

Quad Cities' new steam dryers project

For the first time ever, Exelon performed the replacement of a pair of steam dryers.

EXELON GENERATION'S QUAD Cities nuclear power plant installed new steam dryers in the site's boiling water reactors earlier this year. Quad Cities, in Cordova, Ill., has two General Electric BWRs, each rated at 867-MWe (net design electric rating). Unit 1 started commercial operation in February 1973 and Unit 2 in March 1973.

The installation project, which took place during outages at Unit 1 in April and Unit 2 in May, was a first for Exelon and its contractor, Barnhart Crane and Rigging. The utility-contractor team worked together on the off-site assembly of the steam dryers, transporting them to the site, removing and replacing siding from the reactor building, and designing, fabricating, and building a temporary platform and slide rail system that were used to get the dryers inside the reactor building. Once inside, the dryers were moved from a temporary containment airlock to the refueling floor for their eventual installation in the reactors.

The steam dryers, manufactured in Pennsylvania by GE, weigh 55 tons each. The width of each dryer is 20 ft 7 in., and the height is 17 ft 10 in. After manufacture, the dryers were transported in March in pieces to an assembly plant in Illinois. Once assembled, the dryers traveled 15 miles down the road aboard a hydraulic platform trailer to the Quad Cities plant.

The utility-contractor team focused on minimizing the project's impact on plant activities. Seismic and tornado loads were important considerations for the team in the design and fabrication of the temporary platform, which had to be capable of supporting more than 110 000 pounds. Once on the platform, the dryers were seated on a slide rail system that used hydraulics to transport each one into the airlock through a series of small moves, 30 inches at a time. The distance covered along the slide rail system was about 30 feet, almost an hour's worth of work. Clearances were as tight as a couple of inches for moving the dryers through the airlock doors. Tolerances were less than that for other parts of the job.



Left: A temporary platform was assembled on the exterior of the Quad Cities reactor building in anticipation of accepting a pair of new steam dryers that ultimately would be installed in the plant's boiling water reactors. After the platform was assembled, a hole was cut and a doorway placed in the building's side. (Photos, pp. 41-44: Barnhart Crane and Rigging)

Below: Following the assembly of the steam dryers at a local fabrication plant, they were transported 15 miles aboard a hydraulic platform trailer to the Quad Cities plant. One dryer arrived in April and the other in May.

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Steam dryers are used only in BWRs—not in pressurized water reactors. When wet steam is formed in a BWR, it leaves the core and goes through a steam separator, just like in a PWR. But unlike a PWR, the steam in a BWR also goes through a steam dryer, where additional moisture is removed. The steam then proceeds to the turbine.

This was the first time Exelon had ever replaced steam dryers in any of its BWRs, and it was one of the first replacement jobs of its kind in the industry, according to a project manager.





Above: On the same day that each dryer arrived at Quad Cities, it was connected to a crane lift to be hoisted to the temporary platform.

Left: The project's contractor, Barnhart Crane and Rigging, used a lattice boom crane to lift each of the dryers. Each dryer weighs 55 tons and has a width of 20 ft 7 in. and a height of 17 ft 10 in.

Below: Workers stand ready to accept the dryer onto the reactor building's temporary platform. A slide rail system used four shoes and hydraulic pump assemblies to inch each dryer into the airlock. **Inset:** One of the four shoes upon which the dryer was placed. In photo, the shoe is the flat red piece on the slide rail, located in front of the two hydraulic pumps used to push the shoe—as the other shoes and pumps work in unison.





Top: The dryer edges closer to the temporary platform.
Middle: Nearing setdown, the dryer hovers over the slide rail system used to move it inside the airlock.
Bottom: The dryer is transported through a series of small moves, 30 inches at a time, into the airlock, with clearances through the doorway as tight as a couple of inches.



Top: The dryer nears the end of its journey, from its start at Quad Cities outside the reactor building, to inside the temporary airlock. Once the doors were sealed, the top of the airlock was removed and the plant's overhead crane hoisted the dryer out, moving it to the refueling floor, where it awaited installation into a reactor.

A-D, Below: (A) The overhead crane moves the dryer to a location above a reactor cavity. (B-D) Inside the reactor, the dryer is installed. (Photos A-D: Exelon Generation)

