



Sam Nunn Atlanta Federal Center

Atlanta, Georgia

*One of the Largest Federal
Office Buildings*

In a unique combination of traditional and contemporary architectural elements, the Sam Nunn Atlanta Federal Center houses 5,000 employees for dozens of federal agencies. The center combines four distinct structural elements in a U-shaped configuration in central downtown Atlanta, near the Georgia Dome and the recreational attraction Underground Atlanta. Construction of the facility was completed in phases, with the first completed in 1996 and the final phase in 1998. The facility was named the Building Owners and Managers Association (BOMA) Government Building of the Year for the Southeast Region in 1999. The building is operated by the Federal Government's General Services Administration (GSA).

One Of The Largest Federal Office Buildings

The facility, named for the former U.S. Senator from Georgia, is one of the largest federal office buildings on the East Coast. It encompasses 1.87 million square feet of space. The structure straddles a busy downtown street. The building is also located atop an underground train tunnel of the Atlanta transit system, MARTA.

The building units include the remodeled 1924 department store, Rich's, which was a downtown Atlanta landmark and an Atlanta institution.





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Now this renovated six-story building and its beloved clock are a visual cornerstone for the center. Other elements are a 10-story mid-rise section, an eight-story bridge, six stories over Forsyth Street and a 24-story high-rise tower. Adjacent to the building is a 10-story parking garage. Construction of the building was a joint urban redevelopment enterprise of the City of Atlanta and the Federal Government. The design architect for the facility was the California firm of Kohn, Peterson, Fox and Associates. Newcomb & Boyd, a large Atlanta firm, was chosen as the project engineer.

Designed For 24-Hour Operation
Southeastern Facility Management, Inc., is contracted by GSA to operate this facility. The system was designed for 24-hour seven days a week operation to accommodate the mission of the various agencies housed in the facility. One or more of the 1,310-ton chillers were to operate, depending on the building load, between the hours of 6:00 a.m. and 6:00 p.m. After 6:00 p.m., the 400-ton chiller was to carry all computer rooms and miscellaneous building loads.

As a consequence, the facility designers and engineers needed to plan for continuous occupancy. Atlanta has significant cooling loads for much of the year and high humidity as well. The goal of the



HVAC system design was to assure complete comfort in the building around the clock, year-round. To achieve this, significant emphasis was placed on humidity control with a central chilled water plant, air handlers for each area and a zone-controlled VAV air delivery system. Building designers also recognized that an important part of the office environment is acoustic performance. For this reason, rigorous sound level standards were set for occupied areas throughout the facility. The air conditioning system efficiency was extremely important due to the 24/7 operation.

The Trane Company was the supplier of chillers, air handling units and VAV terminal units for the facility. Bill Faulkner, sales engineer for the Trane Atlanta commercial sales office, worked extensively with Newcomb & Boyd, the contracting/construction team, and with the owners in specifying equipment and systems that would meet the rigorous efficiency, temperature and humidity control standards as well as meet acoustic criteria. The chilled water system chosen was a central electric hermetic centrifugal chiller plant, with several large air handlers on each floor and over 1,300 terminal units—either fan-powered units (PIU) or variable air volume units (VAV) throughout the occupied areas.

Economizer Operation Attractive

The system uses four Trane Model CVHF 1280 chillers rated at 1,310 tons plus one smaller Trane Model CVHE 500 machine rated at 400 tons. These EarthWise™ high-efficiency, low-speed, low-pressure, direct-drive HCFC-123 chillers are located in a large basement mechanical room in the tower section of the facility. In the interest of system efficiency, the

plant also features a plate and frame heat exchanger to allow economizer cooling without having to operate the chillers when outdoor conditions permit. The building is run in economizer mode with outdoor ambient temperatures up to 46 degrees. Because Atlanta has 1,643 hours annually where the ambient temperature is below 46 F and, because the building is in use around the clock, this economizer option is very attractive. The economizer's range of operation is significantly increased by an upward reset of supply air temperature of as much as 10 degrees during winter and mild weather.

EarthWise™ system features high-efficiency HCFC CenTraVac® chillers and a low-flow design for optimum system efficiency.



Another chiller plant energy efficiency approach employed in the Federal Center is the use of a low-flow design for the cooling tower condenser waterflow. The Trane EarthWise CenTraVac chillers were selected with cooling waterflows of 2.0 gpm per ton and still meet the

