

## **Concerned Table View Resident Risk Assessment of Koeberg Nuclear Power Plant**

### **Executive Summary**

The Koeberg Nuclear Power Plant (NPP) is a pressurized water reactor (PWR) located in South Africa. It is the only nuclear power plant in Africa and is responsible for generating a significant portion of the country's electricity. However, the plant has been the subject of concern in recent years due to the discovery of cracks in its containment buildings and the increasing frequency and severity of extreme weather events in the region.

This risk assessment compares the current factors at Koeberg with the factors that caused the Fukushima and Chernobyl accidents. The goal of this comparison is to identify any potential risks to the safety of the Koeberg NPP and to make recommendations for mitigating those risks.

### **Detailed Analysis**

#### **Fukushima Daiichi Nuclear Power Plant Accident**

The Fukushima Daiichi Nuclear Power Plant (NPP) accident occurred on March 11, 2011, in the aftermath of a magnitude 9.0 earthquake and subsequent massive tsunami that struck the eastern coast of Japan. The earthquake triggered a power outage at the plant, which led to the failure of the emergency cooling systems for the reactors. As a result, the reactors overheated and experienced meltdowns, releasing radioactive material into the environment.

#### **Key Factors that contributed to the accident:**

**Design flaws:** The Fukushima NPP was designed to withstand earthquakes up to a magnitude of 8.5, but the actual earthquake was more powerful. The plant's emergency diesel generators were located in basements that were flooded by the tsunami, which prevented them from powering the backup cooling systems.

**Human error:** There were a number of human errors made in the response to the accident, including the decision to continue injecting water into the reactors even after it was clear that the cooling systems were not working and the failure to evacuate the plant in a timely manner.

**Lack of preparedness:** The plant was not adequately prepared for a large earthquake and tsunami, and its emergency plans were not effective.

#### **Comparison with Koeberg:**

**Design flaws:** Similar to Fukushima, Koeberg is located in a seismically active region and is designed to withstand earthquakes up to a magnitude of 7.5. However, the cracks in the Koeberg containment buildings raise concerns about its ability to withstand a more severe earthquake.

**Human error:** Similar to Fukushima, Koeberg has a history of project delivery problems, which has raised concerns about the plant's safety and reliability. These problems have included inadequate planning and budgeting, technical challenges, changes in requirements, and poor management. In the event of a nuclear accident, human error could play a significant role in exacerbating the situation.

**Lack of preparedness:** Koeberg also has a history of operating in violation of its safety permit, which raises concerns about the plant's commitment to safety. An incident at Koeberg could have a significant impact on the surrounding communities and environment.

### **Commonalities with Koeberg:**

**Lack of a strong safety culture:** Both Fukushima and Koeberg have experienced issues with their safety cultures. A strong safety culture is essential for ensuring that nuclear power plants operate safely.

### **Likelihood of an earthquake in this region is actually high.**

According to the South African National Earthquake Network (SANNET), there is a 64% probability of an earthquake occurring with a magnitude of Mw 8.0 or greater within the next 20 years in the western part of South Africa. This is because the region is located near the boundary between the African Plate and the South American Plate, two of the earth's major tectonic plates. These plates are constantly moving, and when they rub against each other, they can cause earthquakes.

In the event of such an earthquake at 8 and higher, the likelihood of a severe nuclear accident is really high, especially with regards to the current issues and challenges.

### **Concerns at Koeberg and the larger context of the current challenges.**

Given the concerns about the safety of the Koeberg NPP, the following recommendations are made:

Immediately repair the cracks in the containment buildings. This is the most urgent priority, as the cracks could pose an immediate risk of a serious accident.

Strengthen the safety culture at Eskom, the company that operates Koeberg. This includes creating a culture of safety that emphasizes the importance of safety in all aspects of plant operations and encouraging workers to report safety concerns without fear of reprisal.

Improve the response procedures at Koeberg. This includes updating and testing the plant's response procedures regularly to ensure that they are effective in responding to accidents.

Take steps to mitigate the risk of extreme weather events. This could include strengthening the plant's infrastructure, improving its emergency cooling system, and developing a plan for responding to extreme weather events.

Continue to monitor the plant closely and make adjustments to its safety measures as needed. The plant is aging, and its safety systems may need to be updated to reflect the latest technology and knowledge.

By taking these steps, the risk of a nuclear accident at the Koeberg NPP can be reduced.

They have to give us confidence that they truly have the local but also all South African's interests at heart.

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