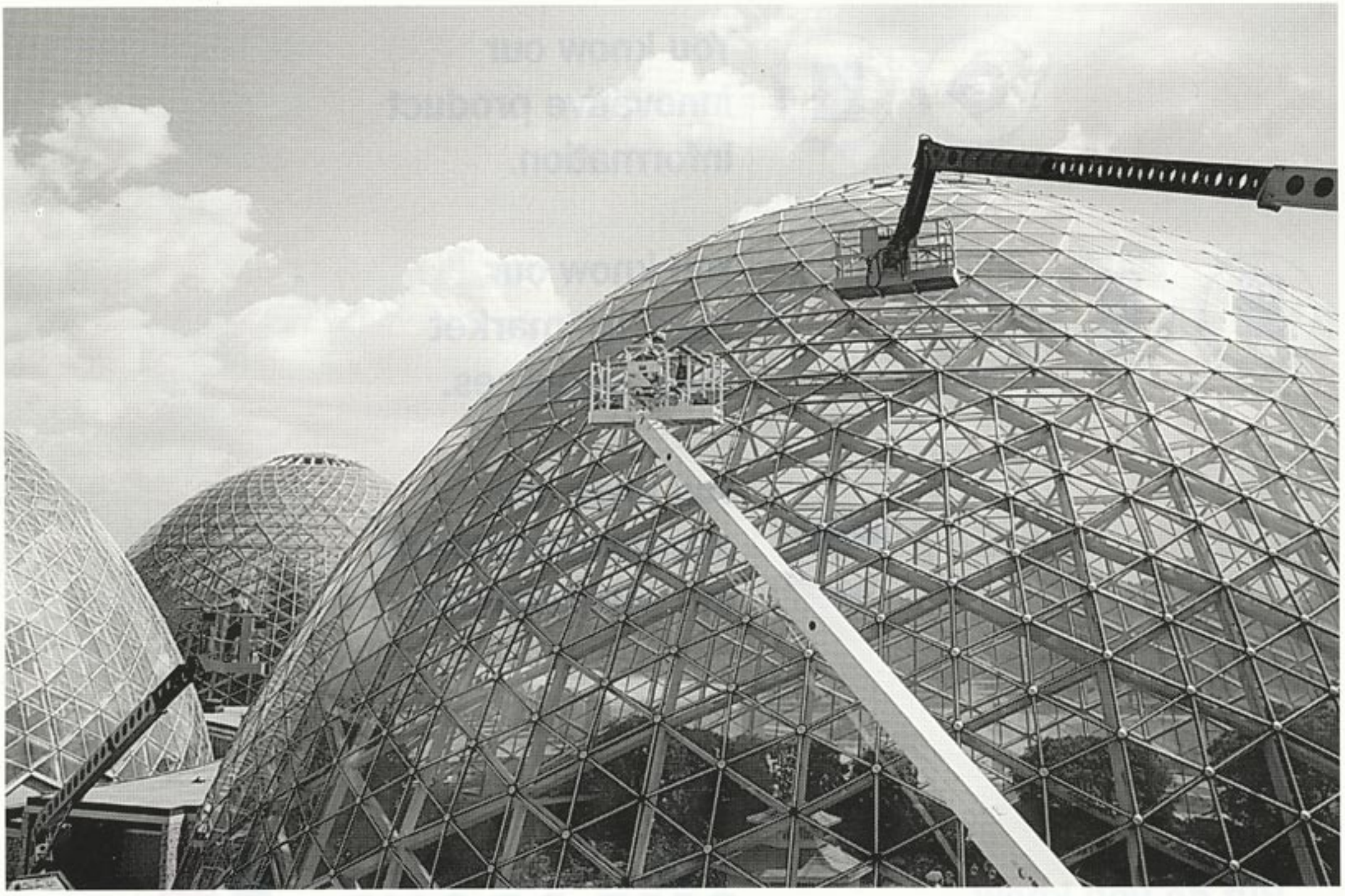


Choice Construction Companies, Inc., of Menomonee Falls, Wis., is using a 66-foot Grove lift, an 80-foot Snorkel lift, and a 131-foot Grove lift to make repairs on the exterior of the 85-foot tall Show Dome at the Mitchell Park Domes in Milwaukee.

Rain, rain, go away -

Milwaukee's Mitchell Park Domes being waterproofed

The Mitchell Park Domes, officially known as the Mitchell Park Horticultural Conservatory, are home to a wide variety of flowers and other plant life, and have been a popular attraction since being built in the 1960s.

The first dome opened to the public in 1964, with the third dome opening in 1967.

