

The Magnitude 9.1 Meltdown at Fukushima

Nickolas Means
@nmeans@ruby.social

SYM

SYM

<https://symops.com/>



<https://managingup.show/>

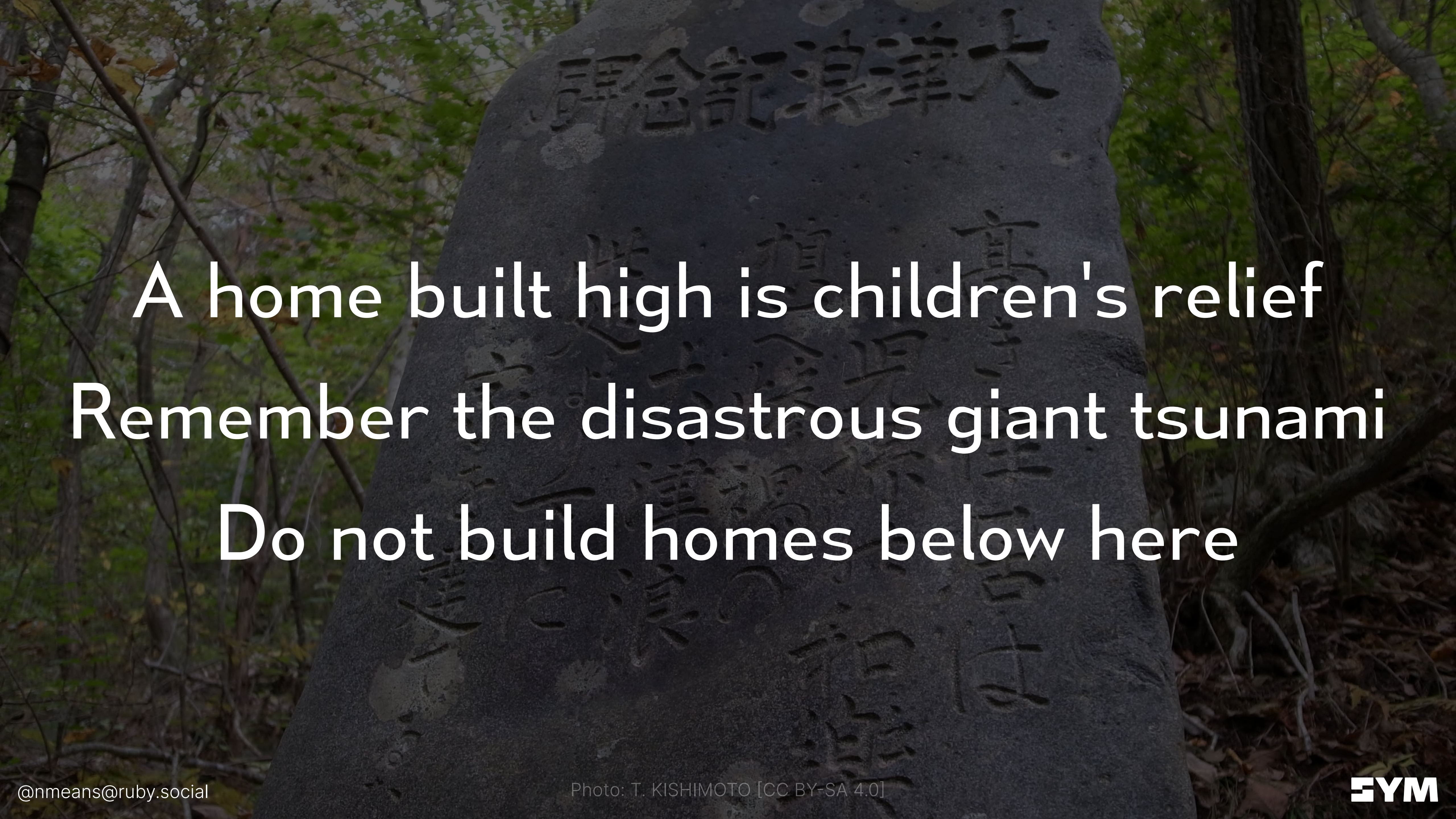
大津浪記念碑

寛政十一年

大津浪記念碑

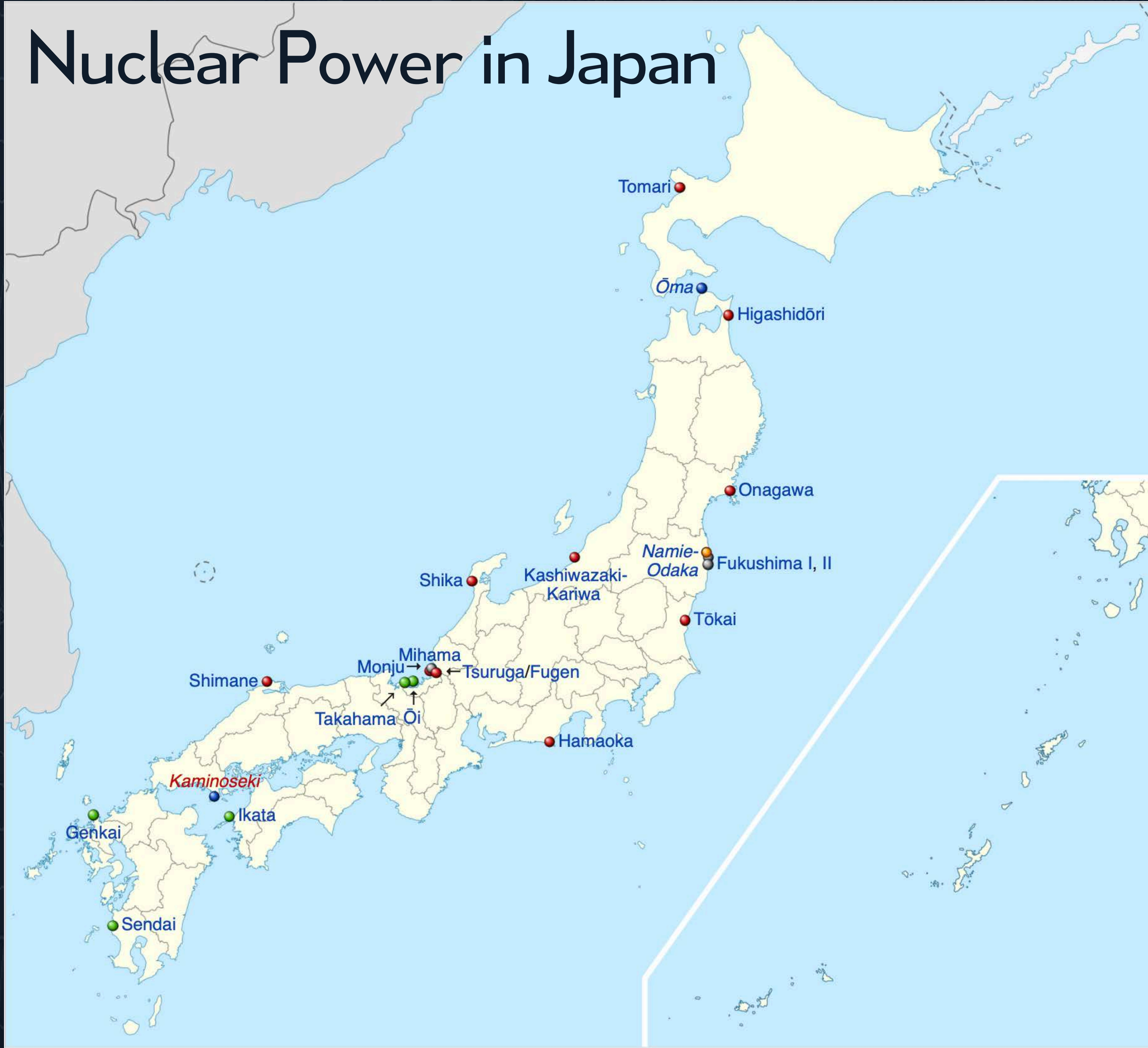
此石

（神代卷）



A home built high is children's relief
Remember the disastrous giant tsunami
Do not build homes below here

Nuclear Power in Japan



Example Nuclear Power Plant



Example Nuclear Power Plant



Didcot Power Station (Natural Gas)



