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Adv

US nuclear plant operators estimate \$3.6 bil in post-Fukushima costs

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US nuclear power plant operators might have to spend nearly \$3.6 billion over the next three to five years on modifications to the Fukushima I accident in 2011, according to a Platts survey of companies.

An analyst said those costs may cut into profits at companies that sell their power in competitive electricity markets, and an industry utilities to rearrange other capital projects. The work is not expected to affect the length of outages, respondents said.

The cost estimate includes US Nuclear Regulatory Commission-ordered capital expenditure on new equipment to handle threats as the cost of conducting extensive engineering studies about each plant's resistance to such events.

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Companies also expect increases in operating and maintenance costs in connection with post-Fukushima requirements. While some are from work at one unit that has been permanently shut and from another under construction.

The responses show that modifications to containment venting systems for certain boiling water reactors, one of the two types that might account for a large portion of upgrade costs for those units, although how much exactly remains uncertain.

The 10 respondents to the survey operate about half the US' reactors and have a mix of boiling water reactors and pressurized

Companies responding to the survey gave cost estimates that averaged, using the middle of ranges, \$1.855 billion for those 53 reactors spent that amount, the total cost for post-Fukushima compliance would be \$3.57 billion.

In March 2012, almost exactly a year after the Fukushima I accident, NRC ordered all reactor operators to comply with new requirements to keep reactors and spent fuel cooled during severe external events such as the earthquake and tsunami that hit the station meltdown and release radioactivity.

The Nuclear Energy Institute, which represents nuclear operators and vendors, developed a plan dubbed FLEX, and eventually portable equipment deployed around the plants and in regional centers to help respond to such an emergency.

Additional orders from NRC in 2012 required improvements to instruments that measure water levels in spent fuel pools. A third 35 BWRs to upgrade containment venting systems.

Dimitri Nikas, a credit analyst with Standard & Poor's Ratings Services, said the spending could hurt the already thin profit margins expected to have an impact on credit ratings of regulated utilities.

The spending by regulated utilities, which are often allowed to obtain a rate of return on spending approved by state regulators, was an interview Tuesday.

"For the unregulated companies, it's a question of how much your profit margins can be squeezed," he said. S&P, like Platts, is

Regulated utilities are likely to gain approval to recover NRC-ordered post-Fukushima costs from ratepayers, said Rob Thorne, Association of Regulatory Utility Commissioners.

In almost all regulated states, upgrades mandated by regulators are subject to recovery from ratepayers with an allowed return varies from state to state, he said Tuesday.

"Our members are looking very carefully at this issue," he said.

WIDE RANGE OF ESTIMATES

Platts' survey of all US nuclear power plant operators revealed a wide range of estimates for the cost of complying with post-Fukushima upgrades. Of 53 units that provided an estimate, the total cost for compliance was between \$1.78 billion and \$1.93 billion, or \$1.855 billion per unit, with a midpoint of \$35 million.

David Lochbaum, director of the nuclear safety project of the Union of Concerned Scientists, said in an interview Monday that the industry faces specific issues, because the US fleet is not standardized. "It's not going to be the same fix for each plant," he said.

Older reactors might require more upgrades than newer ones, Lochbaum said. Half of the country's operational reactors entered service before 1980.

Duke Energy, which operates the US' largest regulated nuclear fleet, said it would spend \$600 million on post-Fukushima upgrades at the permanently closed Crystal River-3 unit in Florida.

By contrast, Exelon expects to spend \$400 million for upgrades to its fleet of 17 units, the largest in the country, over the next five years. It estimates post-Fukushima costs at \$30 million to \$60 million for its two units.

Arizona Public Service, which operates the 4,284-MW three-unit Palo Verde station, forecasts it will spend \$90 million on post-Fukushima upgrades.

Dominion, which has six operating reactors and the permanently shut Kewaunee, will spend \$30 million to \$40 million per operating unit. It estimates post-Fukushima costs at \$180 million to \$240 million.

Pacific Gas & Electric expects to spend between \$60 million and \$80 million at its 2,400-MW Diablo Canyon plant.

PPL will spend \$75 million on upgrades at its two units.

PSEG estimates costs of \$90 million or more for work at its three units. Tennessee Valley Authority said its six operating reactors will require post-Fukushima upgrades totaling \$225 million to \$250 million.

The Duke estimate, provided to financial analysts during a presentation in February, was a "very high level" forecast, company executives adding: "Fukushima costs across the industry cannot be easily compared and will differ based on multiple variables, such as plant age and regulatory requirements."

NO IMPACT ON OTHER UPGRADES EXPECTED

It is unclear whether the spending on post-Fukushima compliance could reduce spending on other capital improvements in either the near or long term.

Even before the Fukushima accident, several operators were already shelving plans for upgrades that would increase the output of existing reactors.

Low electricity and natural gas prices make such upgrades uneconomical in many unregulated power markets, Exelon President John Cravens said in his appearance at an NEI conference.

S&P's Nikas said that because most nuclear operating companies have heavy capital improvements spending every year, the impact of Fukushima might not be large enough in any given year to "crowd out" other spending, although some impact could be felt on discretionary maintenance or trimming of trees around transmission lines.

Most respondents said the post-Fukushima upgrades are unlikely to affect the length of refueling and maintenance outages, due to the need to be done. Dominion, Exelon, NPPD, PPL, and South Carolina Electric & Gas said they do not expect any impact on outage lengths.

Duke's Sipe said in an email May 17 that "conceptual engineering" shows much of the work could probably be done while units are operating.

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