air Reps elected to take a step back to consider alternative solutions. Accordingly, Marnell Consulting and IMEG Engineering developed an HVAC replacement and upgrade project, i.e., the conversion from direct expansion (DX) rooftop units (RTUs) to chilled water/natural gas air handling units (AHUs). Marnell Consulting and IMEG Engineering determined that a chilled water system would pose less maintenance, lower operating costs, improve indoor air quality, and improve comfort for the casino guests — the last two being the Muckleshoot Tribe's priorities. The project had to be accomplished without interrupting the ongoing operation of the casino which is open 24 hours a day and 365 days a year.

Solution:

The heart of the solution was a Daikin modular central plant (MCP). An MCP is a turnkey solution, containing both cooling and heating components. It is designed and manufactured by Daikin to meet specific performance and installation requirements determined by project architects and engineers. It is particularly appropriate for fast-track schedules and scalability. The MCPs also feature pumps, controls, and integral stainless steel cooling towers.

The three Daikin Magnitude® 1200-ton magnetic-bearing WME chillers in the MCP served as the main cooling solution. Magnetic bearing technology in a chiller eliminates oil, mechanical seals, wear surfaces, and gears for longer machine life and increased reliability. Using direct drive technology, integral variable-frequency drives, and ozone-friendly refrigerant, a Magnitude chiller is up to 40% more efficient than standard centrifugal chillers. The variable drive responds according to cooling demand rather than operating at a constant rate. Further, the chiller operates quietly and reliably — ideal for the hospitality environment.

Approximately 40 air handling units were also replaced, in phases, with a combination of Daikin Applied Skyline®, Rebel®, and custom air handling units. The air handlers serving the main casino also featured energy recovery wheels which pre-condition the outside air and transfer energy between exhaust and ventilation streams, effectively recovering 73% of lost energy. Electronically commutated motor (ECM) direct-drive fan arrays (versus single fan belt-drive induction motors) also help dramatically increase operating efficiencies, while reducing maintenance. The two-inch variable aspect ratio of Skyline's semi-custom modular platform provided additional design and installation flexibility for the project and the feature is perfect for replacement applications. Several of the new Skyline units were designed to match existing unit duct layouts and dimensions for ease of installation.

As a result of the major replacements, the casino was able to eliminate hundreds of inefficient compressors on the rooftop in favor of six inverter magnetic bearing compressors in the MCP. The inverter (or variable-frequency drive) modulates the compressor rotational speed to operate as efficiently and reliably as possible, even in part-load conditions, for maximum energy savings.

Outcome:

The role of the AirReps team is to "optimize the owning experience" for its clients. On this project, they were able to optimize the experience for Muckleshoot on several levels throughout a very complex construction project. In terms of the primary goals, indoor air quality and guest comfort were significantly improved. Outside air measurements show 419 PPM particulate matter while the casino air is around 490 PPM. Carbon dioxide levels can now be maintained under 500 ppm. More apparent to staff and patrons, the casino's fresh air quality is noticeable.

Another major improvement was operational cost savings. In this case, operational costs were reduced significantly from \$3.74 per square foot of space to under \$2.00 per square foot. The cost is expected to drop further over time. The latter figures cover in-house/outsourced labor, replacement parts (mechanical and electrical), gas and electric.

Part of what made this project successful was organizing the right team for the job. It resulted in a collaborative, long-term solution that will serve Muckleshoot Casino well into the future with significant energy savings. Further, the casino can manage maintenance and upkeep inhouse because the new rooftop air handling solutions no longer have belts or compressors. Daikin experts will service the MCP through its warranty and service contract.

The current phase of the project is the new 401-room hotel/resort connected to the casino. Once the HVAC infrastructure is in place, Daikin will connect and activate the rest of the MCP to complement Daikin OptiLine® vertical stack fan coil units, blower coils, and additional air handling units.

