

# Tsunami threat a challenge for West Coast LNG project Exclusive

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By Rachel Adams-Heard

The first wave generated by a large earthquake off the West Coast could reach the proposed Jordan Cove LNG export terminal 25 minutes after the shaking stops.

The second wave would follow 30 minutes later, compounding on retreating water.

The third wave, smaller than the others, would arrive 47 minutes after the first.

The threat of a tsunami is not new to the West Coast. But building an LNG export terminal on the western shore of the contiguous United States is new, and those opposed to the Jordan Cove LNG export project are raising the threat of such a catastrophic event as the developers once again try to win federal approval for the contested \$10 billion (</web/client?auth=inherit#news/article?KeyProductLinkType=2&id=40578985>) project.

"It defies logic," wrote Martha Gregor of North Bend, Ore., in an April 9 letter to the Federal Energy Regulatory Commission. "No amount of 'packing' the soils will prevent total destruction by a tsunami."

Developers have said the project, sponsored by Alberta's Veresen Inc. (</web/client?auth=inherit#company/profile?KeyProductLinkType=2&id=4089109>), would be built to withstand the largest wave forecast for a massive earthquake measuring 9.0 on the Richter magnitude scale. The site would be elevated 30 feet or more using material dredged from the shipping berth. This would put the terminal above the tsunami inundation zone, according to Jordan Cove spokesman Michael Hinrichs.

But Jay Wilson, the volunteer chairman for the Oregon Seismic Safety Policy Advisory Commission, said it is difficult to prepare for an event that experts expect to wreak havoc on coastal infrastructure but on a timeline they cannot predict.

"For people to manage a problem that begins during an earthquake and then [multiplies when] a tsunami brings all this debris ... I question that," he said. "Is it reasonable to expect that you have staff there at all times that could manage something that may or may not happen over the next couple of decades?"

Geologists and seismic experts on the West Coast have warned that an earthquake and tsunami comparable to the one that devastated Japan in 2011

will hit the U.S. West Coast sometime in the next several decades, potentially affecting 700 miles of coastline up to 100 miles inland. Depending on where the earthquake hits, the wave could arrive on the shore as soon as five minutes after the shaking, Wilson said.



**A sign points to the tsunami evacuation route in nearby Charleston, Ore.**

*Source: Associated Press*

"There's no question that [Jordan Cove] is located in an area that has seismic and tsunami hazards," said Ian Madin, chief scientist for the Oregon Department of Geology and Mineral Industries. "That's the case with the entire Oregon coast."

The Oregon agency reviews infrastructure to assess potential hazards in events such as earthquakes or tsunamis, but because federal regulations pre-empt state and local rules for natural gas facilities, the agency's role in evaluating Jordan Cove has been strictly voluntary. Madin said it is difficult for the agency to take on full analysis of proposals outside its mandated responsibilities.



"We don't have the capacity to do that for free," he said.

In the Oregon agency's review of Jordan Cove's original proposal, 11 geologic faults were identified as "seismic sources" close enough to the project to affect it, according to FERC. The offshore Cascadia subduction zone is the source of the earthquake identified by FERC staff in a September 2015 environmental impact statement that could bring the first of a series of large waves to Jordan Cove in 25 minutes.

Yet despite the likelihood of a tsunami, the commission staff determined Jordan Cove would be elevated and protected enough that such an event would not pose a major threat. "We therefore conclude that the site-specific tsunami studies, coupled with Jordan Cove's mitigation measures, indicate that the site is not unsuitable because of tsunami hazards,"

staff wrote.

Following the tsunami in Japan, the Shin Minato LNG import terminal shut down for several months so the operator could address damage to piping, buildings, pipe supports and electric systems. However, no LNG was released as a result of the tsunami, and the tanks that store the liquid fuel were undamaged. FERC staff noted the performance of the Japanese terminal in the EIS for Jordan Cove.

The federal commission ultimately rejected (</web/client?auth=inherit#news/article?KeyProductLinkType=2&id=35744620>) Jordan Cove's original proposal in March 2016, saying there was not enough market need for a roughly 232-mile greenfield supply pipeline to justify the environmental and community impacts. The commission denied (</web/client?auth=inherit#news/article?KeyProductLinkType=2&id=38655676>) Jordan Cove's rehearing request in December 2016.

Now with a new application, Jordan Cove is hoping changes to its proposal and support from the White House will give the project the boost it needs. Among the changes, developers are no longer planning to include a power plant on the site, and the pipeline route has been modified in an effort to accommodate landowners' requests. (FERC docket PF17-4)

The proposed venture is still subject to local resistance from residents who say they will be left out of the potential benefits and left vulnerable to impacts.

Christi Tezak, managing director at the energy research firm ClearView Energy Partners LLC, described the project's troubles with the community. "Canadian gas on a greenfield pipeline to export markets? What's not to love?" Tezak said. "You have no local players, and I think that's the problem."

Voters in Coos County, Ore., will decide May 16 whether to pass a measure (/web/client?auth=inherit#news/article?KeyProductLinkType=2&id=40598451) that would ban the transportation of natural gas through the county except for local use. Jordan Cove has spent roughly \$360,000 to shut down the measure.

Only one LNG export terminal is operating in the Lower 48: Cheniere Energy Inc. (/web/client?auth=inherit#company/profile?KeyProductLinkType=2&id=4100855)'s Sabine Pass in Louisiana. Dominion Energy Inc. (/web/client?auth=inherit#company/profile?KeyProductLinkType=2&id=4226114)'s Cove Point export terminal is nearing completion at an existing import facility in Maryland. Almost all of the remaining U.S. LNG export projects are under construction or proposed along the Gulf Coast, where communities are familiar with large energy infrastructure projects and where the tsunami risk is much lower.

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