The domes are still a major attraction, however, age has taken its toll on the domes, and Milwaukee County is in the midst of a four-year, $1.5 million project to repair the domes

"The primary problem is they leak when it rains," said Mike Owsley, one of the owners of Choice Construction Companies, Inc., of Menomonee Falls, Wis., which is doing work to waterproof an area covering approximately one-quarter of the Show Dome this summer and early fall.

Dominic Stroik and Jeff Pereles are other partners in Choice Construction Companies, Inc., a five-year-old company that does general contracting, steel erecting, and consulting for a construction software package.

Removing damaged windows and sealing leaks will improve climate control at the domes, said Kris Ciombor, conservatory director.

"It's just like repairing the roof of your house. We're repairing our roof," she said.

The project is actually much more complex than home roof repair.

Variety of sizes

The Mitchell Park Domes are an engineering marvel, and are built of thousands of triangles of glass held in place by aluminum frames of varying sizes.

The triangles are all different sizes, with a great many of the aluminum legs of the triangles different lengths.

"There's thousands of different sizes in the domes, some of them different by only 1/16th-inch," said Owsley. "There's a lot more complexity to the project than the average person would think."

Triangular frames and glass plates are various sizes because the domes are conical, or cone-shaped. Domes are cone-shaped to get the best angle of the sun for solar heat-

ing, and to provide plenty of room for large trees growing inside the domes, Ciombor said.

In the work being done this summer and early fall, all aluminum frames in two, large pie-shaped areas at the Show Dome are being removed, inspected for damage, and replaced, if necessary.

Silicone gaskets around and under the aluminum frames are being removed and replaced with new materials, as are all hub covers and hub cover gaskets.

The Choice Construction crew is also caulking around frames and hubs so the dome is water tight, and replacing windows as needed. A total of 97 panes of glass are scheduled to be replaced in the current phase of the work, with more replaced if necessary.

"Glass is really a small component of the project," said Owsley.

The biggest part of the job is the retro-fit of aluminum framing.

Choice Construction is also wet sealing the entire area.

Working as high as 80-feet above the ground, Choice Construction employees wear body harnesses to keep them secure when working on the lifts.

Show time

The Show Dome is a priority as it is the site of weddings, banquets, and private parties. It also has more open areas and paths than the other domes.

"In the other domes, if you have a leak it's likely to be in a planted area, but in the Show Dome it's more likely to be on a path or other open area," said Ciombor.

Besides the Show Dome, Mitchell Park is home to the Arid Dome, and the Rain Forest or Tropical Dome. All domes are the same height, 85-feet at the peak.

All work is being done on the outside of the domes, so that operation of the domes isn't disrupted by work. For example, replacement of glass is done before the domes open in the morning so there is no danger to dome patrons.

Choice Construction is doing the work using a 66-foot Grove lift, an 80-foot Snorkel lift, and a 131-foot Grove lift. A 140-ton crane will be used for work above the lightning protection at the upper reaches of the dome.

With the number of lifts on the job and with work being done outdoors, construction must be done before fall winds and rain begin.

"If it gets windy or wet, we're done," said Pereles.

Choice started in mid-August and expects to be finished with the work by the end of October, when fall rains and wind and cold would make work difficult.

"The caulking procedure cannot be done if the dome is wet or damp," said Owsley.

Because work needs to be done by the end of fall, Choice is using three lifts on the job, rather than the two that would usually be used in a project of this nature.

However, with all the large construction projects underway in the Milwaukee area, Choice had to go all the way to Cleveland, Ohio to find a 131' lift available to rent for the job.

Workers on lifts wear body harnesses to keep them secure while working as high as 80-feet above ground level.

