



10 CFR 53 Discussion

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a TerraPower & GE-Hitachi technology

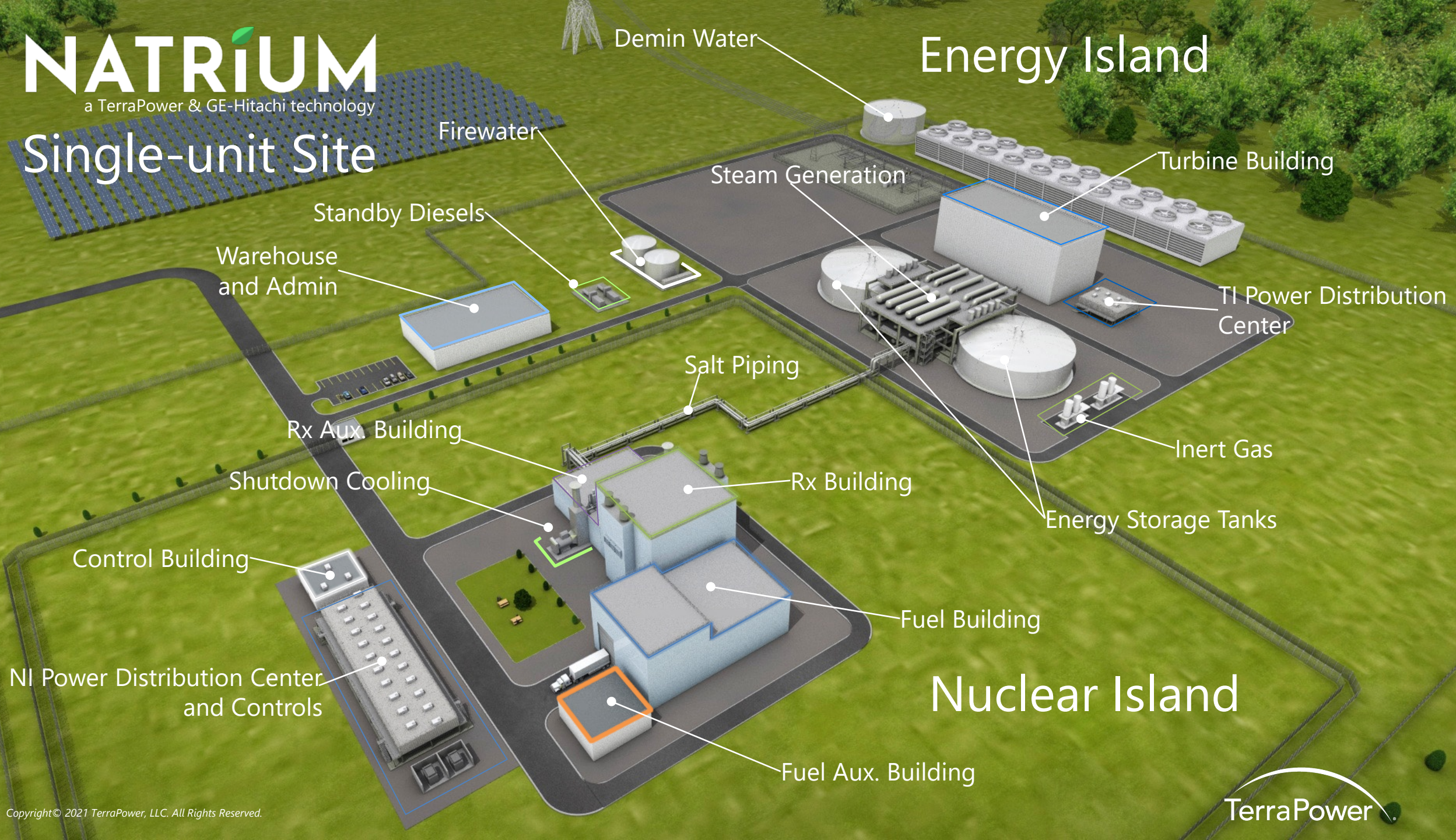
The World is Changing. How does the Nuclear Industry keep up while maintaining its strong nuclear culture?

- TerraPower is leading a multi-company team to develop the Natrium™ Advanced Reactor in cooperation with DOE.
- The first reactor will be built near the Naughton Coal Plant which is scheduled to be shutdown in 2025.
- The Natrium™ reactor has many inherently safe features that will benefit from a risk informed approach to licensing.
- We want to limit our Safety Related Equipment to what really is necessary, ensure that we address any possible events that could occur and focus on what really matters to protect public safety.

NATRIUM

a TerraPower & GE-Hitachi technology

Single-unit Site



Demin Water

Energy Island

Firewater

Standby Diesels

Warehouse
and Admin

Steam Generation

Turbine Building

TI Power Distribution
Center

Salt Piping

Rx Aux. Building

Shutdown Cooling

Rx Building

Inert Gas

Energy Storage Tanks

Control Building

NI Power Distribution Center
and Controls

Fuel Building

Nuclear Island

Fuel Aux. Building

TerraPower Licensing Plans

- We plan to license the Natrium™ reactor under 10 CFR 50, primarily due to the time limitations on the demonstration project.
- We hope to be able to implement some of the advantages of 10 CFR 53 in our operating license application
- We will be performing a complete Probabilistic Risk Assessment

General Impressions of 10 CFR 53

- The NRC has taken on a monumental task in response to the Nuclear Energy Innovation and Modernization Act put into place in January 2019.
 - TECHNOLOGY-INCLUSIVE REGULATORY FRAMEWORK—The term “technology-inclusive regulatory framework” means a regulatory framework developed using methods of evaluation that are flexible and practicable for application to a variety of reactor technologies, including, where appropriate, the use of risk-informed and performance-based techniques and other tools and methods

NRC is making good progress

- Generic Environmental Impact Statement
- Physical Security
- In-Service Inspections
- HFE is required where needed to support safety functions, versus being generically applied to a control room.
- Operator staffing is required to the extent necessary to support design-specific needs for safety function fulfilment, versus relying upon a prescribed number of reactor operators (RO) and senior reactor operators (SRO).
- The fundamental role of the licensed operator centers around the management and fulfilment of safety functions, in addition to the manipulation of facility controls.

Challenges It is tough to make everyone satisfied

- Need to see the complete picture to determine whether there is consistency between the subparts.
- For most reactors, other than maybe Micro-Reactors, development of a full scope PRA makes sense under the Risk-Informed application of Part 53. However, during the Construction permit stage, the PRA may not be full scope, and may not be peer reviewed against the ANS/ASME PRA standard. Peer review would be needed prior to operation, however.
- Use of QHOs makes sense when applying a full scope PRA. It may not make sense if a full scope PRA is not planned.

What would help Nuclear Plant Developers?

- 10 CFR 53 was intended to reduce or eliminate the need for exemptions.
- Due to the many potential applications that the NRC may see, we should expect exemptions and make that process easier – perhaps even the NRC could recommend exemptions.

Conclusions

- NRC has made tremendous progress in developing a technology inclusive risk informed approach to licensing.
- It may not meet all the needs for every type of reactor, but it provides tremendous flexibility over what is currently available today.
- I encourage the NRC to look closely at all the comments provided in the responses from USNIC and NEI.