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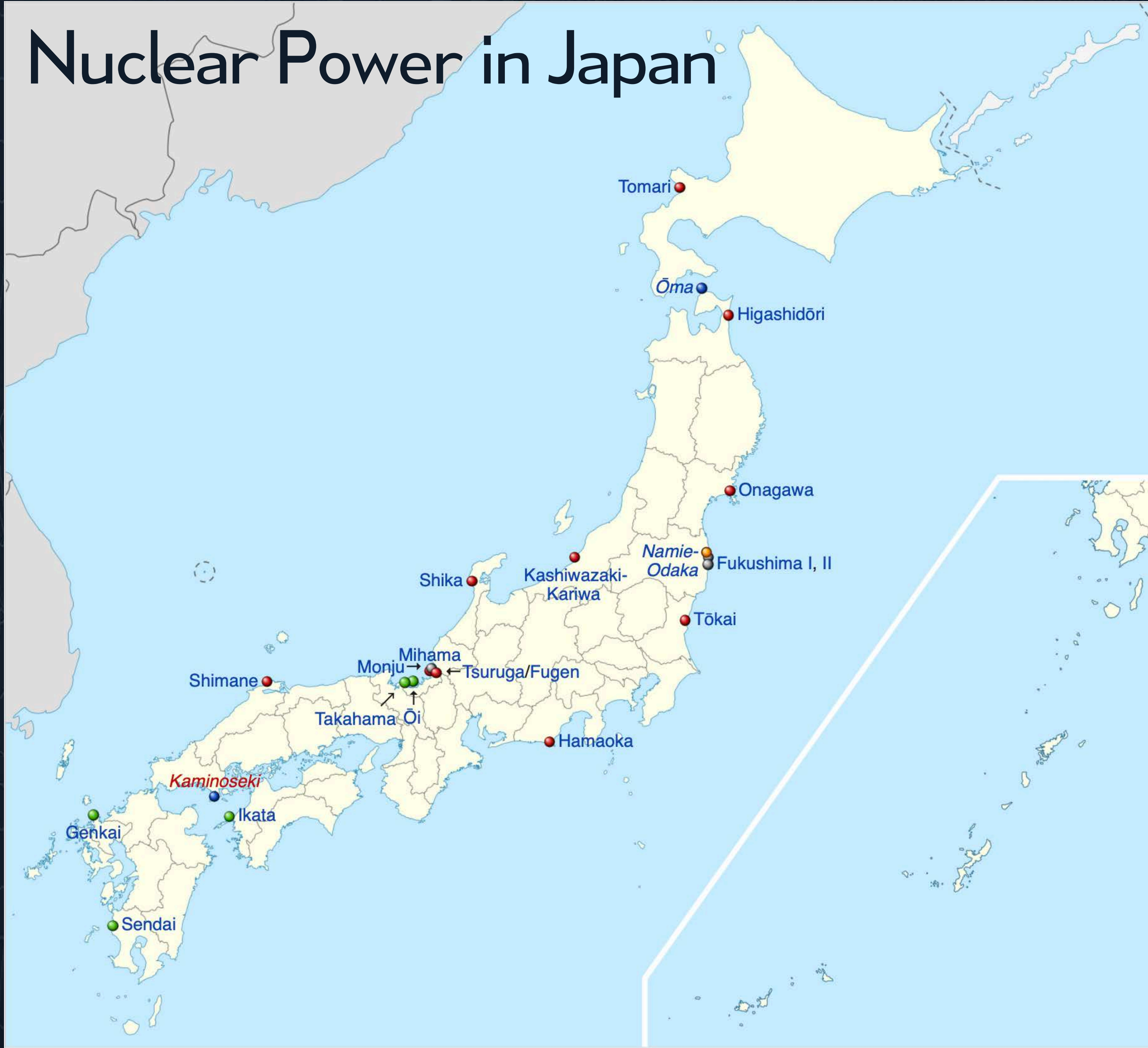
Photo: Dave Price [CC BY-SA 2.0]



