

## **MAJOR RISKS FROM VOLCANIC ASH AT SENDAI NUCLEAR PLANT**

### **NRA AND KYUSHU ELECTRIC IGNORE IAEA AND U.S. NRC STANDARDS GREENPEACE REPORT REVEALS**

Kagoshima, 26 February 2015 — The Japan Nuclear Regulation Authority (NRA) has accepted flawed volcano risk analysis from the Kyushu Electric Power Company, resulting in major safety risks to the Sendai nuclear plant in Kagoshima, Greenpeace commissioned analysis has concluded. The analysis reveals that Kyushu Electric has underestimated the potential impacts of ash deposits on operations of the Sendai nuclear reactors following a major volcanic eruption. This could lead to loss of electrical power and cooling function for the reactors and a nuclear accident. The analysis, prepared by an independent nuclear engineering consultancy, details how the NRA has failed to adopt key recommendations from the International Atomic Energy Agency's (IAEA) safety guidelines on volcano risks. It also shows that safety standards at the Sendai plant are weaker than those applied by the U.S. Nuclear Regulatory Commission (NRC).

The NRA has accepted Kyushu Electric's flawed plans for managing ash fallout from nearby volcanoes and, in doing so, the plants are slowly moving towards restart after nearly four years of shutdown. The NRA is currently reviewing the construction plan for the Sendai reactors prior to restart, which could be as early as June 2015.

The Sendai plant is located about 50 km from the active volcanic field of Mt. Sakurajima, which is currently releasing ash on a daily basis. The past geologic record shows that this volcanic field had a major eruption in the recent geological past (about 12,800 years ago) and that there is a risk of it releasing upwards of 10 to more than 100 cubic kilometers of volcanic ash in case of a major eruption.

Safety risks arise from both management and assessment issues, as found in the Greenpeace commissioned report. For example, Kyushu Electric plans to replace ash blocked air filters for emergency diesel generators after 26.5 hours, whereas the U.S. NRC assessments for a nuclear plant in the Pacific Northwest anticipates replacing filters after 2.3 hours. The Greenpeace commissioned report also explains how 30 cm ash layers at the nuclear plant would exceed the building code for the spent fuel buildings with the risk of structural collapse.

“Four years after the start of the Fukushima Daiichi accident, the NRA is clearly not applying the highest safety standards in the world. The NRA has blindly accepted Kyushu Electric's flawed volcano analysis on nuclear risks and preventative accident measures. They need to suspend their current review process of the Sendai reactors and reject current plans as not credible to meet the real threats from volcanic eruptions. Failure to act in the interests of public safety is not acceptable,” said Shaun Burnie, senior nuclear campaigner with Greenpeace Germany.

Greenpeace commissioned London based Consulting Engineers Large & Associates to evaluate the publicly available submissions of Kyushu Electric to the NRA and the NRA's assessment of the utility's volcano measures under revised post-Fukushima guidelines. The Greenpeace report - *Implications of Tephra (Volcanic Ash) Fall-Out on*

*the Operational Safety of the Sendai Nuclear Power Plant* - details and evaluates the regulatory process for reviewing how the Sendai nuclear plant would operate and manage risks from volcanic ash deposits.

John Large, of the Consulting Engineers Large & Associates, expressed his concern about Kyushu Electric's preparedness for coping with volcanic ash fallout, noting that "the NRA's original draft volcanic effect guide required the nuclear plant operator to provide a risk-informed approach accounting for probabilities and 'off the cliff-edge' situations. This included that the Sendai plant needed to be physically modified against these extremes by setting up volcanic design-basis resilience. However, the final NRA guide dropped all of these requirements thereby permitting Kyushu Electric not to include these common sense safeguards against the inevitable—as a result, the final Sendai volcanic site evaluation is weak, departing considerably from the IAEA's volcano safety guidelines for nuclear plants."

Greenpeace has submitted its report to the NRA Chairman Shunichi Tanaka. It also submitted its analysis on NRA failure to adopt the IAEA volcano safety guidelines to the Kagoshima District Court to support citizens seeking a court injunction against restart of the Sendai reactors.

"120,000 Japanese people are still living as refugees because of the Fukushima Daiichi nuclear accident. The disaster robbed people of their hometowns and livelihoods. While it is impossible to prevent a large volcanic eruption from happening, nuclear accidents can be avoided. We demand that the restart of the Sendai plant will be discussed at the Kagoshima assembly once more", said Hisayo Takada, climate and energy campaigner at Greenpeace Japan.

### **Key conclusions of the Greenpeace commissioned report:**

- The NRA fails to adopt key recommendations of the 2012 IAEA volcano safety guidelines—including a requirement that the nuclear plant operator needs to modify the plant to make it able to withstand extreme volcanic events—the so called *design basis*;
- Kyushu Electric relies upon flawed historical analysis, underestimating the potential ash fallout that could reach the Sendai nuclear reactors and that could result in serious on-and off-site radiological consequences;
- Ash fall and deposition can lead to a common-mode failure, which in turn results in failure of safety equipment and functioning and other day-to-day operations across and beyond the power plant site—any one affect of ash fall may not, in itself and alone, be sufficient to bring the plant down, but when acting in combination and possibly chaotically, the plant's overall resilience may fail;
- Inevitably, in the aftermath of major volcanic eruption, the impact of ash fallout will include short-circuiting (flashover) of electricity distribution networks and switchgear, leading to loss of off-site electrical power (LOOP), for which the nuclear plant relies upon to cool both the reactors and the spent fuel in the storage ponds—this will place the two Sendai nuclear reactors and their spent

fuel ponds in much the same risk situation as the Fukushima Daiichi reactors following the earthquake and before the arrival of the tsunami;

- In this LOOP situation, the Sendai plant will be wholly dependent upon the emergency diesel generators, yet Kyushu Electric fails to adequately prepare for maintaining these generators in operation, especially in its plans for unblocking of the air filters (necessary for operation) —the utility plans to replace filters after 26.5 hours, whereas the U.S. NRC requires the replacing after 2.3 hours at the Columbia nuclear reactor. Combined with LOOP, and other impacts, the failure to replace the air filters would lead to Station Black Out (SBO) and loss of cooling function to the nuclear reactors and spent fuel pools, ;
- The NRA and Kyushu Electric fail to provide credible plans for how the deposited ash layer would be removed from key buildings, roofs and access routes, especially from the roofs of the buildings containing as much as 800 tons of highly radioactive nuclear spent fuel. Kyushu Electric acknowledges that the roofs of the spent fuel buildings have minimal reserve or safety margins against overloading by ash layers, resulting in a heightened risk of roof collapse.

1 - [http://www.greenpeace.org/japan/Global/japan/pdf/Volcano\\_Ash\\_report\\_by\\_John\\_Large.pdf](http://www.greenpeace.org/japan/Global/japan/pdf/Volcano_Ash_report_by_John_Large.pdf)

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