

Tremors, gases will be best proof of NK nuke test

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SEOUL, South Korea (AP) —

With North Korea appearing set to detonate an atomic device, the U.N. agency that detected two previous tests says it is prepared to confirm an explosion when it takes place. But experts say it might be difficult to establish whether the blast is nuclear in nature.

The best indication of a test will be seismic tremors and gases released into the air, phenomena that the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty identified from previous testing.

The Vienna-based organization's most potent detection tools are more than 150 seismic stations across the globe. Although very small in yield, North Korea's first test in 2006 was picked up by the CTBTO, as was a second test in 2009.

Last week, North Korea warned that it plans a third nuclear test to protest toughened international sanctions meant to punish it for firing a long-range rocket in December. The world sees the launch as a ballistic missile test banned by the U.N., while Pyongyang says it launched a satellite into orbit as part of a peaceful space development program.

The U.S., South Korea and their allies have pressed the North to scrap its nuclear test plans, saying it will only worsen the country's decades-old international isolation.

The threats have placed scientists and experts in South Korea on high alert as any test is likely to aggravate tensions on the Korean Peninsula.

South Korea's Defense Ministry said Tuesday it believes North Korea has nearly

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completed its nuclear test preparations, confirming satellite analysis last week by the U.S.-Korea Institute, a research group at the Johns Hopkins School of Advanced International Studies.

U.S. Secretary of State Hillary Rodham Clinton expressed concerns Tuesday about the series of actions the North Korean regime led by new leader Kim Jong Un has taken.

"Let me express my regret, because I think with a new young leader we all expected something different. We expected him to focus on improving the lives of the North Korean people, not just the elite, but everyone to have more education, more openness, more opportunity," she said in a town hall-style meeting in Washington. "And instead, he has engaged in very provocative rhetoric and behavior.

Its satellite images of the Punggye-ri site — where the previous two tests were conducted — show that the North Koreans may have been sealing a tunnel into a mountain where a nuclear device would be detonated.

In the event of such an underground nuclear test, both the CTBTO facilities and earthquake monitoring stations in South Korea can detect seismic tremors.

But although this is a strong indication of a test, it is not an absolute confirmation.

An earthquake expert at the state-run Korea Meteorological Administration said his office aims to find out the magnitude of the tremor, the time it started and the exact location on the map within 10 minutes of the explosion. He spoke on condition of anonymity because he wasn't authorized to speak to the media.

Experts also note that artificial earthquakes, such as those created by nuclear explosions, rarely trigger the same wave patterns as natural quakes.

North Korea could still try to deceive and give the impression that it exploded a nuclear device by simply exploding sophisticated conventional weapons that would trigger the same seismic waves produced by a nuclear test, said Chi Heoncheol, an earthquake specialist at the government-funded Korea Institute of Geoscience and Mineral Resources.

By raising tensions this way, North Korea may hope to wrest concessions or aid in return for promises to scale back its unproven nuclear capability.

"Even if they bring truckloads of high-powered conventional explosives, put them (into an underground tunnel) and explode them, they will generate the same seismic wave and sound wave," Chi said. The only difference is no radioactivity would be detected from the explosion of conventional weapons, he said.

The best course for scientists would be to collect air samples to look for increased radiation but the process could take days. Even if the wind is favorable — and assuming North Korea conducts the test at Punggye-ri in the country's northeastern

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corner — it will take more than one day for airborne radioactive isotopes like xenon to reach South Korea, according to an official at the government-run Nuclear Safety and Security Commission.

The official, who requested anonymity citing the sensitive nature of the subject, acknowledged it may be impossible for South Korea to confirm a test if the wind doesn't blow southward or if North Korea plugs the underground tunnel so tightly that no radioactive gas escapes.

Both South Korea and the Vienna-based CTBTO confirmed increased radiation levels following the North's 2006 nuclear test but didn't find anything in 2009.

CTBTO spokeswoman Annika Thunborg says that generally speaking it is hard for those conducting nuclear tests to control the escape of noble gases, which is a clear indication of a nuclear test. With her organization's extensive air sampling network, it is less dependent on wind direction than the South Koreans in identifying such traces.

If North Korea decides to conduct a so-called subcritical test, there would be no release of radioactivity at all — but that may be beyond the North's expertise.

A sub-critical test only works on the properties of plutonium but stop short of creating a critical mass, the point at which a self-sustaining nuclear reaction occurs. Such an experiment requires a "very difficult technology" that only a few countries like the U.S., Russia and England have acquired, said nuclear expert Whang Joo-ho of Kyung Hee University.

"I believe North Korea's technology has not reached that level," Whang said.

North Korea said its upcoming atomic explosion will be a "high-level" test and many analysts said that refers to a device made from highly enriched uranium, which gives the country a second source for manufacturing bombs in addition to plutonium.

Whether North Korea detonates a uranium- or plutonium-based device, there won't be much difference in how easily scientists can detect the tests. The only difference is that they produce different radioactive gases, Whang said.

He also said a uranium-based test explosion would mean that North Korea's nuclear stockpile can continue to be enlarged at a time when there is no evidence of continued production of plutonium at its main Yongbyon nuclear complex.

North Korea watchers in South Korea are speculating various dates for a possible nuclear test, with some predicting it could happen as early as this week and others choosing days just before the Feb. 16 birthday of late North Korean leader Kim Jong Il.

There is no way to determine when North Korea will conduct a nuclear test, said analyst Shim BeomChul at the state-run Korea Institute for Defense Analyses in

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Seoul. U.S. spy satellites "can detect objects 15 centimeters (5.9 inches) in size on the ground but they cannot detect what's happening underground," he said.

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