Palo Verde Nuclear Generating Station



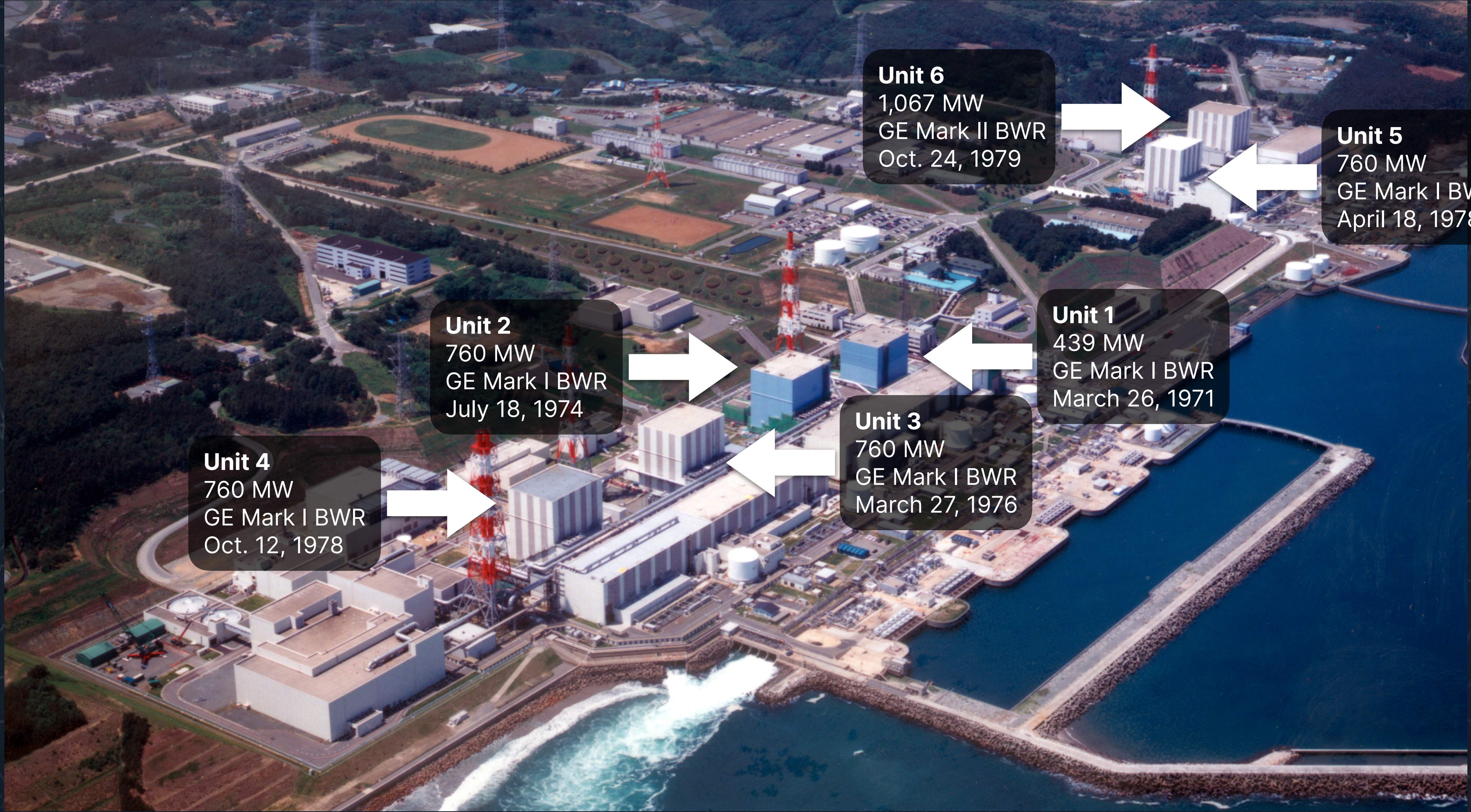
Nuclear Power in Japan



Fukushima Daiichi Nuclear Power Plant



Fukushima Daiichi Nuclear Power Plant



Unit 6
1,067 MW
GE Mark II BWR
Oct. 24, 1979

Unit 5
760 MW
GE Mark I BWR
April 18, 1978

Unit 1
439 MW
GE Mark I BWR
March 26, 1971

Unit 3
760 MW
GE Mark I BWR
March 27, 1976

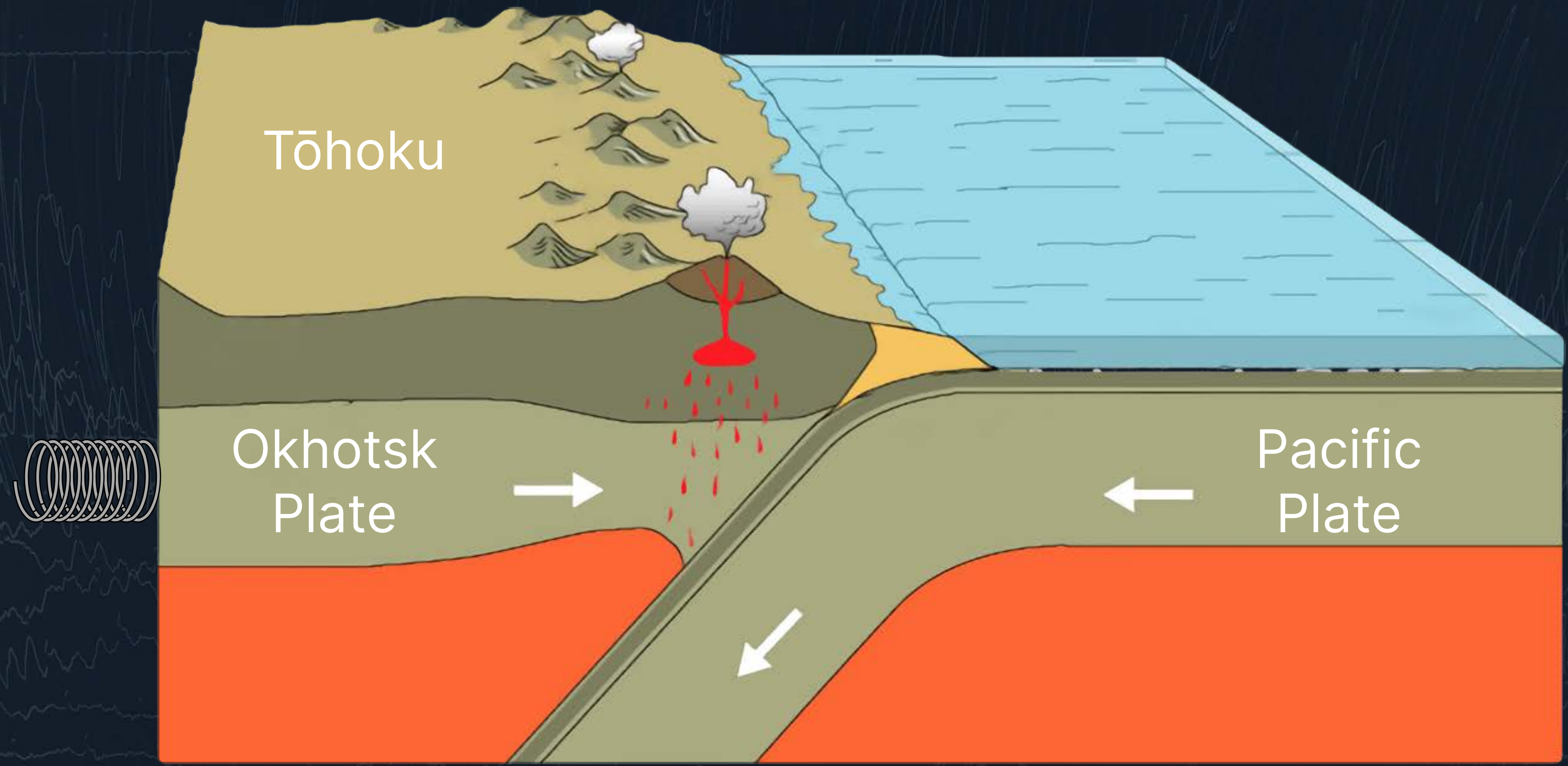
Unit 2
760 MW
GE Mark I BWR
July 18, 1974

Unit 4
760 MW
GE Mark I BWR
Oct. 12, 1978

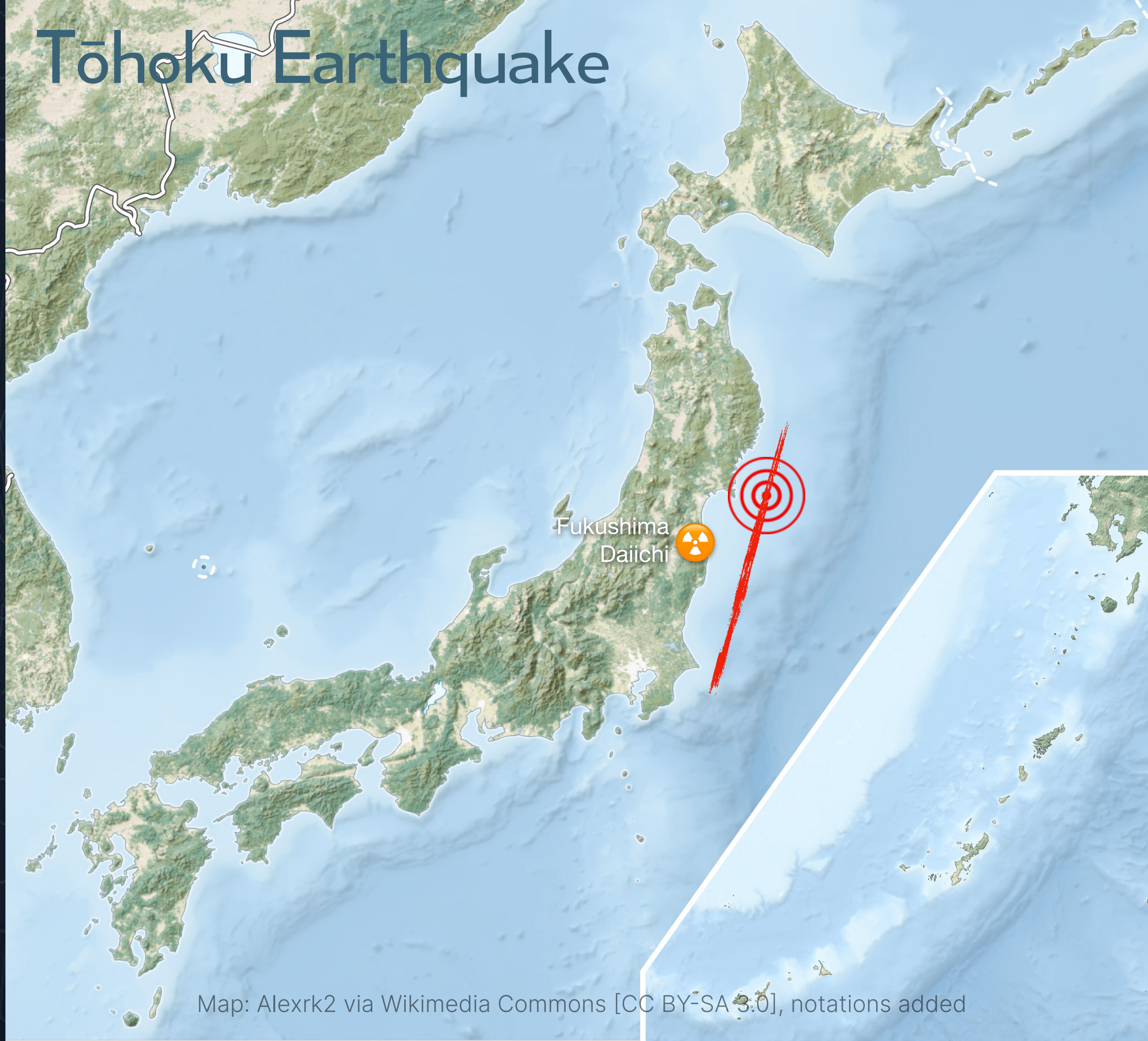
Fukushima Daiichi Nuclear Power Plant



Tōhoku Subduction Zone



Tōhoku Earthquake



Map: Alexrk2 via Wikimedia Commons [CC BY-SA 3.0], notations added



Masao Yoshida

Fukushima Daiichi Plant Director

Photo: ©KYODO [Fair Use]



