By Scott DiSavino and Eileen O'Grady
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Analysis: After Japan, nuclear accident ratings reform sought

(Reuters) - The declaration that the Fukushima crisis ranks at the same level as the Chernobyl disaster on the international nuclear accident scale has some experts calling for radical reform of the system.

Before Fukushima, the 1986 Chernobyl disaster was the only event classified as a level 7 event on the scale. The blast at Chernobyl in Ukraine spread radioactive material over much of Europe, killing dozens in and around the plant and many more from cancer over time.

Japan's nuclear regulator, the Nuclear and Industrial Safety Agency (NISA), on Tuesday raised the severity of the Fukushima accident from a level 5 to a 7, based on the amount of radiation pouring out of the plant.

"Fukushima was not as bad as Chernobyl. If Fukushima is a level 7 accident, maybe we need to go back and recalibrate the scale and add a level 8 or 9," said Najmedin Meshkati, Professor of Civil and Environmental Engineering at the University of Southern California.

NISA itself has said the amount of radiation released was only about 10 percent of that from Chernobyl and no radiation-linked deaths have yet been reported. About 21 plant workers have had minor radiation sickness.

The International Nuclear Event Scale (INES) was designed in 1989 by the International Atomic Energy Agency and others after the Chernobyl disaster to help inform the public about the severity of a nuclear accident.

Its rankings are similar to the Richter or the moment magnitude scale for earthquakes. Each level on the INES scale represents a nuclear accident about ten times more severe than the previous level. The INES scale starts at Level 1 or 'Anomaly' and rises to a Level 7 or 'Major Accident'.

The inconsistency in comparing Fukushima and Chernobyl comes from the fact that "a 7 covers a wide magnitude of sins," said James Acton, an associate at the Carnegie Endowment for International Peace.

He said both events are categorized as a level 7 on the INES scale because the amount of radiation emitted had reached a defined threshold, not because the accident at Tokyo Electric Power Co's (TEPCO) stricken Fukushima plant was as serious as Chernobyl.

CONFUSING RANKINGS

There can be confusion as to the actual severity of an accident because there is no one authority to rank the event. Depending on the nation concerned, the job is left up to the company that owns the plant, the government agency that regulates the plant or a scientific body.

"Clearly (Fukushima) is not as bad as it can get and not as bad as Chernobyl," said Kenneth Barish, professor of physics at University of California at Riverside.
"Even if the amount of radiation released at Fukushima is of the same order of magnitude as Chernobyl...the effect on health appears to be far lower due to the differences in the event and response to the event," Barish said.

But Fukushima did involve three reactors and seven spent fuel pools, containing thousands of highly radioactive rods. Hydrogen explosions rocked the plant in the first week after an earthquake and tsunami crippled the reactors.

Chernobyl meanwhile involved only one reactor. In fact, the last unit at Chernobyl did not shut until 2000, 14 years after the accident.

"It has been obvious all along this was a 7 ... There are three reactors that are not being cooled and four fuel pools too. Chernobyl was only one core," said Arnie Gundersen, chief engineer at Fairewinds Associates and a 29-year veteran of the nuclear industry who worked on reactors similar to those at Fukushima.

SURPRISE UPGRADE

The experts said Japan could have done a better job of preparing its citizens and neighboring countries for the shock rise in the ranking.

"I think the Japanese government and TEPCO could have emphasized how little they knew about conditions at the reactors and spent fuel ponds when the crisis began," said IHS Energy Asia Pacific analyst Thomas Grieder.

"They could have stated that the crisis rating was based on what information they had available at the time -- with the caveat that this information was severely limited and it would take time to gather on radiation releases and there was a possibility the situation could be worse than they initially believed," Grieder said.

Bad as Fukushima is on the ranking system, experts warn that the plant is still not fully under control and a deterioration is still possible.

Another hydrogen explosion could severely damage the containment facilities, releasing large amounts of radiation, while the aftershocks that keep rocking the plant could lead to a complete core meltdown if the workers cannot keep the cooling water flowing.

"There is still hope of repairing or replacing damaged cooling systems at Fukushima rather than simply burying the entire site," Grieder said.

The damaged reactor at Chernobyl was in such a serious condition that it had to be buried in a concrete and steel sarcophagus. (Reporting by Scott DiSavino in New York and Eileen O'Grady in Houston, editing by Martin Howell)