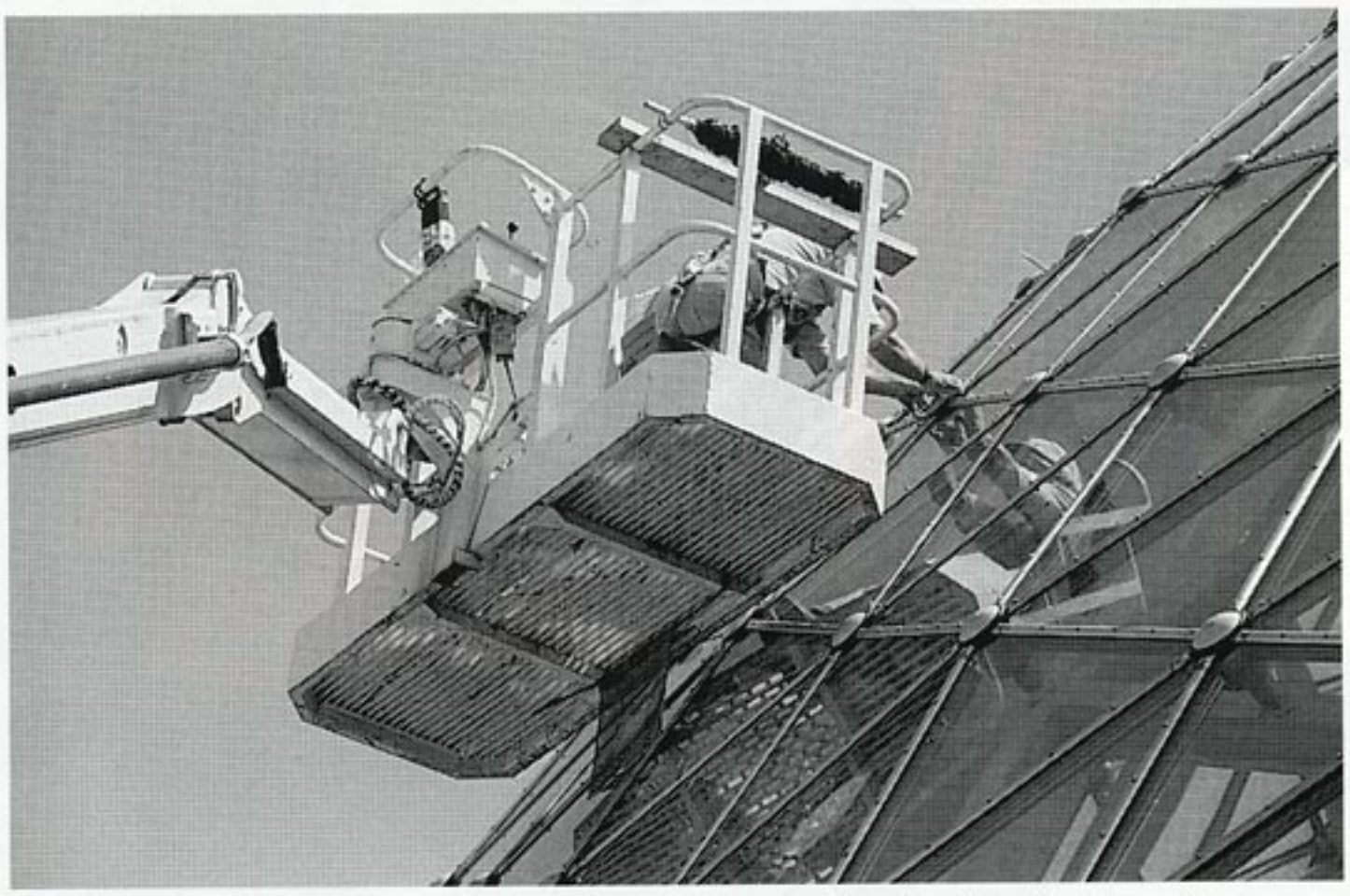
Choice has worked over 300,000 man hours, and had only two lost-time accidents, Pereles said.

"Safety is a big concern," said Pereles.