Unit 1 and 2 Control Room



Boiling Water Reactor

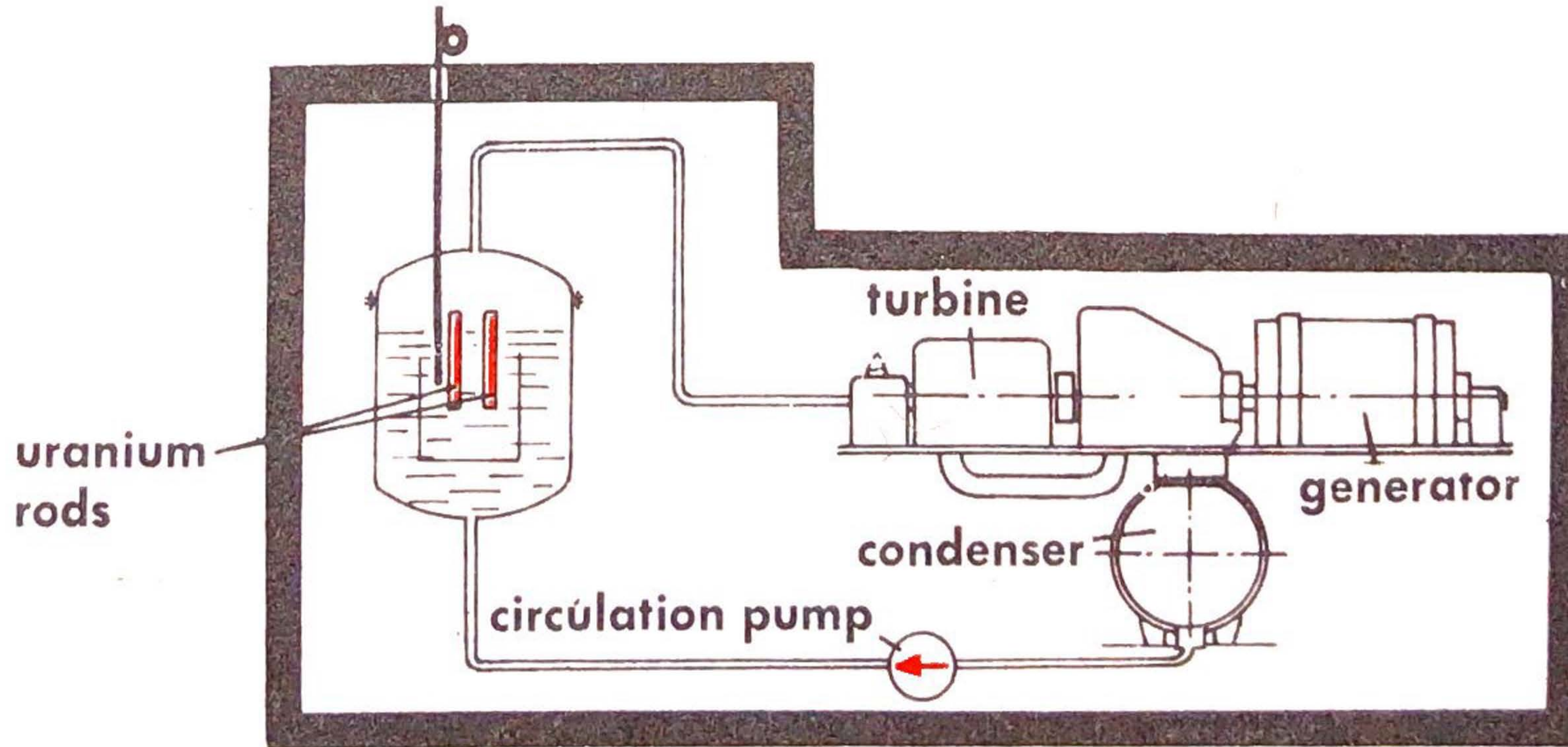


Fig. 4 BOILING WATER REACTOR
(schematic)

