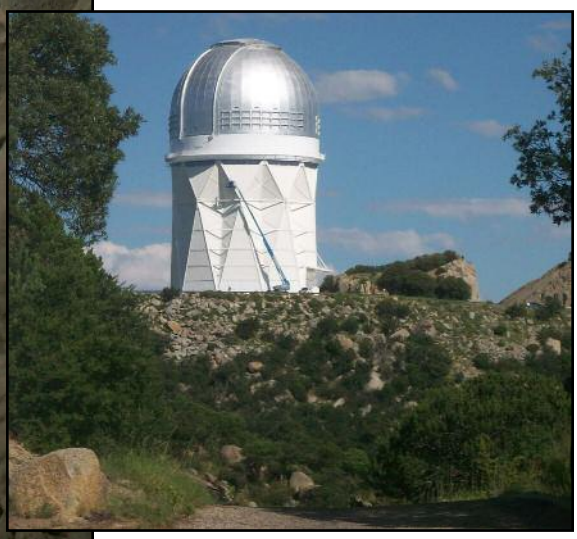
Photos courtesy of John Dunlop, PE.



A FLEXIBLE SILICONE COATING WAS APPLIED TO THE ROOF OF THE DOME. THE RADIANT BARRIER ROOF COATING SIGNIFICANTLY REDUCES EXTERIOR ROOF SURFACE TEMPERATURES.

An Astronomical Facelift

Desert Observatory Gets Renovated in Tucson, Arizona

by Matt McNelis, vice president of operations, SOLEC

Kitt Peak National Observatory is an astronomical site located in the Sonoran Desert just outside of Tucson, Arizona. Nestled atop a nearly 7,000 foot peak sits an array of over 25 optical and radio telescopes. First founded in 1958, Kitt Peak continues to be at the center of modern astronomical research with observations on this site noted for important contributions towards understanding dark matter, galaxy redshifts, supernovae, near-earth asteroids, and more. It is also a highly popular tourist destination in the area with breathtaking views. Kitt Peak is part of the National Optical Astronomy Observatory (NOAO), a research and development center for ground-based nighttime astronomy.

Towering over all others on Kitt Peak is the 18-story tall Nicholas U. Mayall Telescope. The massive 30,000 sq.ft., 500-ton reflector telescope structure, named after the former director of the site, was the second largest optical telescope in the world when it saw first light in 1973. It houses a 4-meter telescope but is currently being primed for the installation of a new instrument in 2017, the Dark Energy Spectroscopic Instrument, which is designed to make 3D images of the universe in an effort to better understand the relationship between dark energy and gravity.

As part of the preparation for the new instrument, the telescope facility underwent a series of recent renovations with the help of energy conservation company SOLEC, Ewing, New Jersey. One upgrade is a new coat of

(Continued on Page 50)

Photo courtesy of Keith Blaine.

Photo courtesy of John Dunlop, PE.

An Astronomical Facelift

(Continued from Page 48)

exterior paint on the dome structure. The old titanium dioxide-coated surface was severely weathered and the steel substrate below was beginning to oxidize, so the large dome was sandblasted and primed. As NOAO facilities manager, John Dunlop, PE, notes, "It was a challenging project for both the contractor and our staff. Some of the work was done while significant activity was ongoing within the dome and facility. During the power washing phase we had to make sure our interior telescope was protected from any potential infiltration into the dome. Some work on the very top of the dome was done through an access hatch, with the workers in full fall protection gear. A large crane with workers in a basket was utilized for the majority of the work. There was limited space around the telescope structure for the crane and we had to work around it for access to the structure while significant interior work was ongoing internal to the facility. Some smaller areas were also worked on from our exterior catwalk. The contractor had to coordinate their work with us and the weather was a detriment on some days when wind prevented working. The contractor's staff did a good job in minimizing impact on our operations while they power washed the area and put on the primer and final coat of LO/MIT paint."

The paint selected for the final topcoat of the dome surface was a reflective product called a radiant barrier roof coating. Radiant barrier coatings, also referred to as low-emissivity, have high reflectivity in the visible and infrared wavelengths of the electro-magnetic spectrum. The particular coating chosen for the Mayall project is made with a 100% silicone binder and is ENERGY STAR® certified. In essence, radiant barrier coatings are a liquefied aluminum foil and have a highly metallic silvery finish. They provide a low-emissive roof signature, ideal for infrared optical measurements. Over the years, this particular coating has covered many of the largest telescopes around the world, including the twin 8-meter AURA Gemini telescopes in Hawaii and Chile, and the 10-meter GTC in the Canary Islands, the world's largest single-aperture optical telescope.

Radiant barrier roof coatings are not just designed for telescope applications. They can be applied on a wide variety of exterior roofing surfaces, including metal, rubber, built-up, and gravel. Their flexible silicones also allow for applications on pliable materials like polypropylene and fabrics to reduce unwanted radiant heat transfer. Radiant barrier roof coatings significantly reduce exterior roofing surface temperatures, which in turn helps control interior building temperatures and conditioning costs. They minimize heat-related expansion and contraction fatigue and are highly resistant to UV degradation, extending roof life. Radiant barrier roof coatings are installed at a very low cost due to coverage rates of approximately 400 sq.ft. per gallon and only one coat is required for full substrate coverage.

Radiant barrier roof coatings give the specifier, applicator, or building owner another intriguing coating option for building energy conservation and better roof performance. While the astronomers at the Mayall telescope will be benefitting from a low-emissive roof signature as they explore the great mysteries of the universe, other terrestrial buildings can see lower utility costs, greater interior comfort levels, and longer-lived roof surfaces, all at a very low applied cost per square foot.