

# CONTRACTOR

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## A jobsite of seismic proportions

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POTOMAC, MD. — “At first I thought someone was sliding a 5-gal. bucket across the floor upstairs,” said Dan Foley, owner of Foley Mechanical Inc. (FMI), Lorton, Va. “But when the pile of 24-in. spiral duct started bouncing, I knew it was something more.”

When the East Coast quake rattled the Washington D.C. area, Foley was in the basement of a 20,000-sq.ft., custom home under construction in Potomac, Md. He’d stopped in to talk to three of his technicians working on an extensive mechanical system for the home.

“The jobsite didn’t sustain any damage, but the 8-in., elevated basement slab we were standing on wobbled like jelly,” said Foley. “Potomac is just outside the Capital Beltway, not far from downtown D.C. where several national monuments were damaged.”

By design, FMI stays near the Capital Beltway. The company’s 14 technicians concentrate on high-end installations and service contracts. Few jobs are under the \$10,000 mark, with several each year exceeding \$1.5 million.

### **Demanding domestic**

Actually, Foley was in the sub-basement when the 5.9 quake hit in August. The giant home has two subterranean levels. The first basement level includes a living room, two small mechanical rooms, fireplace room, grand staircase and enormous fish tank. The lowest level includes the main mechanical room, full theatre and a cavernous athletic court.

A sprawling footprint, massive domestic hot water demand, heated four car garage and snowmelt in the motor court bump the home’s mechanical system into the (not so) light commercial realm.

Two gas-fired, 500 MBH boilers heat a portion of the home, supply the domestic hot water, and provide supplemental heat to the first floor spa. Surrounded by windows on three sides, a suspended 8,000-gal. hot tub is covered by a canopy of stars. A domed black ceiling speckled with fiber optics creates the illusion of being outside on a clear night. Linear diffusers along the windows keep the glass from fogging in the winter.

“The owner made it clear that he doesn’t want to wait for the hot tub to get warm,” said Foley. “So we packed-in the BTUs. In addition to the Pool-Pak spa heater/dehumidifier,

the water also draws warmth from a heat exchanger connected to one of the boilers.

“The architect was flown to Italy twice to get ideas for the spa,” added Foley.

Outside, a second, in-ground hot tub also draws heat from the boilers. Buried, super-insulated supply and return lines were used to deliver BTUs to the heat exchanger. In the main mechanical room, two, 120-gal., dual-coil indirect-fired water heaters supply the numerous bathrooms and multi-head showers with plenty of water.

### **Snowmelt**

The snowmelt system in the front of the house starts on the front porch steps, which are capped with monolithic slabs of granite. From there, 10,000 lineal feet of 3/4-in. Watts RadiantPEX+ lies below an 8,500-sq.ft. section of the driveway. Under the tubing and asphalt, FMI crews installed two-inch rigid insulation to keep energy from entering the ground.

Although the lane is more than 200 yards long, the heated portion only extends to the slope approaching the home and covers the whole motor court area and up to the garage doors. Behind the four car garage, a 1.2 Million BTU, gas-fired Laars Rheos boiler is dedicated to the snow melt system.

“Rheos boilers are dependable, and as efficient as possible without getting into a condensing boiler,” said Foley. “Laars also makes the Rheos+, which is a condensing boiler, but we chose a conventional model because it’s located outside. Winter conditions would mean freezing condensate.”

The Rheos line runs from 1,200 to 1,400 Mbtuh, and installs indoors or outdoors. As a low-Nox, modulating boiler, all four units in the compact Rheos line fit through a standard 36-in. doorway.

### **Hydronic cooling**

Three, 10-ton commercial chillers handle all the cooling needs of the home. Last summer, the D.C. area went over a week at a shot with daytime temperatures cresting 100°F. But accompanying the heat, humidity levels around 9% really make for sweltering, steamy discomfort.

While the news anchor warns about keeping an eye on the elderly and pets, cooling systems are working overtime. All the chilled water in the home is distributed by fuse-welded polypropylene pipe.

“The fusing isn’t hard once you get the hang of it,” said Brian Golden, lead pipefitter for FMI. “And you know it’s not going to leak. After the pipe and fitting are fused, they form one continuous piece of plastic.”

The supply lines coming from the chiller start at 2.5 inches and drop to one inch or three-quarter as they go to the many individual fan coil units throughout the home. Two Taco Viridian pumps are used to move system fluids throughout the home, both on the heating side as well as the cooling side.

The new Viridian is a web-enabled, wet rotor, variable speed commercial pump product line. The ECM motor saves up to 60% of the electrical energy compared with conventional commercial pumps, and its multiple operating modes fit most applications.

A seven-and-a-half ton air handler tied into the hydronic system serves the sport court in the lowest level of the basement.

## **Heating**

Despite the summer heat and humidity, D.C. winters can be equally cruel. For the past few years, there was little shoulder season to speak of. Much like the chilled water distribution system in the home, water from the two boilers is channeled to air handlers. For piping on the heating side, Foley crews used copper pipe, all neatly connected with ProPress gear.

The entire house is heated with forced air from hot deck coils in the air handlers, though some areas include in-floor radiant. In the rooms with radiant, like the large spa, in-floor heat is used as first stage, and forced air is supplemental.

All of the in-floor tubing is 3/8-in. Watts Radiant PEX in a mud base under the tile. Taco 008-VDT variable-speed circulators, Zone Sentry zone valves and ZVC zone valve controls operate the many zones within the home.

“Although the home is large, when mechanical components were chosen, efficiency was second only to reliability,” said Golden. “With a variable-speed, Delta-T pumping strategy, the numerous zones receive the precise amount of heat needed for comfort, without sacrificing any extra to inefficiency.

“The ductwork is also impressive,” said Ron Etter, a sheet metal worker at FMI. “The gymnasium required the use of the 24-in. spiral duct. There were spaces in the home where we worked directly with the structural engineer to accommodate the large duct. At one spot, a steel I-beam was oversized so we could cut a hole through it for a duct run. An FMI installation is as custom as they come.”

“I’m used to demanding clientele,” said Foley. “It can be difficult, though our response to a tough, discerning client base has helped to shape the company into what it is today. FMI installations are designed and installed with uncompromising performance and precision. The firm stays ahead of the curve when it comes to new products and technology.

“Earthquakes, hurricanes, drought, flooding and a volatile economy; 2011 has been an interesting year,” said Foley. “We’ll be here to do it all again next year.”