Boiling Water Reactor

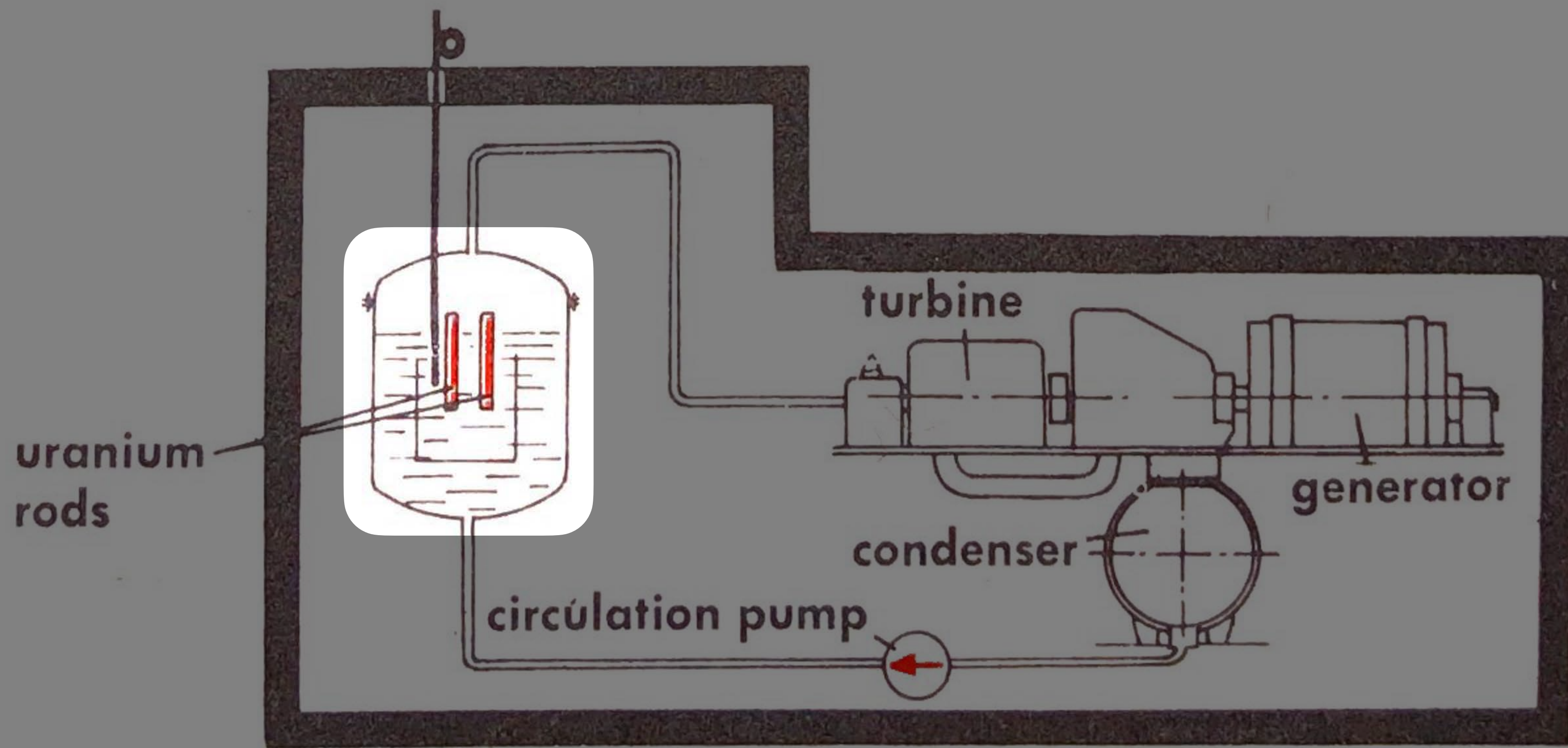


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Boiling Water Reactor

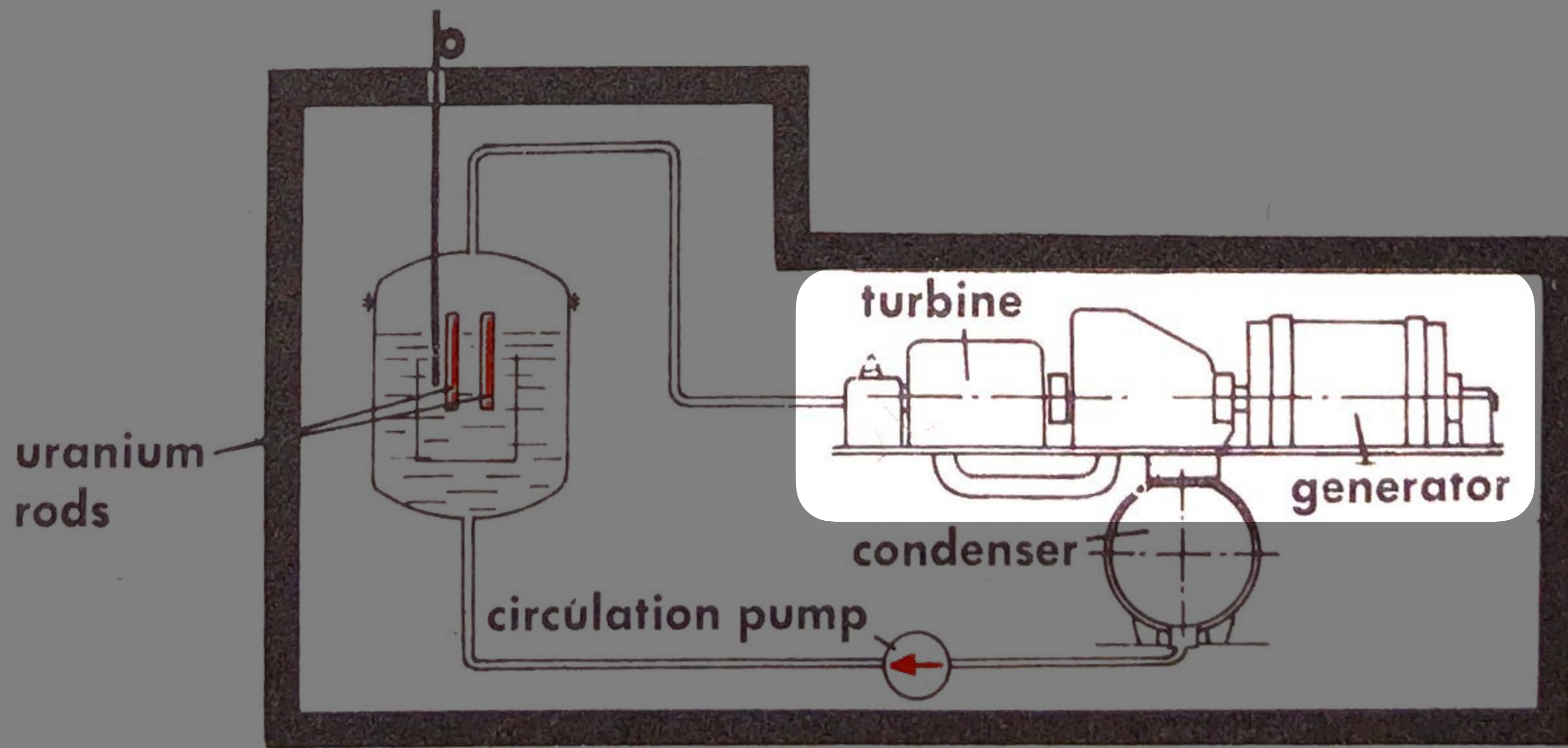


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Boiling Water Reactor

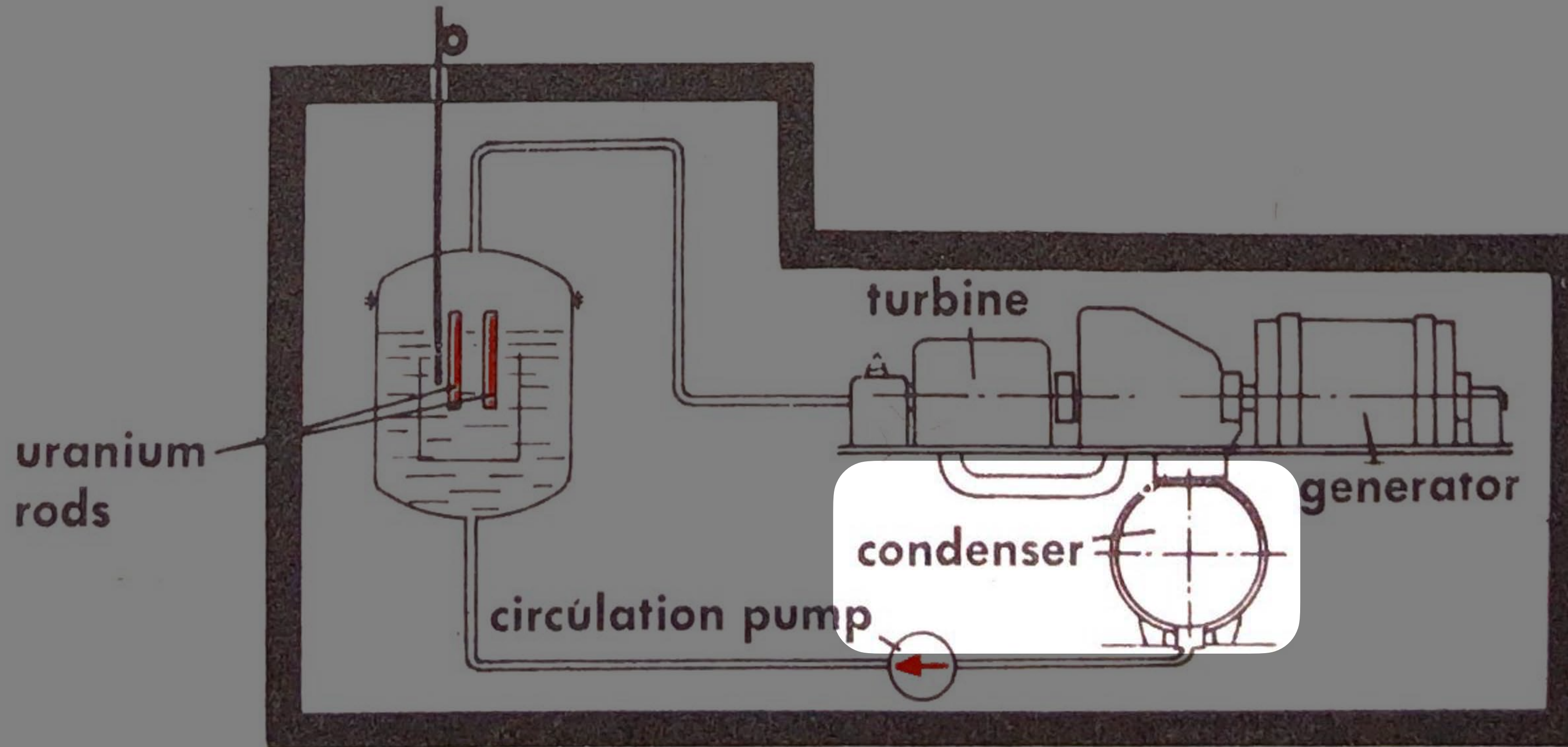


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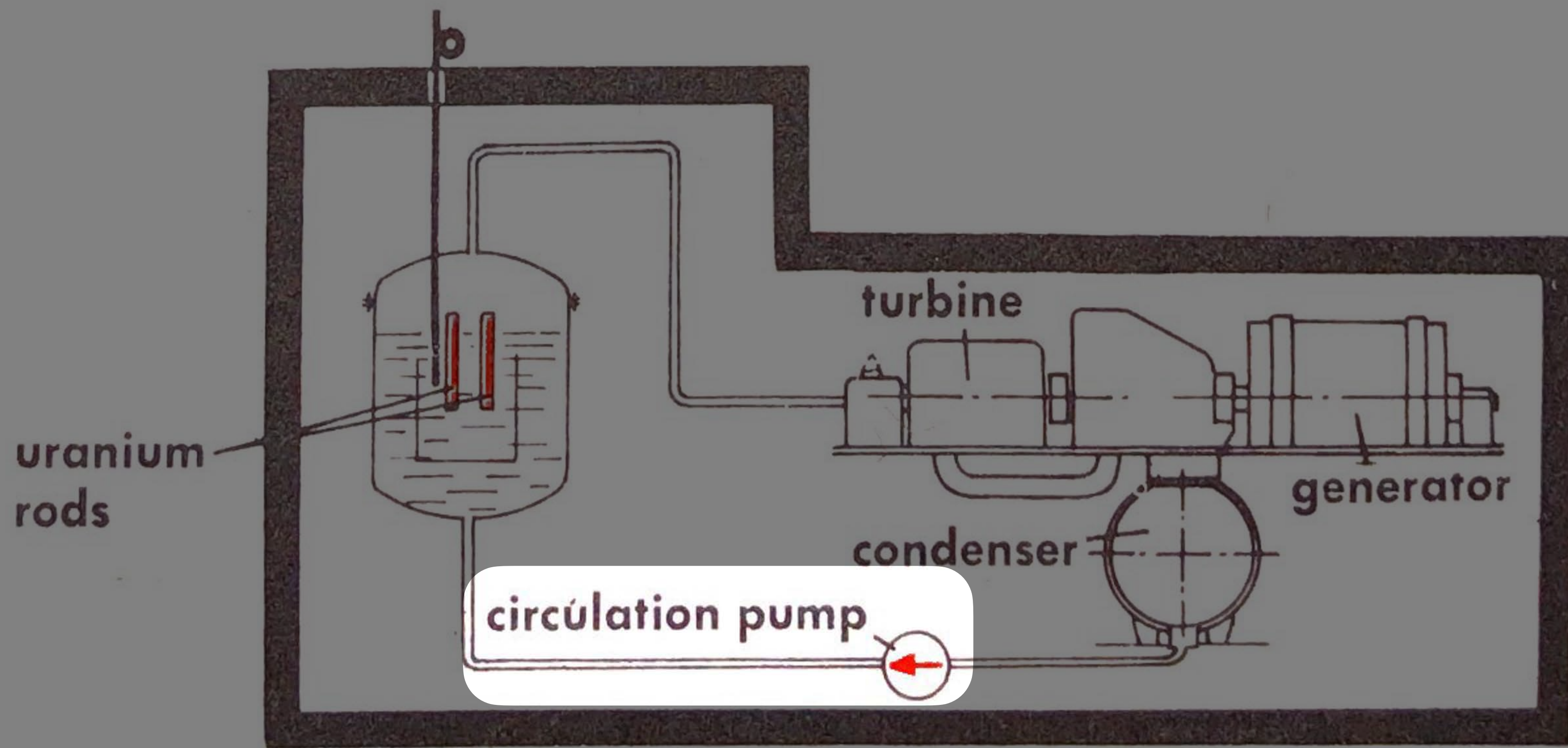


