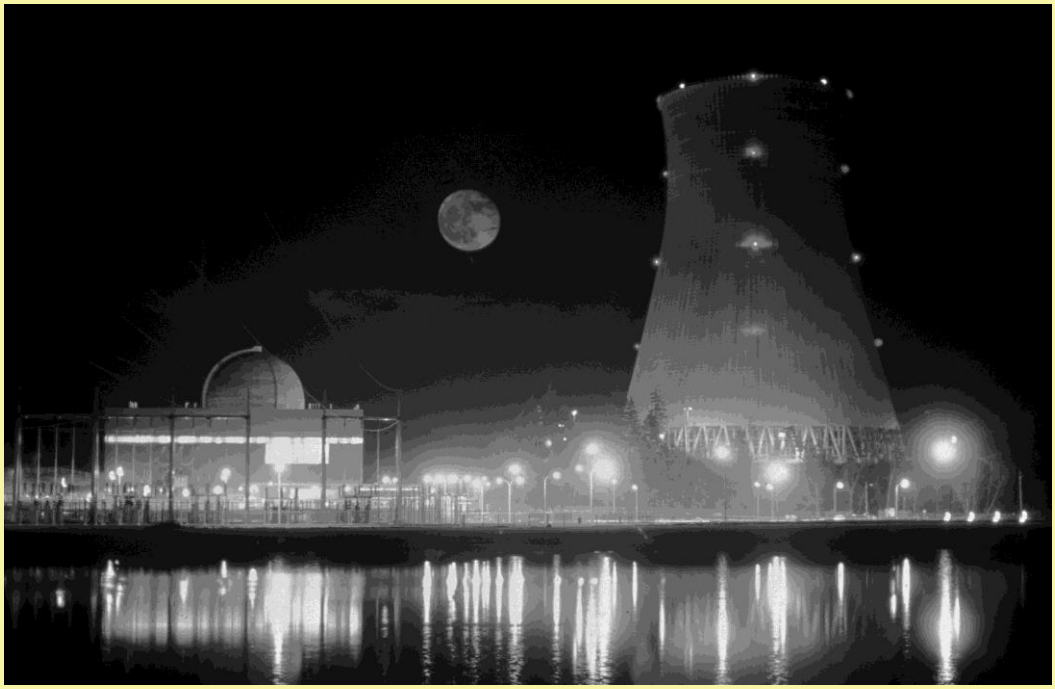
Portland General Electric



Trojan: The lasting legacy of PGE's atomic age

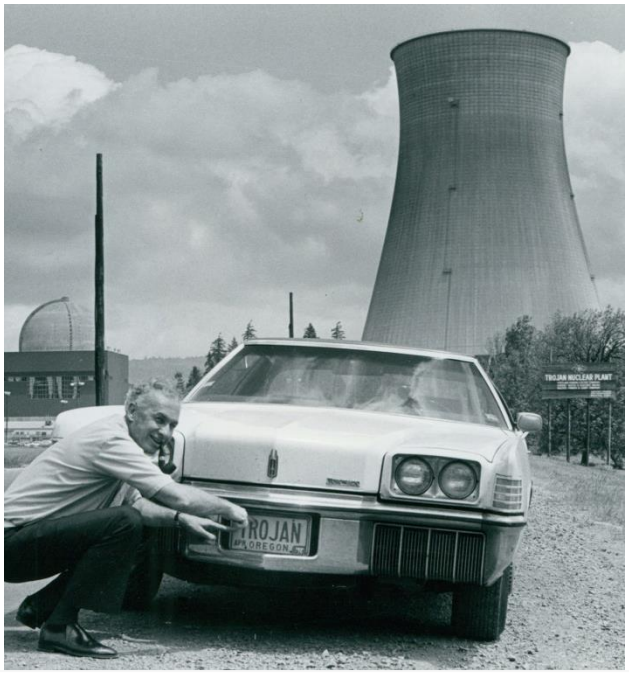
An Oregon kind of energy

A brief history

You may already know PGE holds the distinction of being the first in the nation to produce long-distance transmission of direct-current electricity. In 1889, we flipped a switch and sent a 14-mile transmission from Willamette Falls to downtown Portland that resulted in the lighting of 55 streetlamps.

But did you know the years between 1967 and 1993 marked PGE's atomic age — an era of optimism and growth at the company, fueled and dominated by the powerful Trojan Nuclear Plant.

