The Phillip Burton Federal Building is the second-largest building in San Francisco, housing several federal agencies including the U.S. District Courts, U.S. Attorney, and U.S. Marshal Service. The building was constructed in 1962 and has since undergone several remodels. A controls system was installed in 1996 and the chillers and boilers were retrofitted, but not commissioned, in 2000. The need for a building assessment became apparent in 2002 when problems with the old systems began to arise and building occupants started complaining about discomfort. It was determined that a project to improve building performance was needed, and that retrocommissioning would play an important role in the process.

From the tenants’ perspective, the temperature in the building was fluctuating greatly and comfort was never guaranteed. For the building manager, a malfunctioning control system meant boilers and chillers had to be operated manually, a time-consuming responsibility for the operations staff. To the owner, the building appeared unstable, required a great amount of energy and staff time, and was still nearly impossible to keep conditioned. For these reasons, the U.S. General Services Administration (GSA), the building owner, decided to hire a commissioning provider to investigate and help resolve the building’s problems.

To implement the project, the owner chose a commissioning provider with whom they had worked on several previous diagnostic projects. The retrocommissioning effort focused on the chillers, boilers, and air distribution system – all major systems the building manager and owner knew were causing problems. Functional tests revealed a variety of mechanical and controls issues. Chillers were operating at

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a 50 – 60% load and multiple pumps were running needlessly. Boilers had been retrofitted with incompatible controls and were also operating inefficiently. Finally, many of the air dampers had operational issues and were requiring a lot of attention from maintenance staff.

The problems encountered at the Phillip Burton Federal Building are common in large office buildings, as is the ability to resolve them with relatively simple, low-cost solutions. Explains commissioning provider Tom Allin of Facility Dynamics Engineering, “We didn’t have to dig deep to find the operational issues, and these fixes were successful in reducing energy use and improving building performance.”

The commissioning provider partnered with another GSA contractor who had experience with the building’s controls and who was able to correct software problems as they were found. Control system programming was changed to increase flow to the chillers and maximize the tonnage, enabling the existing equipment to run much more efficiently and reduce energy waste. Boilers were retrofitted with new controls, correcting the operational problems and extending equipment life. A new control strategy was implemented to reset air according to demand on cold decks and hot decks, eliminating both overheating and cooling problems. A chilled water reset was also implemented to minimize pump energy based on demand.

The energy and non-energy benefits from these measures were obvious almost immediately after implementation. The building’s electricity use was reduced, tenants made fewer temperature complaints, and the once unsteady controls system became more stable, alleviating stress on the building staff and the owner. According to building manager Julius de Leon, “Retrocommissioning freed up more staff time because it eliminated the need for personnel to manually operate the boilers and the chillers.”

Since the project concluded in 2004, the building has undergone continuous monitoring to maintain implemented measures as well as identify additional opportunities to improve efficiency. The building staff has made use of the Mechanical Systems Operations Manual, created as a part of the retrocommissioning process, which gives detailed equipment descriptions and sequences of operation as well as setting the stage for ongoing operational efficiency.

**Case Study: Phillip Burton Federal Building**

“Retrocommissioning freed up more staff time because it eliminated the need for personnel to operate the boilers and the chillers.”

- Julius de Leon, GSA Assistant Building Manager

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**Project Partners**

**BUILDING OWNER**

U.S. General Services Administration  
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www.gsa.gov

**COMMISSIONING PROVIDERS**

Facility Dynamics Engineering  
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Enovity  
Contact: Jonathan Soper  
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**FOR MORE INFORMATION**

California Commissioning Collaborative  
www.cacx.org  
A resource for commissioning providers and owners featuring sample commissioning documents, case studies, tools, and the latest industry news.

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A control diagram from the Mechanical Systems Operation Manual depicting the operation of the dual duct VAV box.