Fig. 4 BOILING WATER REACTOR (schematic)

Boiling Water Reactor

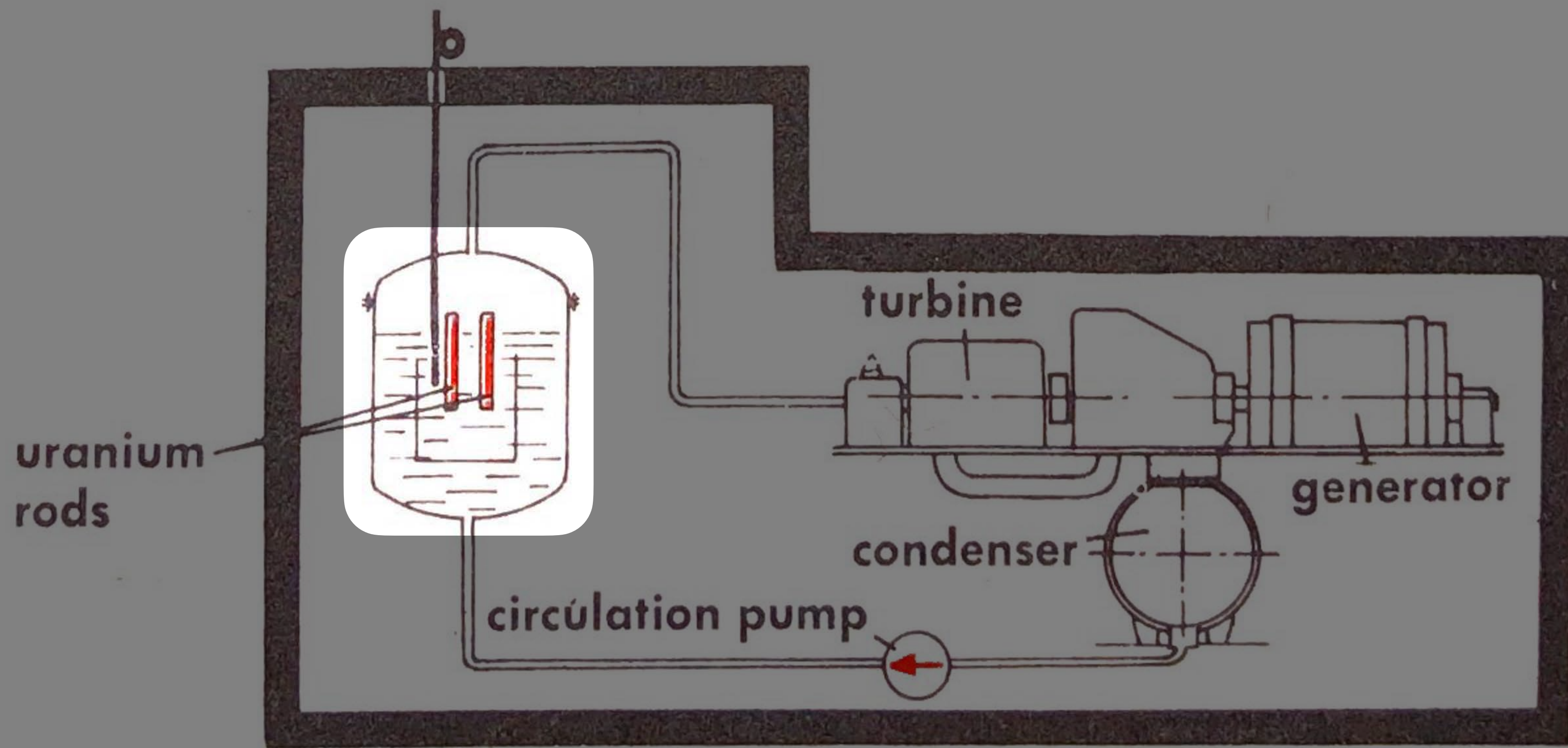


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Boiling