For those who have not been with the company long, it may be hard to imagine a generating facility that once bustled with 1,200 employees and many contractors (especially during outages) , for a period of about 16 years, generated enough to power a quarter of PGE's electricity — a net generating capacity of 1,130 MW (about two times the generating capacity of Boardman).



In July 1975 Trojan Plant Superintendent Chuck Goodwin affixes a "TROJAN" license plate to his car. The special plates had belonged to former St. Helens District Manager Kevin Cadigan, who presented the plates after taking a position in Portland.

"By all rational standards, Trojan is a sound investment and a technological success," boasted Chairman and CEO Frank Warren in PGE's 1977 annual report, following the plant's completion. "It is expected to be an extremely valuable asset to our customers for many years to come."

Trojan served as a point of pride for the company but over time became a magnet for criticism during its years of commercial operation.

"The days when the plant was in full operation was a different time. Trojan was a huge part of PGE's generation resources, and we all understood the urgency of pulling together and solving any problems when they came up and keeping the plant operating," says Jay Fischer, former manager, Independent Spent Fuel Storage

Installation. Fischer has been with the company more than 35 years — with all of that time associated with Trojan.

"There was a strong team spirit among Trojan employees," he adds. "The people who worked here did their work in a very competent and professional manner, whether it was keeping the plant running when it was operating, or determining the safest, most cost-effective way to decommission the plant after it was commercially shut down."

For many years, visitors to the Trojan Visitor Center were greeted by tour guides in brightly colored uniforms.

In 1967 PGE announced plans to build the plant just south of Rainier in Columbia County on a 634-acre site that had been owned previously by the Trojan Powder Company. Trojan successfully began commercial operation about nine years later — on May 20, 1976. Construction took nearly five years — from the February 1971 groundbreaking to the Dec. 23, 1975, test operation at the plant.

Originally projected to cost about $169 million, the completed construction costs were closer to $460 million. During its operation, no fewer than five initiatives were placed on the Oregon ballot by anti-nuclear groups in attempts to shut down the plant. In the end, it wasn't controversy that closed the plant at all. It was simple economics. The least cost planning process completed in 1992 recommended a six-year phase out of Trojan. Before that plan was finalized, a Nov. 9, 1992 steam generator tube leak occurred resulting in a shutdown of the plant. During that shutdown, PGE decided to accelerate the closure for a variety of reasons, including significant repair costs. On Jan. 4, 1993, PGE became the first utility in the nation to voluntarily shut down a nuclear plant for economic reasons.

"I know a lot of people were disappointed by the decision at the time, but from a customer perspective and a cost perspective, it was the right decision to make," said Jim Piro, retired PGE president and CEO, who joined the company in 1980 as an engineer at Trojan. "I believe Trojan left a lasting legacy that's still paying off today — all the great people who worked there who continued their careers at PGE and brought their dedication, expertise and innovations to other parts of the company."

> **"The people who worked here did their work in a very competent and professional manner, whether it was keeping the plant running when it was operating, or determining the safest, most cost-effective way to decommission the plant after it was commercially shut down."**
>
> – Jay Fischer
> Retired ISFSI manager

"They really were a great group of people at Trojan," said Eric Jespersen, supervisor, Faraday, who worked six years at Trojan as an electrician. "A lot of people that had been in the nuclear Navy came to work at Trojan and that was a smart bunch of people. If you look around, you still see a lot of them here today. I enjoyed working at Trojan and learned a lot there. You saw something new and interesting every day."

Barb Pohl, planner scheduler for T&D Planning and Project Management, worked nearly 13 years at the plant in word processing and radiation protection and chemistry, and to this day, she continues to lead annual volunteer projects at Trojan Park.

"We worked together so many hours — often six days a week — it really felt like a family," she said. "We spent a lot of time together, both at work and socially. We had a lot of activities, picnics, Easter egg hunts, softball games, a big Christmas party every year."

"Oh man, I had a lot of respect for a lot of the operations staff there. I was surprised by the decision to close it," recalls Vern Abell, shift supervisor, Beaver Plant, who worked at Trojan as a shift supervisor for just about a year before the closure announcement came. Abell left the company but returned four years later. "I met a lot of people there and many of them still work downtown or at other parts of the company."

The years following the closure were challenging. PGE worked hard to moderate the effects of the shutdown not only for employees, but also for the surrounding communities. A small, dedicated staff remains at Trojan to support and safeguard the dry cask storage facility, which stores the spent nuclear fuel in preparation for its eventual move to a federal repository. The radiological decommissioning of the plant was completed in 2004 employing a number of innovative new practices that have since become standard in the industry.