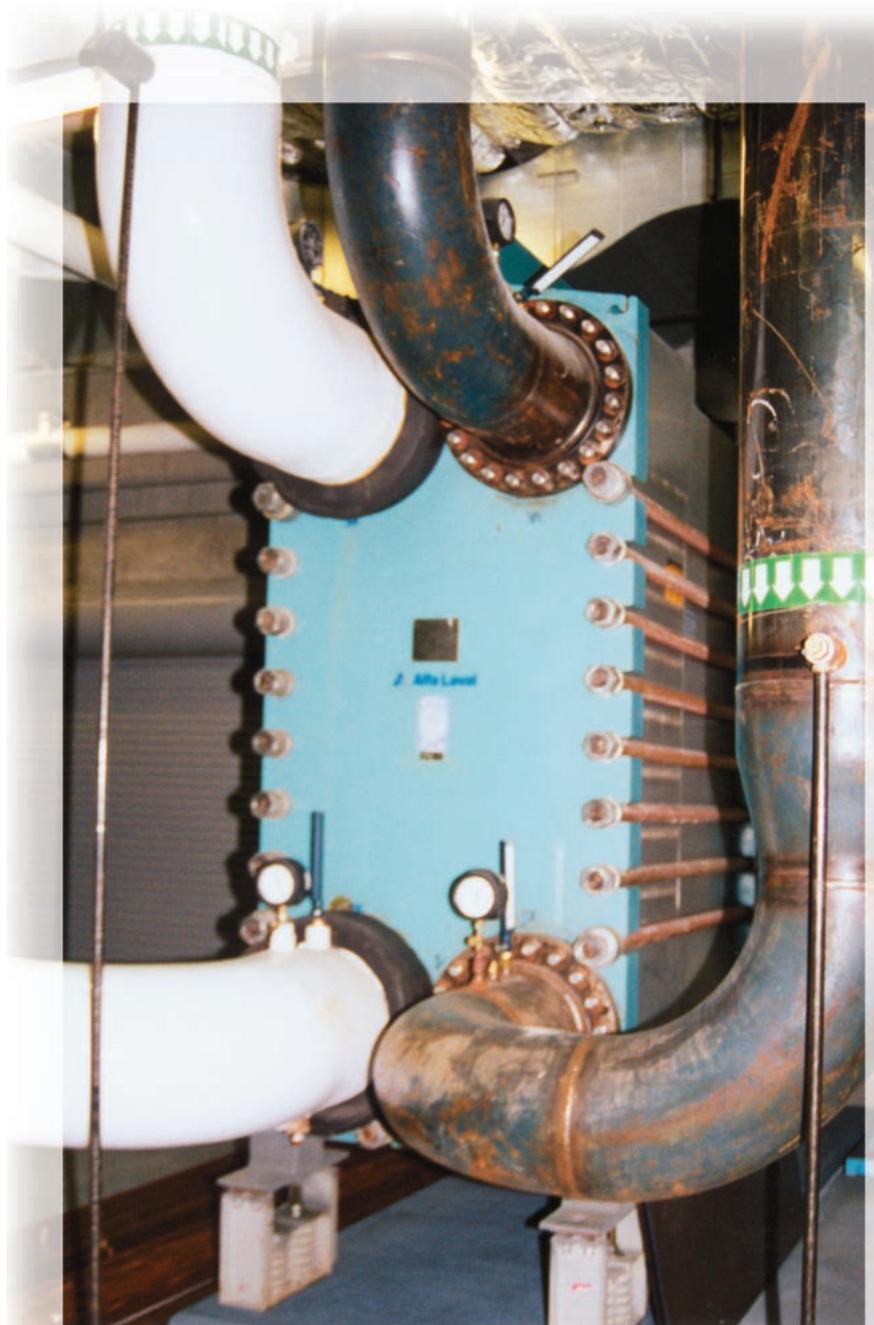
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government’s required maximum compressor kW consumption. This low-flow design improves overall plant efficiency as well as allowing dramatically lower first cost in condenser piping, cooling towers and condenser water pumps. In the Federal Center design, for example, the piping from the basement chiller plant to the roof-mounted cooling towers 25 stories above could be reduced from 24-inch to 18-inch pipe.

The facility managers strive to maintain building relative humidity at 40 percent, even with the extensive mixing of outside ventilation air. To accomplish this, they rely on the ability of the centrifugal chillers to deliver 42 F chilled water for enhanced dehumidification. The building also has significant internal thermal loads. This is in part because of the high concentration of computer equipment. A recent survey indicated two personal computers per building occupant. In addition, there are numerous agency data processing centers. The maintenance staff indicated they have found the lower relative humidity level that they were able to achieve has essentially eliminated any mold or mildew problems in the facility.

Air Distribution To Meet Acoustic Standards

Distribution of chilled air in the building is accomplished with 100 central station air handlers and associated fan-powered VAV boxes. The air handlers are Trane Modular Climate Changer® air



Heat exchanger allows operation in economizer mode.

“This design has been proven to reduce sound levels, particularly in the lowest two octave bands.”