Water Reactor

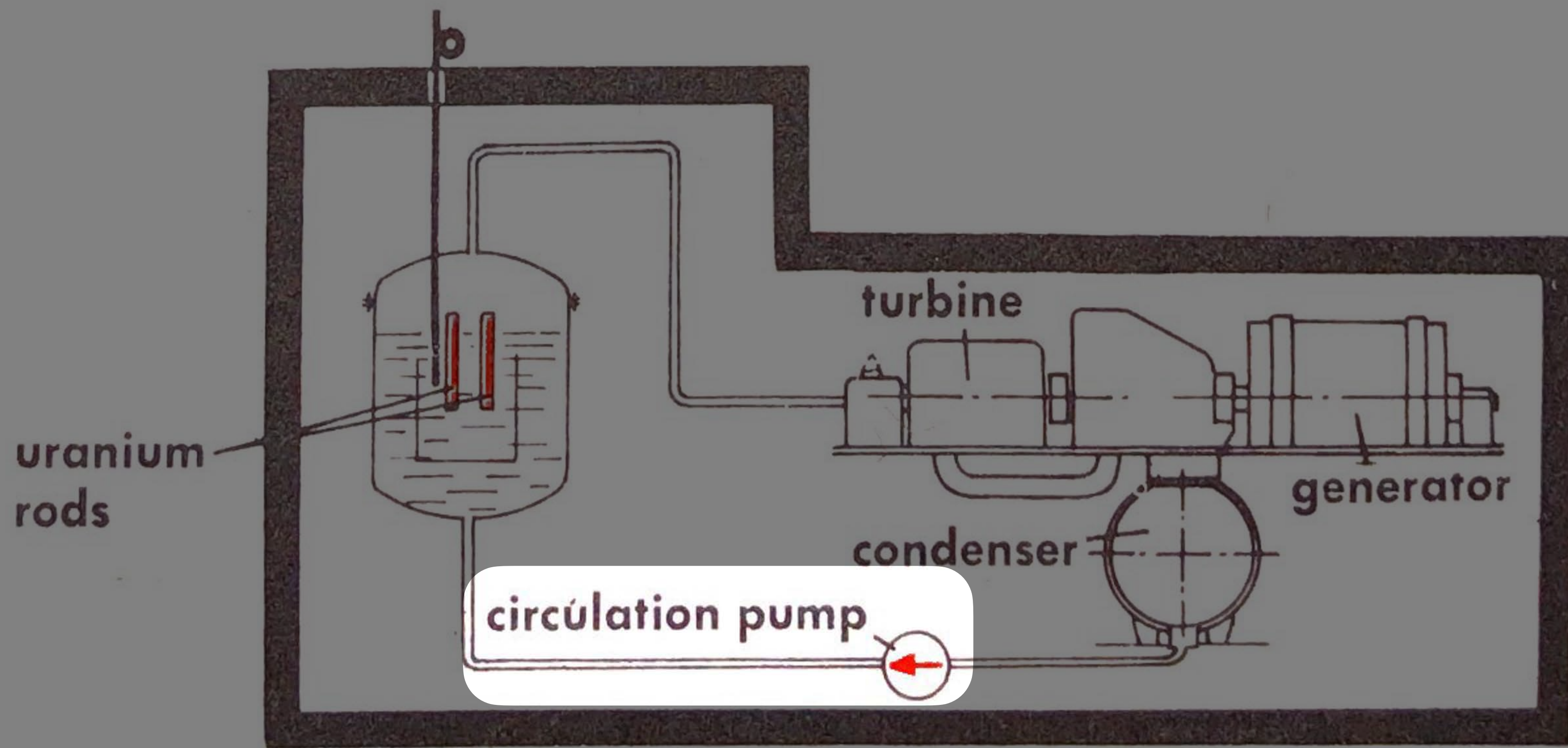
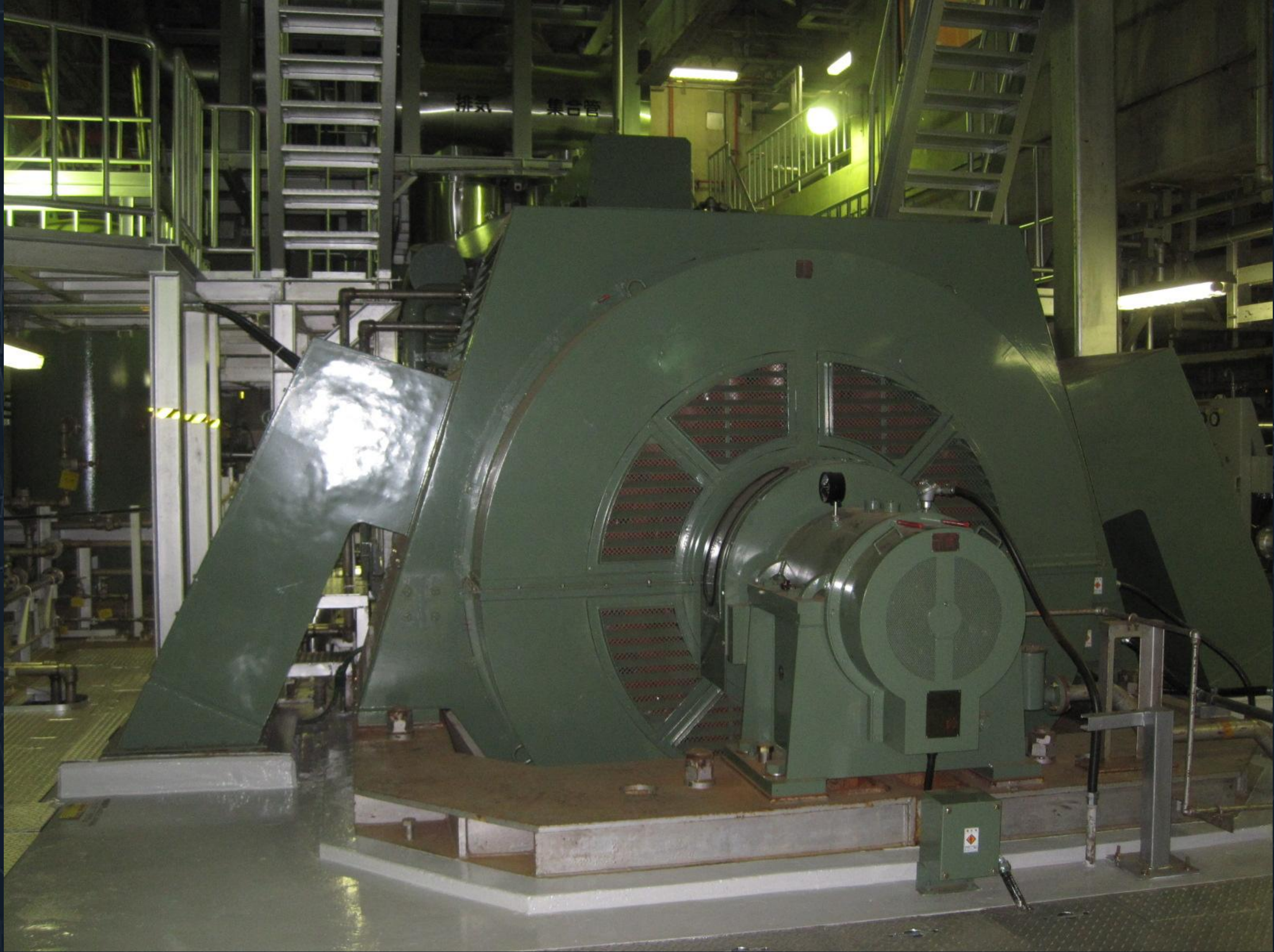
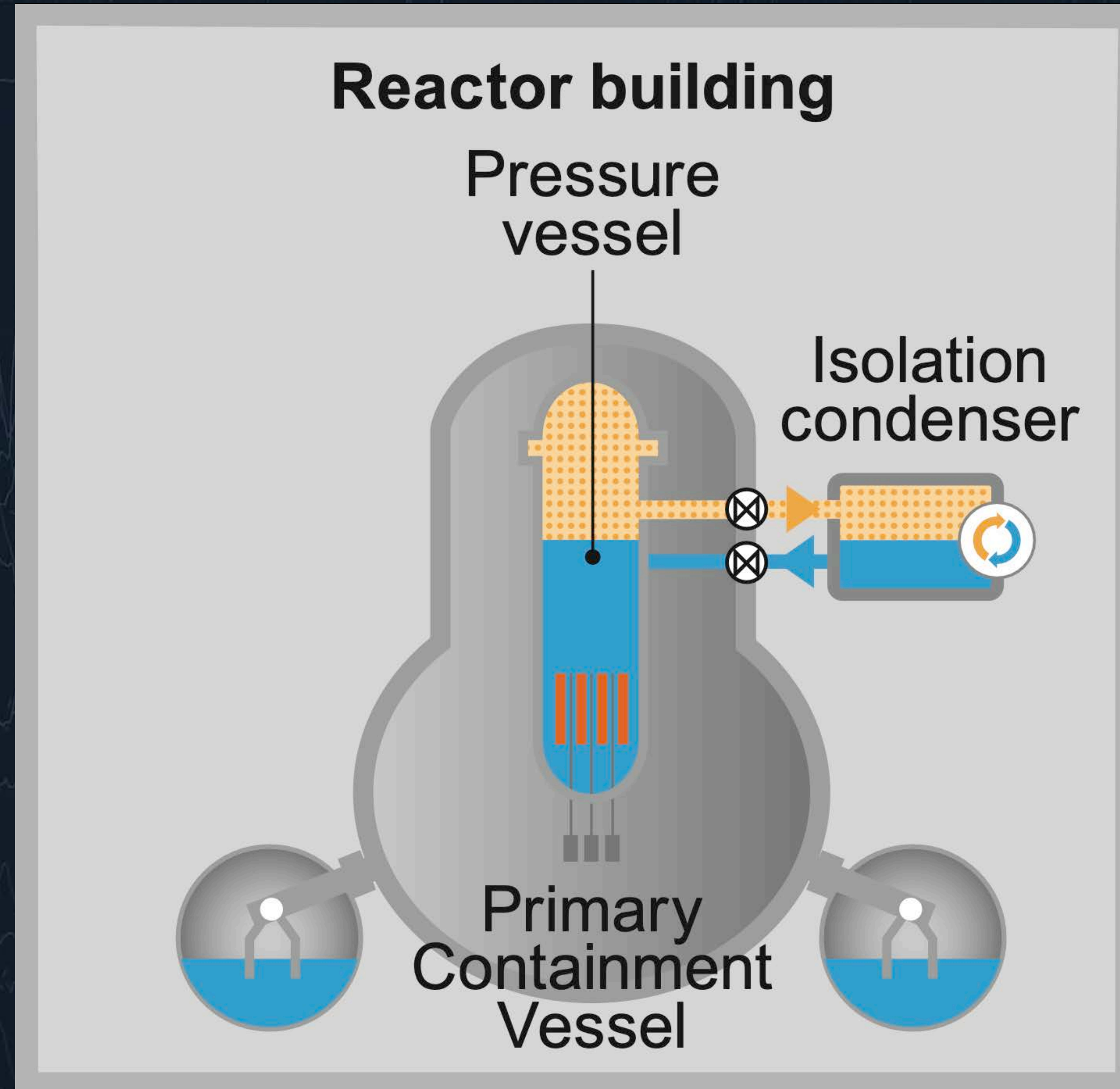