The Trojan cooling tower was imploded on May 21, 2006. Because the tower was visible from I-5, PGE closely coordinated with ODOT and the Highway Patrol to conduct a rolling slowdown of traffic prior to the implosion, so drivers who were unaware of the planned explosion were not alarmed, causing an accident.

Many employees who worked at Trojan were on hand in 2006 when the most visible symbol of Trojan — the 499-foot-tall cooling tower — was imploded. The reactor containment building was removed shortly after. Most of the buildings at the site have been removed or are in the process of removal – the Training Building and Trojan North Building are in the process of being removed this year – both will be restored to green fields by year's end. Thousands of visitors each year continue to enjoy visits to the Trojan Park day camp.

The true legacy of Trojan continues to live on, though, in the people who worked there, their innovative spirit, and the many contributions they made to PGE and our industry in the years that followed.

"I learned perseverance at Trojan," Jespersen said. "It was not always easy to get a job done at Trojan. There were a lot of regulations required and many roadblocks. We learned that if you persevered you can get through any obstacles that come your way."

"I think my time at Trojan helped me to be a more well-rounded employee," Pohl said. "We were isolated from the rest of the company and didn't have all the support you got when you worked downtown, so we had to learn systems inside and out. It's helped me even today. For some, change is hard. But I learned to not be afraid of new systems or some of the changes we've seen since that time."

Decommissioning completed

On May 23, 2005, the Nuclear Regulatory Commission terminated Trojan's license, signifying completion of radiological decommissioning, although it would be a number of years before other work on the 634-acre site was completed.

Today, most of the buildings on the site have been removed.

While the 2006 tower implosion was the most visible sign of the plant's decommissioning, a much more significant decommissioning event took place years earlier. In 1999, when Trojan's massive reactor vessel was enclosed in concrete foam, sheathed in blue shrink-wrapped plastic, and barged up the Columbia River to the Hanford Nuclear Reservation in Washington. There it was buried in a forty-five-foot deep pit and covered with six inches of gravel. It was the first commercial reactor to be moved and buried in one piece, the largest such device to be decommissioned.

In 1999, PGE transported the Trojan reactor vessel and its internal components to the Hanford Nuclear Reservation disposal facility. The 1,020-ton package was safely transported by a specially made barge pushed by two tugboats 270 miles up the Columbia River.

Trojan today

If you visited the Trojan site today, you would see very little evidence that the site once was home to Oregon's only nuclear-generating plant, with a net generating capacity of 1,130 megawatts — enough to power more than 900,000 homes.

The 75-acre Trojan Park, which was built alongside the original Trojan Nuclear Plant, still operates as part of the PGE Parks system. The day-use park has facilities for picnicking, hiking, biking and includes a stocked lake, multi-use trails and a sports field.

Also remaining at the site is the Trojan Independent Spent Fuel Storage Installation (ISFSI). Until a federal waste repository is built and the spent fuel can be moved to a permanent storage location, the Trojan storage facility will be operated by PGE and monitored by the Nuclear Regulatory Commission and the Oregon Department of Energy. The ISFSI storage pad is surrounded by a secured area, which is monitored and protected round the clock by PGE employees.

The Trojan Independent Spent Fuel Storage Installation (ISFSI).

The ISFSI is an above-ground, air-cooled dry cask storage system. It consists of 34 concrete casts containing steel inner cannisters designed to safely contain 790 fuel assemblies as well as fuel debris. The storage system is specifically designed to withstand foreseeable hazards, including a 9.0 subduction zone earthquake off the coast of the Pacific Northwest.

The Trojan ISFSI is one of many spent nuclear fuel storage facilities in the United States that have been issued licenses by the Nuclear Regulatory Commission.

1979: The conversation changes after Three Mile Island

Two 1979 events dramatically changed the national conversation about nuclear power. The first took place on March 28, 1979, when the Three Mile Island Generating Station near Harrisburg, Penn., experienced the worst nuclear accident in U.S. history. Extensive new standards and changes in operations were soon mandated. These came to be known throughout the industry as "post TMI-modifications." In a 1991 article in "Trojan News," Jim Pickett, a former manager of training at Trojan, noted that pre-TMI "we had less than 100 employees, contrasted with more than 1,000 now."

In what was perhaps the most opportune timing for a Hollywood film release ever, the second event occurred just 12 days before the Three Mile Island accident, when the Jane Fonda and Michael Douglas film, "The China Syndrome," was released. During development of the film, Douglas and others from the film toured Trojan, which at the time was the only nuclear plant in the nation to offer tours that included a view of the control room. Much of the fictional Ventana Nuclear Plant featured in the film looked like Trojan, as the film company had modeled its sets upon what they had seen while touring Trojan.

