[BIRDS CHIRPING]

[SOLEMN MUSIC]

Deep underground in an immense cavern, chiseled out of solid granite, is an extraordinary powerhouse. Located 50 miles East of Fresno on the North Fork of the Kings River, it adds more than a million kilowatts of electric-generating capacity to the PG&E system. Inside are three massive reversible generators, capable of supplying enough electricity to serve a city the size of San Francisco.

All right, let's go take a look.

Helms was an enormous and complex engineering and construction job. At its heart is the powerhouse.

So we're going down to 6,225, and Wishon is 6,550. So we'll be about 225 below the elevation of that lake. So you're not only 1,000 feet--

Wow.

--inside the mountain. You're 200 feet below Wishon Reservoir. We are underwater, underground and underwater.

A chamber high as a 10-story building and long is a football field, carved out of solid granite, 1,000 feet underground.

Wow. That is incredible.

It was the early '70s. We were coming off an energy crisis. And here at PG&E, we're thinking, how do we address that? This powerhouse that was literally born from a mountain was what's going to help meet the needs of our customers.

[AUDIO PLAYBACK]

- In the High Sierra, a new season begins, and construction continues on a massive undertaking, the Helms Pumped Storage project. Helms will be a part of PG&E's diverse array of power-generating facilities that include hydroelectric, fossil fuel, geothermal, and nuclear.

[PLAYBACK ENDS]

There was a constant cloud of diesel smoke and rock dust in that plant. I've heard it described as the eighth engineering marvel of the world. How did they actually do that? How did they get that done?

[MUSIC PLAYING]

I also pulled out from here the original press kit for when we had the dedication ceremony.

When the plant is operating, 4 million gallons of water a minute passed through Helms' three units. That's enough to meet the average daily water requirements of the city of San Francisco every 21 minutes.

Yeah.

It's a little different today.

[LAUGHTER]

The idea that we can generate 1200 megawatts and then turn around and pull 900 megawatts off the grid, everything that this plant does for the stability of the grid. In the overall scheme of storage, it doesn't get any bigger than Helms, not for PG&E.

Basically, Helms is a conventional hydro facility, but it has a unique superpower that makes it stand out from other hydropower plants. It can reuse its own fuel.

Located between two existing reservoirs, helms can be brought online in a matter of minutes to help meet the peak demand of electricity during the day. Water from the higher reservoir drops over 1,700 feet to the powerhouse, spinning the turbines that drive the generators, which produce more than a million kilowatts of electricity, simply a remarkable piece of engineering.

That's where the water comes in, right there. That's the end of the penstock.

Behind that door is where the turbine is. We call it the submarine door. You open that door up and you look up, you would see the turbine.

Water's coming in there, going through that valve, going around the spiral case through our turbine and out to Wishon. And it produces a mechanical energy for us to make power. When we're pumping, it's the opposite flow, and we're actually pushing water back up that pipe up the mountain. All right, let's go up and look at the turbine.

They call it some of the hardest working water in the world.

Call it a battery. We're pumping in the daytime for grid stability so all of that other energy out of the solar fields can be utilized efficiently on our grid. There are times where this plant has to be available and running to maintain the West Coast. As far as grid stability, that's how important the plant has become. Water, turn it off. Turn it on.

So this is the turbine pit. It's like a snail shell. It starts out big, and it runs around. And it's reducing, and it comes to a terminus right back where it started. It's smaller.

So it starts big. It ends up small. And that's putting pressurized water all the way around the turbine ready to go. That water is controlled by our wicket gates. All of those gates open in unison and let that high pressure water, that 850 pounds, loose on the turbine and spin that shaft.

It's incredible to just know how smooth of an operation this is.

Yes This is not new technology. It's large technology, but it's not new.

[MUSIC PLAYING]

This place has no soul. It don't care. That machine down in that cavern, it does not care. It comes down to the people that make it happen and truly produce the power with what they're given to work with. It's our job to make sure they're giving the best that we can to make that happen.

If those trucks don't run, then those guys don't go to work. And if those guys don't go to work, well, then other problems happen. If I'm doing my job right, yeah, it's essential.

Even if you tell somebody this is what it's like, they don't understand. It's a lot of work, but you just roll with the flow.

There's just a challenge to the work here. That's the great thing about being here. You can never be bored.

From the top of that, all the way down to the bottom of that turbine, is 71 feet of rotating mass that's spinning, rotating at 360 revolutions a minute.

That's unbelievable, and there's three of them.

I do a lot of tours because I want to share the plant. Outside people, I consistently get the comment, I had no idea. I had no idea that's what it took to make that light switch over there work.

You're still awestruck every time you go in there. You have to stop for a minute and look around and go, oh my gosh, I can't believe they built this.

They walk around, and they see the machines. And they see the pure scale of what we're doing here. Eyes are open big and looking around. It's like, wow. The vision was correct.

With such a humongous feat of literally carving through mountains, I think, ultimately, at the end of the day, all anybody wanted to do was to make this a reality.

[MUSIC PLAYING]

They started construction in '77, went on line in 1984, and just an amazing feat.

We have our reservoirs that were built, but it takes the human genius, it takes the human vision to make those engineering dreams come true.

That's the end of the power tunnel.

Unbelievable.

That turbine is rotating at 360 revolutions a minute.

And there's three of them.

Yep. Amazing amount of energy.

When things are happening down in the Valley, We are relied on heavily to keep the grid stable.

We're making the progress that we need to make this plant run for another 40 years. That's what we've been asked to do.