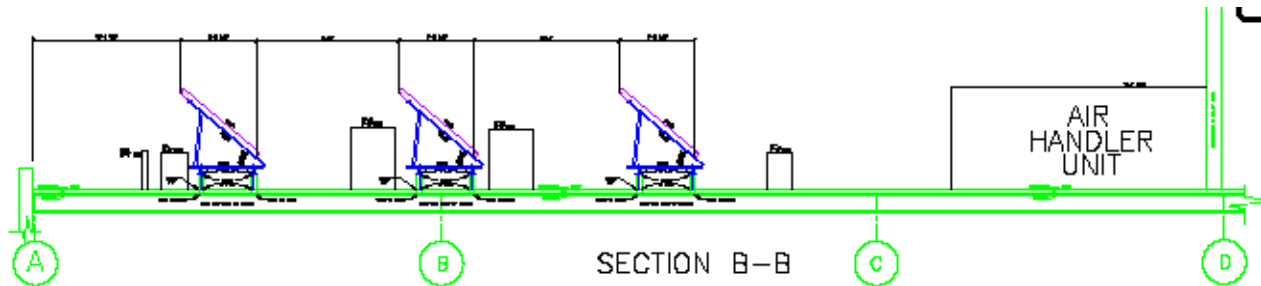


Rooftop Solar Water Heating System,
Riverside Correctional Facility
Philadelphia Prison System



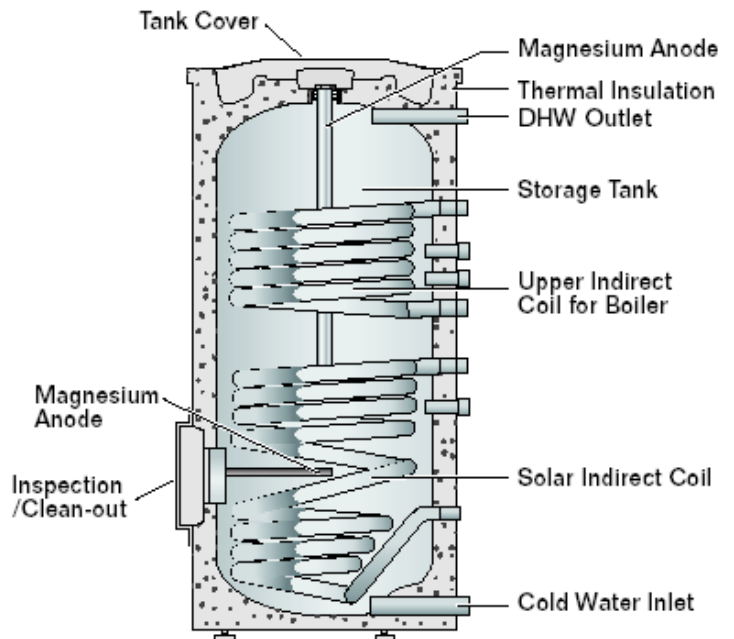
*Elevation of roof-top installation of solar panels, mounted in 3 rows at a 40° angle, facing south, southeast.
Drawing by Herman Goldner, Inc.*

Components:

- Rooftop Installation of 45 Buderus SKS 4.0 Flat Plate Solar Collectors
- Boiler-room installation of 15 105-Gallon Solar Indirect DHS Storage Tanks (LogaLux SM 400 Dual Coil Storage Tanks).
- Boiler Installation of Solar Pump Station and Controller
- Boiler-room installation of 2 Buderus 1 Million BTU Dual-Fuel Supplemental Boilers

How it works:

1. The Roof-top Solar Panels transfer solar heat to a closed system circulating Propylene Glycol (similar to anti-freeze).
2. The Pump Station and Controller circulate the heated Propylene Glycol at a maximum temperature of 265° Fahrenheit, through coils in the Hot Water Storage Tanks.
3. The insulated storage tanks maintain water temperature, with an estimated heat loss of ½ of one degree per hour.
4. The conventionally-fueled supplemental boilers provide hot water at times when solar heating is unavailable (the middle of the night, for example).