A defining moment

In 1992, employees learned PGE planned to phase out Trojan by 1996. Five months later, on Jan. 4, 1993, the PGE Board of Directors agreed to a plan that dramatically accelerated the timeline and resulted in immediate closure.

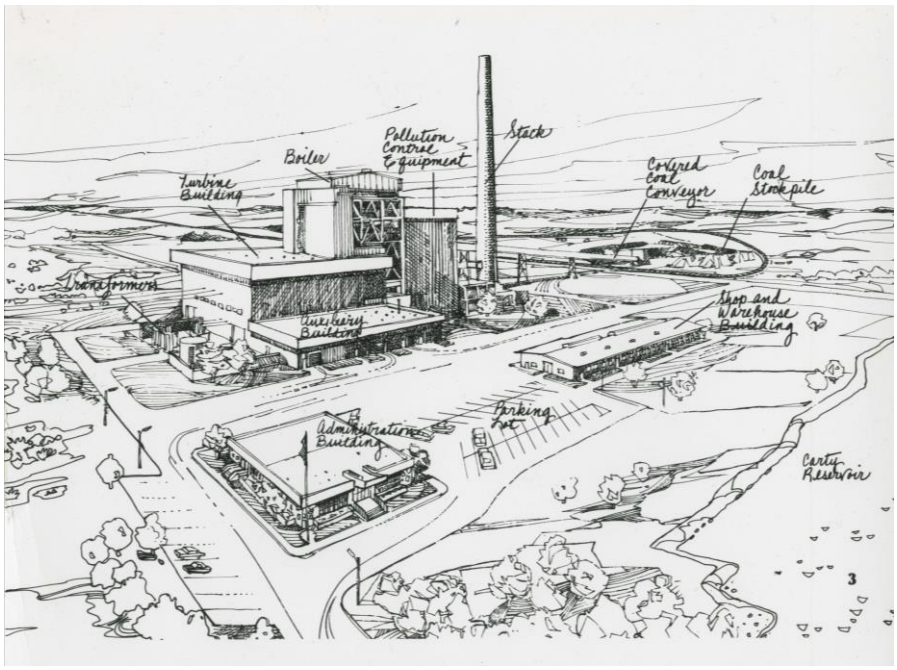
"While this is the right decision for Oregon, it is gut-wrenching because of the effect on our employees and their communities," wrote former Chairman and CEO Ken

Harrison in a special edition of NewsLine, issued on Jan. 14, 1993. "We want to do our best to help them make a successful transition to a future without Trojan."

PGE immediately established a comprehensive program to place Trojan employees in other parts of the company and support employees looking for work elsewhere — even those who left the company expressed appreciation for the support they received during the transition.

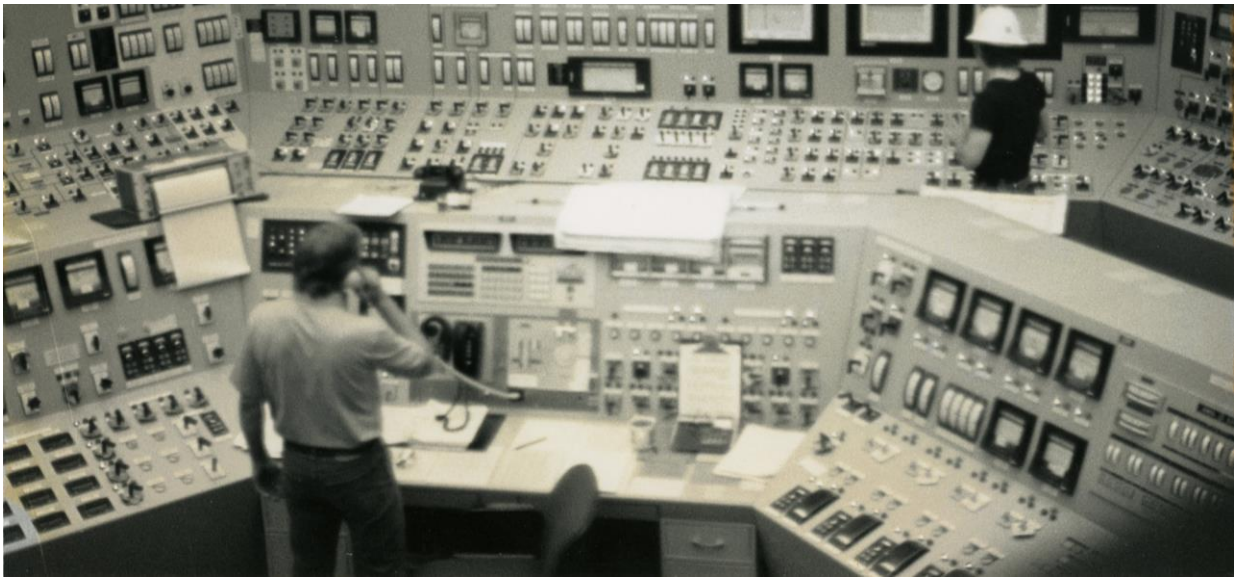
Did you know?

