



System: CSRS

Kinetics Noise Control Solutions

Induced-Draft Cooling Tower Attenuation

Client

Owner of a large casino and hotel complex

Issues

- The client needed to install three double-cell, induced draft cooling towers.
- The luxury hotel is adjacent to a large waterfall with entrances, walkways and windows opening toward the falls.
- Installation of the cooling towers would have a negative environmental impact on the natural sounds of the waterfalls, a main tourist attraction to the hotel and casino.
- The casino and hotel were already under construction and the need for noise attenuation of the cooling towers was not thought of until halfway through the project. The cooling towers were already being installed. The customer was under a very short time constraint.

Solutions

- The Kinetics Noise Control, Inc. (KNC) local representative and in-house engineering team worked closely with the acoustical consultant, general contractor, and cooling towers supplier and designed the proper attenuation system to meet the needs of the client
- Access for maintenance was designed into the intake and discharge silencing systems.
- KNC designed a system that maintains proper airflow, pressure drop and equipment access required by the cooling towers. This was done by selecting a combination of KNC standard and custom silencers.



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Advantages of Proposed Solution

- Due to the Kinetics Noise Control, Inc. (KNC) extensive ventilation silencer database, silencers were expertly selected and adapted to the noise control needs of the induced-draft cooling towers.
- KNC has an experienced engineering team who analyzed the dual cell cooling towers and designed specific solutions.
- Standard products were used which allowed for quick manufacture, delivery and installation.

Considerations

- Environmental noise issue
- Three double-cell, induced-draft, cooling towers
- Each unit supplied 1970 tons of cooling
- Propeller fan diameter of each dual cell was (11 ft.)
- Each propeller fan airflow was 230,000 cfm
- Large casino and hotel project already under construction

Project Goals

- Quiet the noise levels of the three dual cell cooling towers to below that of the natural waterfall sound (ambient).
- Guarantee the design and product acoustical and structural performance.
- Meet the time constraints dictated by the scheduled opening of the casino and hotel.
- Make sure the performance of the cooling towers was not degraded by the introduction of sound attenuation products.

NOISEBLOCK™ Applied Products

1) Discharge Attenuation

KNC's, custom, ventilation silencers were installed at the discharge of the propeller fans on top of each of the dual cooling cells. The project required six, rectangular discharge silencers each 11'-6" x 11'-6" x 10'-0" L with

acoustic and aerodynamic, specially designed sound absorbing internal bullets. The design pressure loss of the discharge silencers needed to stay low enough to not degrade the performance of the cooling towers yet still achieve the required attenuation. A separate structural steel support frame designed by KNC was needed to support the weight of the discharge silencers. Cooling towers are rarely designed to support any additional external weight.

2) Intake Attenuation

KNC's model VRS, standard ventilation silencers were installed on the two intakes (front and back) of each cell. This particular project required twelve intake silencers, each 11'-6" x 17'-0" x 3'-0" L. The airflow per silencer was 115,000 cfm.

3) Special Design Concerns

Because the discharge air was 100% saturated with water vapor the materials of construction was a consideration. The allowable budget, life expectancy and operating environment were considered. Due to cost constraints the client elected to use galvanized steel, Type G90 for the entire project with the structural steel support frame coated with hot-dipped galvanized finish. They elected to keep a strict maintenance program to inspect and keep ahead of any corrosion before it became an issue.

Resolution

The KNC design introduced a 20 dBA noise reduction which was just enough to bring the operating cooling towers below ambient noise levels. The client was pleased and the system continues to operate as needed. This casino and hotel continues to be one of the most popular attractions in the region.