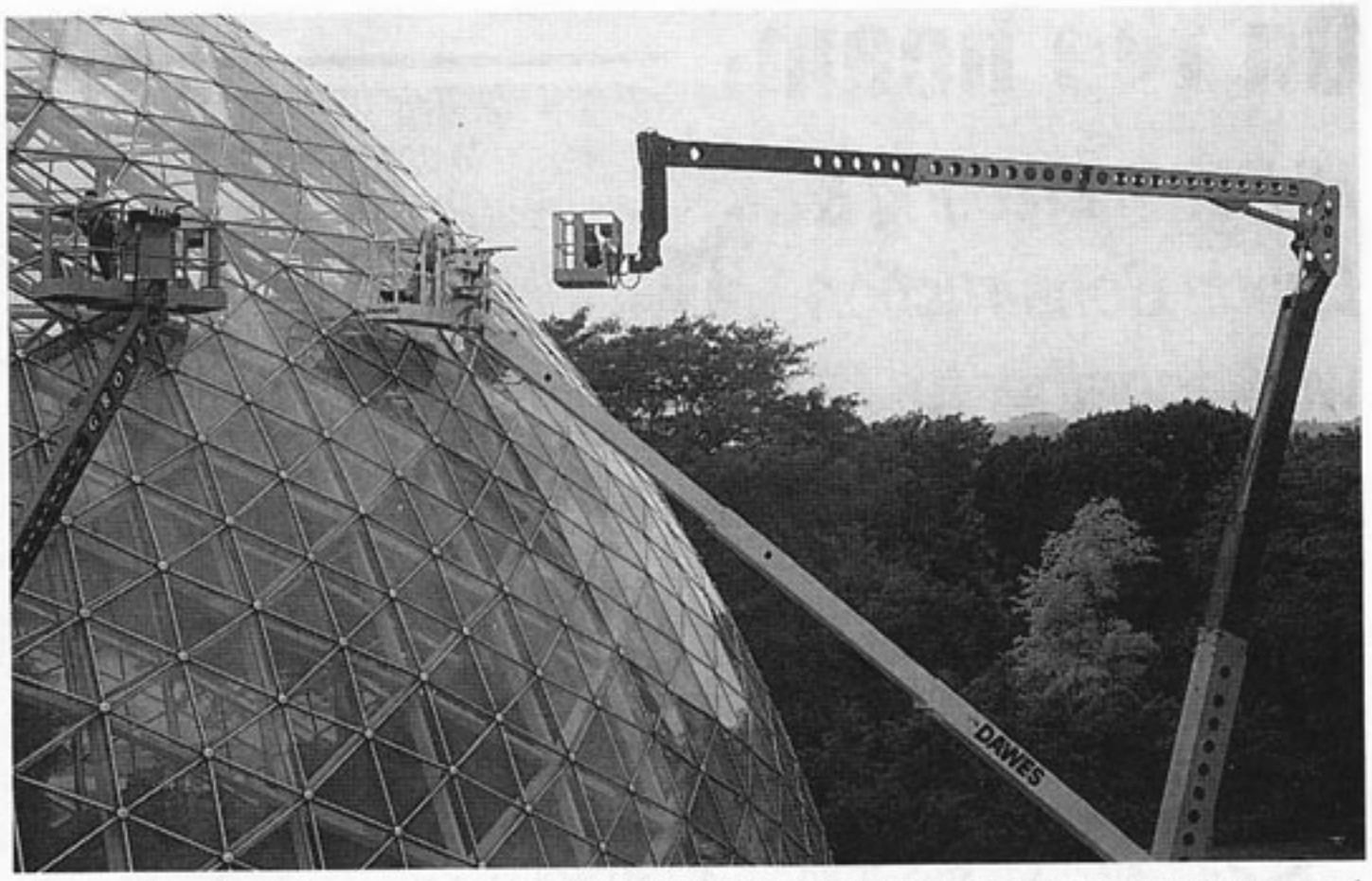
No pressure

Choice Construction is using the lifts to reach the numerous glass plates and triangular frames without putting pressure on the domes.

"Access was the difficult problem they solved with the use of the lifts," said Ciombor.



All hub covers, hub cover gaskets, and gaskets around and under aluminum frames, as well as 97 glass panes are being replaced in the job this summer and early fall at the Show Dome.



Choice Construction employees in lifts work on one triangular section at a time, and then move the lift before starting on the next triangular section of the dome.

"It's in the specifications, nothing is allowed to touch the dome," said Pereles.

That means that specialized equipment like window washing equipment can't be used for the work.

"Structurally, the glass isn't strong enough to do that," Owsley said of using the dome to support equipment such as window washing equipment.

Choice Construction workers in lifts work on one triangular section at a time, and then must move the lift before moving onto the next section. The legs of the triangular sections are usually 4- or 5-feet in length, so lifts on the job are moved in small increments all day long.

The work is not only time consuming, it is also exacting. For example, wire in the glass plates must be placed so that the configuration of the wire in the glass is exactly the same as it was before the work so that wire in the glass plates forms the same pattern as it did before the job began.

Also, if stainless steel screws aren't installed correctly, the screws will strip the aluminum sash and need to be replaced.

"You have to be really careful, you can't be sloppy," said Ciombor.

Choice job

About a dozen people at Choice have been trained and are able to work at the job, which is an unusually high number of people to train for a job of this nature, Owsley said.

"It's like no other structure in the city. It has totally different components. It's not a typical glass and window sash," said Owsley.

The job this summer and fall at the Show Dome is the sixth that Choice Construction has done at the Mitchell Park Domes, including a gift shop addition, and the construction of a classroom.

This is the third repair job of this nature that Choice Construction has done at the Mitchell Park Domes.

"We had some learning curve the first couple of jobs, now we're pretty familiar with it," said Owsley.

Before Choice's first job at the domes, it was thought building scaffolding around the dome would be the best way to do the work.

"The problem with scaffolding is that you're going up, and over the dome," said Owsley.

It was also first thought that the best way to repair leaking domes was to fix the gutters on the interior of the domes.

An integral secondary gutter system on the interior of the domes collects water on the inside of the domes. Gutters on the underside of the legs of the aluminum triangles collect water, which flows to hubs and drains down toward the bottom of the dome.

It was decided that the best and most economical way to make the dome watertight was to concentrate on the exterior which included the aluminum frames, glass, and gaskets.

"If it's not the aluminum and it's not the glass, it's got to be the gaskets," Owsley said of the process of elimination that led to the replacement of all exterior gaskets in an effort to waterproof the Show Dome.