Trojan Nuclear Plant was envisioned as one of a series of nuclear plants designed to reduce the Pacific Northwest's reliance on hydro power and solve the region's future energy needs. During Trojan construction, PGE explored a number of additional nuclear projects. The most notable of these was the Pebble Springs Nuclear Project, which PGE sponsored and was to maintain 47 percent ownership of. Initially envisioned as a dual-reactor project to be built on the site where Boardman Plant stands today, the location was moved to a site near Arlington due to Boardman's proximity to the nearby government bombing range. After nine years of studying the project and trying to obtain all the necessary approvals, the project was scrapped in 1982 with PGE writing off its $134 million investment.



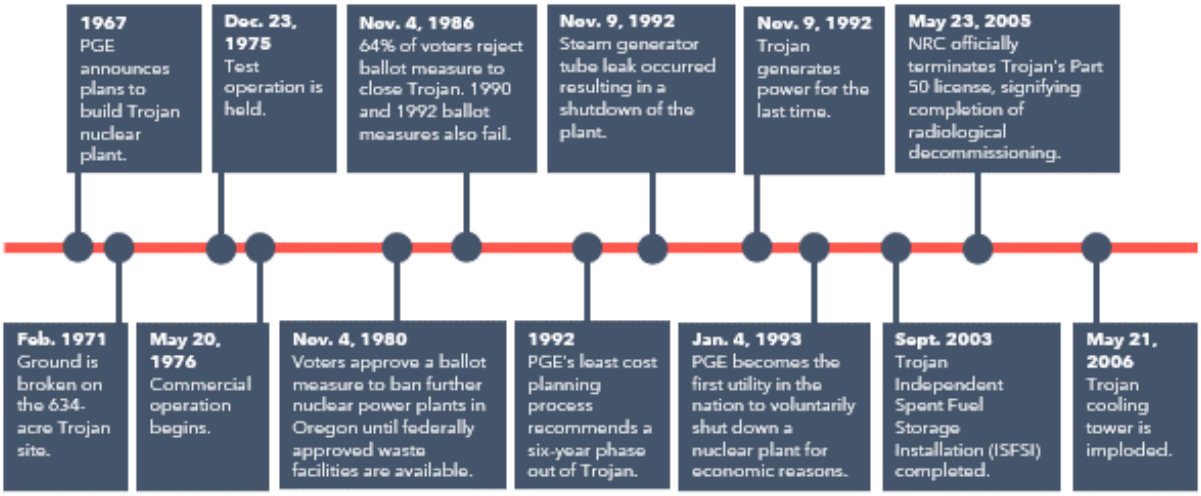
An artist's pre-construction rendering of the Trojan Nuclear Plant.

A piece of history



The Trojan story represents an important part of the history of our company and our region. While very little remains from the plant, PGE contributed the Trojan main control panel to the Oregon Historical Society, where it is occasionally put on display. In 2012, online voters named the control panel as one of OHS' 16 most significant "Treasures of the Vault." Other treasures include a fragment of the Willamette Meteor, the first issue of The Oregonian, Gov. Tom McCall's desk, and Meriwether Lewis' Branding Iron from the Lewis & Clark Expedition

Trojan time



To learn more, check out these informative resources:

- In 2008, PGE produced a 123-page retrospective on Trojan, from initial concept to decommissioning. Check out **26 Years: PGE's Trojan Nuclear Plant** publication.

- In 2006, PGE produced a 17-minute employee video commemorating the brief history of Trojan and shared it with employees to coincide with the historic May 21, 2006 implosion of the plant's cooling tower. Check out **Trojan: Making History.**

- In 1970, PGE produced a video to promote the construction of Oregon's first nuclear plant in the 13-minute **Trojan for Tomorrow.**

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