. Section view of Buderus 105 Gallon Storage Tank.

Cost:

\$ 665,000. \$ 400,000 was allocated from the Prison System's Maintenance Budget in FY2008 when PPS purchased the dual-coil storage tanks; with supplementary funds allocated from the Mayor's Office of Sustainability.

Carbon Savings:

Estimated 1 Million Pounds of Carbon Emissions will be avoided through the 25 year life of the equipment.

Savings:

With a conservative estimate of 20-25% savings, the project will pay for itself within 9 years of installation, and save over \$ 1.1 Million over anticipated 25-year life.

Estimated Savings (based on 10% rate of increase in energy prices):

- 1st Year combined installation and repair savings: \$ 54,974.00
- 10-Year combined installation and repair savings: \$712,863.00

Estimated Savings (based on 20% rate of increase in energy prices):

- 1st Year combined installation and repair savings: \$ 54,974.00
- 8-Year combined installation and repair savings: \$673,295.00

Project Challenges:

- Remove old system in boiler room and install new hot water storage tanks and supplemental boiler with no loss of service
- Install new system in a very limited space in the existing boiler room.

Project Partners:

- Capital Program Office of the City of Philadelphia
- Managing Director's Office of Energy Conservation
- Mayor's Office of Sustainability
- *US Facilities, Inc.* has the facilities management contract for Riverside Correctional Facility and for Curran-Fromhold Correctional Facility. USF proposed the dual-coil hot-water storage tanks, enabling both conventional fueled hot-water and thermal exchange heating via rooftop solar panels.
- *Herman Goldner, Inc.* provided project engineering, scheduling and coordination.
- *Buderus* is a distributor of hot water heating equipment for residential and commercial applications. Established in the United States in 1990, Buderus is a wholly-owned subsidiary of Buderus Heiztechnik GmbH of Wetzlar Germany. *J. Lorber Company* provided equipment, supplies and fittings for installation.

The Philadelphia Prison System is a large urban jail system, serving Philadelphia. It manages over 35,000 new admissions a year, with an average daily population of over 9200 inmates in FY2008. Most of the inmates are held pre-trial, for an average length of stay of 92 days. There are 6 major facilities on the campus in northeast Philadelphia.

The Riverside Correctional Facility (RCF) is the intake facility for all women who are incarcerated in Philadelphia. With an average daily population of about 800 inmates, RCF provides admissions and diagnostic services, medical and behavioral health treatment, substance abuse treatment, education and vocational training programs for women. Designed by the Vitetta Group, RCF is comprised of a Housing Building and a Support Building, the total taking up over 200,000 square feet. The facility opened in July of 2004.

Project Timeline:

September

9/4/2008	City Approves Project
9/8/2008	USF Provides sealed structural review letter
9/12/2008	First focus meeting to discuss project
9/15/2008	Design review process with manufacturer
9/18/2008	Site visit for preliminary design measurements
9/22/2008	Technical engineering drawings of existing roof

October

10/3/2008	Layout of all solar panels for cad design and drawing
10/7/2008	Review of construction drawing to city, engineer and US Facilities
10/17/2008	Formal release of construction documents
10/27/2008	Begin Installation of steel post, beams and solar panel steel framing
11/3-8/2008	Solar panels, frames, lines, and pump packages to ship

November

11/10/2008	Receive solar materials and shop assemble panel frames
11/17/2008	Deliver solar materials to job site
11/18-24/2008	Mount solar panel frames and solar panels
11/25-28/2008	Install all solar trim and piping below roof level

December

12/1-12/2008	Install solar pump packages, piping, controls and electrical
12/15-19/2008	Fill system, check for leaks, start-up
12/22/2008	Make adjustments and monitor operation
12/24/2008	Active Solar System "Merry Christmas"



Completed Solar Panel Installation, top of RCF Gym Roof, December 4, 2008

For more information call: Bob Eskind, Public Information Officer, 215 685-7888
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