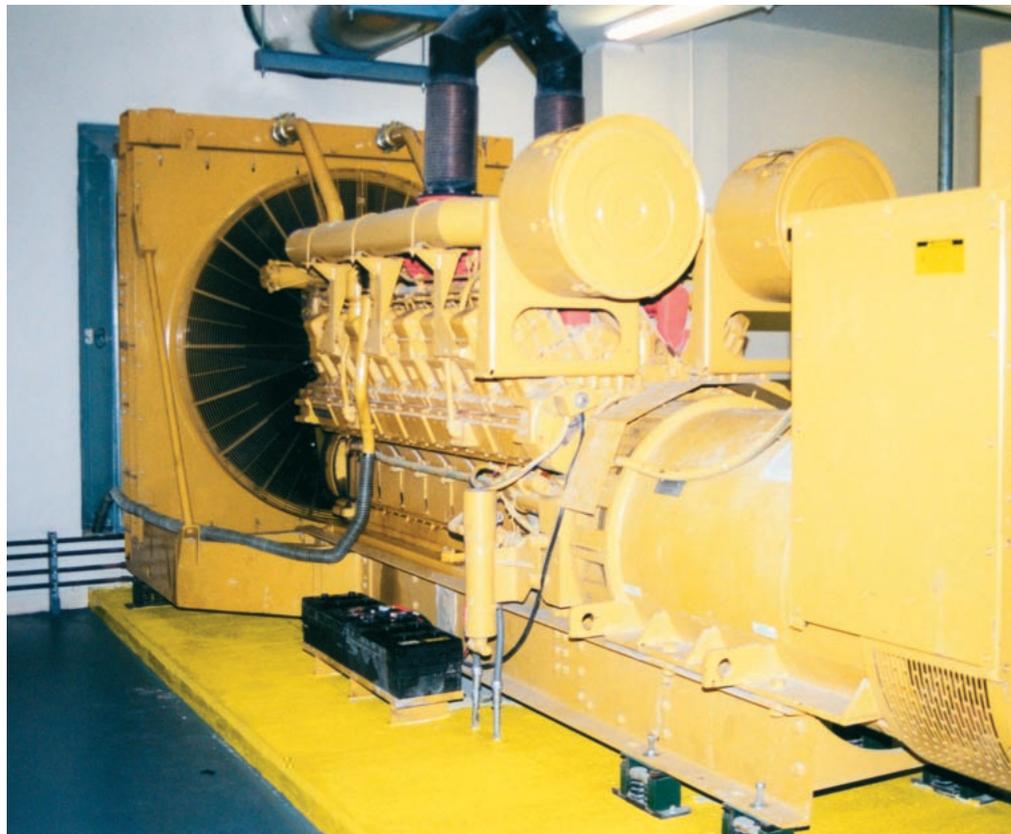
handling units and the VAV equipment was also provided by Trane. Faulkner noted that the owner had set rigorous acoustic standards for the air handler mechanical rooms throughout the building. “They set a required sound performance level of NC 40 just outside the mechanical rooms and NC 35 elsewhere on the occupied floors. This was an interesting design challenge.”

One acoustic solution was to take advantage of the modular design of the air handler. Trane team members worked with the designers at Newcomb & Boyd to configure the air handlers in a blow-thru double-deck stacked configuration. That configuration delivers 48 F supply air with the fan drawing building air through filters at the lower level and then turning the

airflow and moving it through the coil sections at the upper level. Turning the airflow within the air handler using dual discharge plenums attenuates the low frequency fan sound energy using a phenomenon called “end reflection” that reduces the transmission of sound at the air handling unit discharge as well

as radiated sound. The 48 F air temperature allowed lower quantities of air, or fewer cubic feet per minute, to be circulated. This dramatically increased the airside energy efficiency of the building.

This design has been proven to reduce sound levels, particularly in the lowest two octave bands.



Generator set can power chillers during peak demand hours.

"This is important," says Faulkner, "because these low frequency 'rumble' sounds are particularly difficult to attenuate. Stacking the units with the coil above the fan stiffens the whole assembly and reduces the rumble effect."

Regular Cleaning An Important IAQ Strategy

The building facility management team puts a high priority on indoor air quality and the design of the modular air handlers is an important feature in this strategy. The system in the Federal Center uses the mechanical room itself as an inlet and mixing source for the air handlers. The air handlers have a free return. Building air first travels through a four-ply pre-filter module, then through a bag filter section before going through the fan and coil.

The staff notes that this double filtration design allows the system to capture particles down to the small-micron sizes. This is part of GSA's emphasis on maintaining good indoor air quality. For the same reason, the facility management crew completely cleans the air handlers on an annual basis. "We remove the side panels to do this. Because of their blow-thru double-deck stacked configuration, these units are easy to clean." Faulkner indicates that the

cleanup crew vacuums and washes every square inch of the air handler interior, including the coils. "It's almost like a food service level of cleanliness."

According to the maintenance staff, now that the facility is up and running and the system is tuned, there are very few comfort complaints from building occupants. "Typically it's eight to ten comfort-related trouble calls per month. For a facility this size and with this many occupants, that's phenomenal."

Faulkner suggests that the reason for the low complaint level is attention by the facility staff to detail in the design and selection of equipment, in operation and in scheduled maintenance of the facility to maintain its high performance levels. "The performance and comfort of the facility is not an accident. It's a result of good planning and great attention to detail."

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Historic clock at Rich's Department Store building portion of facility.



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|-------------------------|----------------|
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