

Virginia Department of Forensic Science Performance Contract

Phase 1:

Project Size: \$11,063,199

Contract Date: December, 2009

Guaranteed Annual Energy Savings: \$821,031

Phase 2:

Project Size: \$2,902,630

Contract Date: May, 2014

Guaranteed Annual Energy Savings: \$202,255



Central Lab – Richmond



Eastern Lab - Norfolk



Western Lab – Roanoke



Northern Lab – Manassas

Leaders at the Virginia Department of Forensic Science (DFS) undertook improvements to their four laboratories totaling approximately 500,000 square-feet. The three facilities addressed in phase 1 include the Eastern, Central and Western laboratories located in Norfolk, Richmond and Roanoke respectively. DFS extended the project into their Northern facility, located in Manassas, as part of a phase 2 of the performance contract. The project also supports Gov. Terry McAuliffe's recently released 2014 Virginia Energy Plan on reducing energy consumption in state buildings.

The building upgrades are helping to improve the comfort of DFS visitors and employees while reducing the state's environmental impact.

DFS funded all of the improvements with a performance contract, made possible through a program managed by the Virginia Department of Mines, Minerals and Energy. The agency also worked closely with the Department of General Services and the Department of the Treasury for the effort.

The performance contract allowed DFS to use future energy and operational savings to finance the infrastructure improvements up front. Performance contracting is a funding option that provides measurable business results to support strategic business objectives.

The DFS chilled water plant at the Central Laboratory was equipped with two 650-ton centrifugal chillers. Both chillers were required on a hot day to condition the building. The pumping system was constant

volume on the chilled water and condenser water sides. The heating plant at the same laboratory utilized large cast-iron, gas-fired hot water boilers to provide heat for the building. Due to the design conditions of the building and how the boilers were operated since they were installed, the tubes inside all three machines were damaged and on the verge of failure.

Trane performed a comprehensive project at the Central Laboratory that optimized the amount of ventilation air required in the laboratories. As a result, the heating and cooling demand required for the ventilation air was reduced by a significant amount without sacrificing the indoor air quality requirements of the laboratories. The effect of this measure to the heating and cooling system was that the demand on both plants was reduced significantly. A 250-ton centrifugal chiller was installed in addition to the two existing chillers. This solution offered an improved efficiency at lower loads and resulted in one of the two existing chillers becoming a redundant machine to be used in the event of a chiller failure; a luxury that the facility did not enjoy prior to Trane's project. The pumping systems were also retrofitted to incorporate a variable primary approach to the chilled water and condenser water systems. The existing hot water boilers were replaced with small condensing boilers that offer improved efficiency, superior reliability, and greater flexibility with regard to the system performance.

Trane also implemented significant enhancements throughout the facilities including:

- Laboratory ventilation optimization at all facilities. An evaluation was conducted to ensure that the laboratory ventilation airflows were set at their optimal level to maximize energy efficiency while ensuring proper indoor air quality in a laboratory environment. The upgrades not only reduced energy consumption in the buildings, but also reduced the heating and cooling loads significantly so that heating and cooling plant redundancy was accomplished where none existed before.
- Energy efficient retrofits were implemented on most fume hoods that allowed the reduction of exhaust and ventilation air while improving safety.
- Laboratory Reverse Osmosis water purification systems were replaced in the Eastern and Central Laboratories that both improve water quality and reduce waste.

DFS leaders expect the improvements to reduce energy consumption by approximately 40 percent and save \$1,030,000 a year. The upgrades also have reduced the buildings' environmental impact while improving building comfort for employees and visitors and supporting increased productivity for staff.



In February of 2013, the Department of Forensic Science was recognized at the VCU Energy and Sustainability Conference as a leader in Energy and Sustainability for State Agencies for their energy-focused accomplishments inclusive of their first phase of performance contracting with Trane.



In October of 2015, DFS was awarded the Energy Efficiency Leader Award which recognizes the agency as a national leader in reducing its environmental impact.