

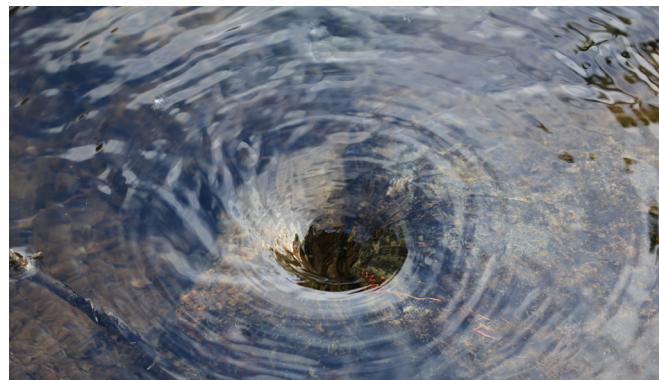


The chimney is the last standing remnant of a house that used to rest on the shore of Lake Peigneur.

Engineering Oops: The Maelstrom of Lake Peigneur

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Lake Peigneur is a small saltwater lake near the Vermilion Bay in south Louisiana. The lake has a maximum depth of 200 feet and is the deepest lake in Louisiana. This size is amazing considering 40 years ago it was a 10-foot-deep freshwater lake. A minor drilling accident caused the entire contents of the lake, 13 barges, a fishing boat, some trees, a house, and half of an island to be consumed in a massive whirlpool. This event dramatically altered the geography and ecosystem of the lake and is an example of how a minor miscalculation can lead to a cataclysmic event.



When the mine collapsed, a large whirlpool was created that sucked up barges, trees, a house, and half of an island.

The lake was a popular destination for fishing and other outdoor recreational activities and was home to the locally famous Live Oaks Gardens. Additionally, the area was famous for its massive salt deposits. The Diamond Crystal Salt

Company started mining in the area in 1919. Part of the large salt mine was directly under Lake Peigneur. The salt deposit was formed from pressure created by the upper layer of stone. This displacement of salt also created large pockets of space, which can often trap oil. As a result, an oil rig contracted by Texaco was simultaneously doing exploratory drilling in the lake.

On the morning of November 20, 1980, the crew of the infamous oil rig ran into a small problem: Their large 14-inch drill bit became stuck. They soon realized that the bit was trapped in crystal salt. The crew was expecting to hit salt, but not for another hundred feet. When they attempted to free the bit, they heard popping noises and the rig started to tilt. At this point, the crew abandoned the rig and headed for the shore. Shortly after abandoning the rig, the crew watched as the 150-foot oil rig disappeared into the 10-foot-deep lake. Soon, in place of the oil rig, was a maelstrom that was rapidly growing. Several barges were near the hole, these barges were quickly being sucked in by the torrent. Their motors were insufficient to overcome the current, so they had to be abandoned. A tug boat even tried to pull one barge free, unsuccessfully. A small motorized fishing boat was also trapped in the current, but the fisher was able to guide his boat to the edge of the shore closest to the whirlpool and jump out. Down below in the mine shaft, the miners noticed something was wrong when the mine started to fill with water. Luckily, they had a well-practiced evacuation procedure and were all escaped the mine without incident.

As the maelstrom grew, it began to cause the land nearby, including part of a nearby island, to slide into the lake. The water entered the mine with so much force it caused a geyser of compressed air, water, and salt to be launched 400 feet into the air out of the opening of the mine. This geyser continued to spew for several hours until the lake was completely drained. After the lake was emptied, the Delcambre Canal, a man-made river that leads from Lake Peigneur into the Vermillion Bay and, eventually, into the Gulf of Mexico, started to flow backward. This backflow temporarily created a 164-foot waterfall, the largest waterfall in Louisiana history. It is important to note that this is the only time in recorded history that the Gulf of Mexico flowed into the continental United States.

This backflow continued for three days, until the entire mine and lake were filled with water, except this time, the lake was filled with saltwater. The change from freshwater to saltwater was not caused by the salt mine but by the water from the Delcambre Canal, which came from the Gulf of Mexico. After it stopped, the maelstrom had consumed a drilling platform, a fishing boat, a tug boat, a house, 65 acres of land, and possibly hundreds of trees. A few days later, 11 of the 13 barges resurfaced mostly intact. The house was almost completely consumed. Only the chimney, which is still visible through the top of the lake to this day, was left. The locally famous botanical garden, Live Oaks Gardens, which was located on the nearby island, was completely decimated. Miraculously, through this whole event, no one was killed or severely injured. Texaco ended up paying \$45 million to the owners of the mine and other local businesses. The area around the lake became the Rip Van Winkle Garden, which is still open for business. Some of the upper shafts that were not under the lake weren't flooded, and the mine wasn't officially closed until 1984. After closure, the mine was bought by the State of Louisiana and is now used to store some of the state's natural gas reserves.

The question is how did an oil rig end up drilling into a salt mine? The answer is amazingly simple. Through testing, the drilling company knew that there was a possible oil pocket near one of the outer mine shafts. The oil rig's crew had planned to drill about 50 feet away from the mine shaft. This plan was approved by the Diamond Crystal Salt Company, and they were given detailed maps on where the shafts were located. Drilling only 50 feet away from a mine shaft that is hundreds of feet under the ground sounds like an impossible task, but it is a fairly easy job. With careful measurements, it should have been easily accomplished, and careful measurements were taken but with the wrong coordinate system! The map used a Universal Transverse Mercator, or UTM, coordinate system. This system estimates the world as an ellipsoid, and splits the world into 60 planes. The planes have a specific scaling and measurements from latitude and longitude. However, the engineer mistakenly thought the map used a Mercator Projection coordinate system. This system is similar to UTM, except instead of splitting the entire world

into 60 planes, the Mercator Projection coordinate system relies on a local zone projected onto the larger zone. This system uses a slightly different set of measurements and scaling, which is what caused the error. The ironic part of this ordeal is that the Mercator Projection coordinate system is more accurate within a small area than the UTM. The map maker was not wrong for using the UTM system; it is a valid method for almost every application. The fault lies entirely with the oil company's engineer, who should have confirmed his coordinate systems.

This event shows that even if the math is sound and the measurements are correct, a small mistake can lead to a catastrophic event. Even though Texaco paid for all damages and no one was killed, the land and the ecosystem are forever changed. What was a shallow freshwater lake is now deep and brackish. This forever changed the ecosystem of the area, changing the aquatic life naturally found in the lake and even the dynamic of the local wildlife. This lake will forever be scarred by the mistake of a simple case of confusing the coordinate systems.

Sources:

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