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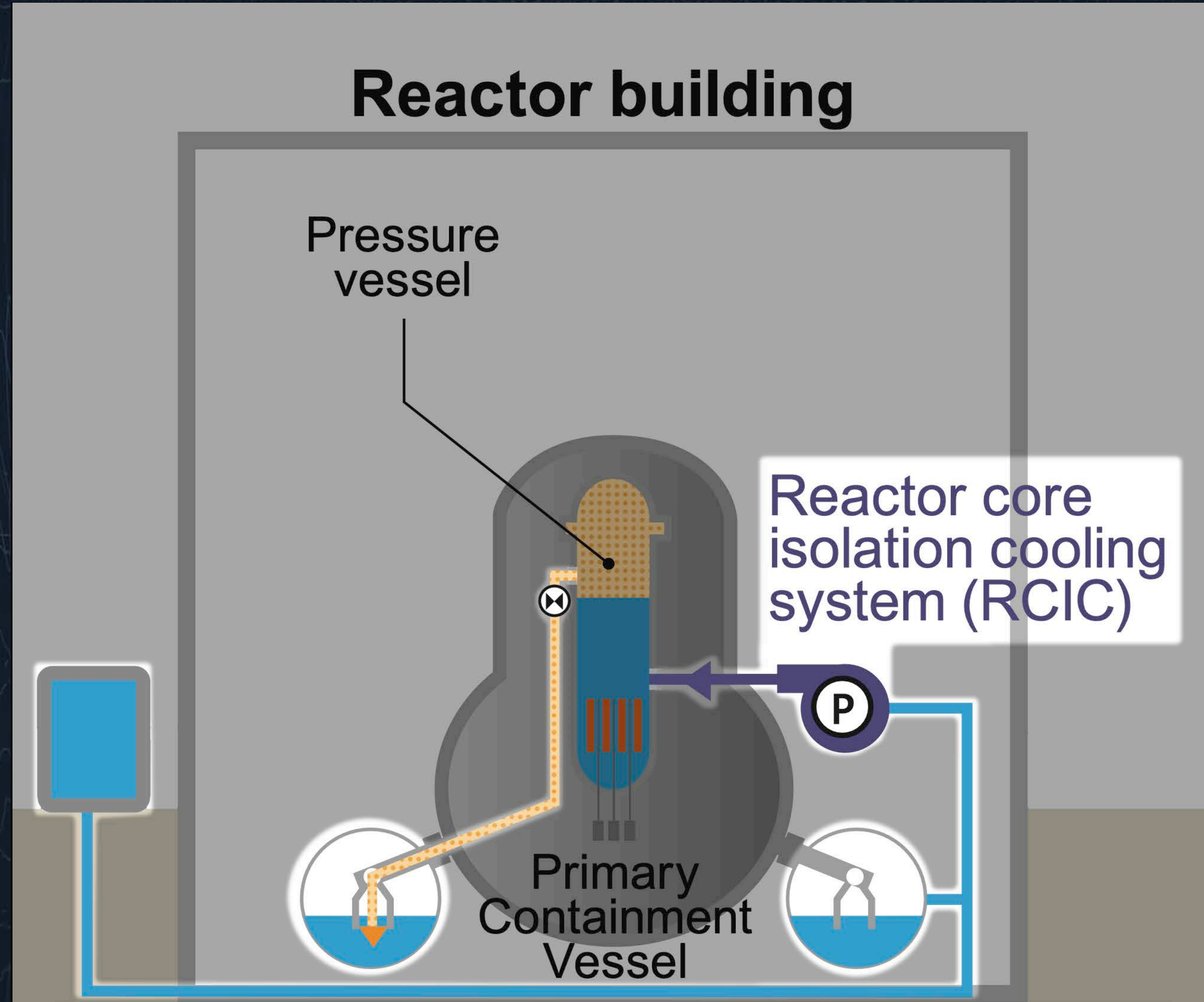
Backup Diesel Generator



Passive Cooling: Unit 1



Passive Cooling: Units 2 and 3



津波注意報 青森県太平洋沿岸 岩手県
福島県 茨城県

津波到達予想

津波！避難！

津波警報

宮城県 午後 5:40 1m

津波注意報

岩手県 午後 5:40 50cm

福島県 午後 5:50 50cm

青森県太平洋沿岸 午後 6:00 50cm

茨城県 午後 6:00 50cm



津波警報
津波注意報

SYM

陸上自衛隊
東北方面隊

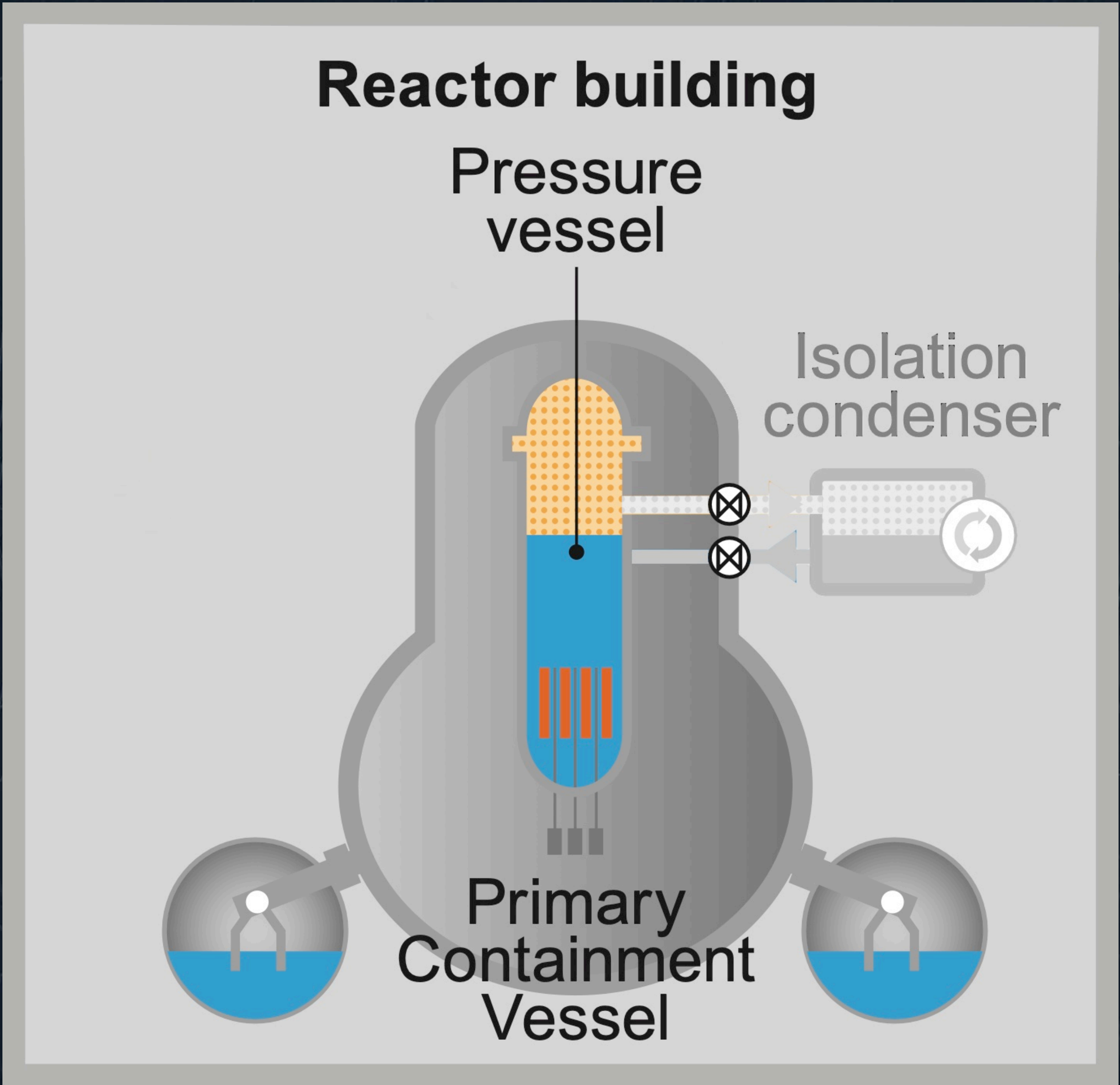
Unit 1 and 2 Control Room



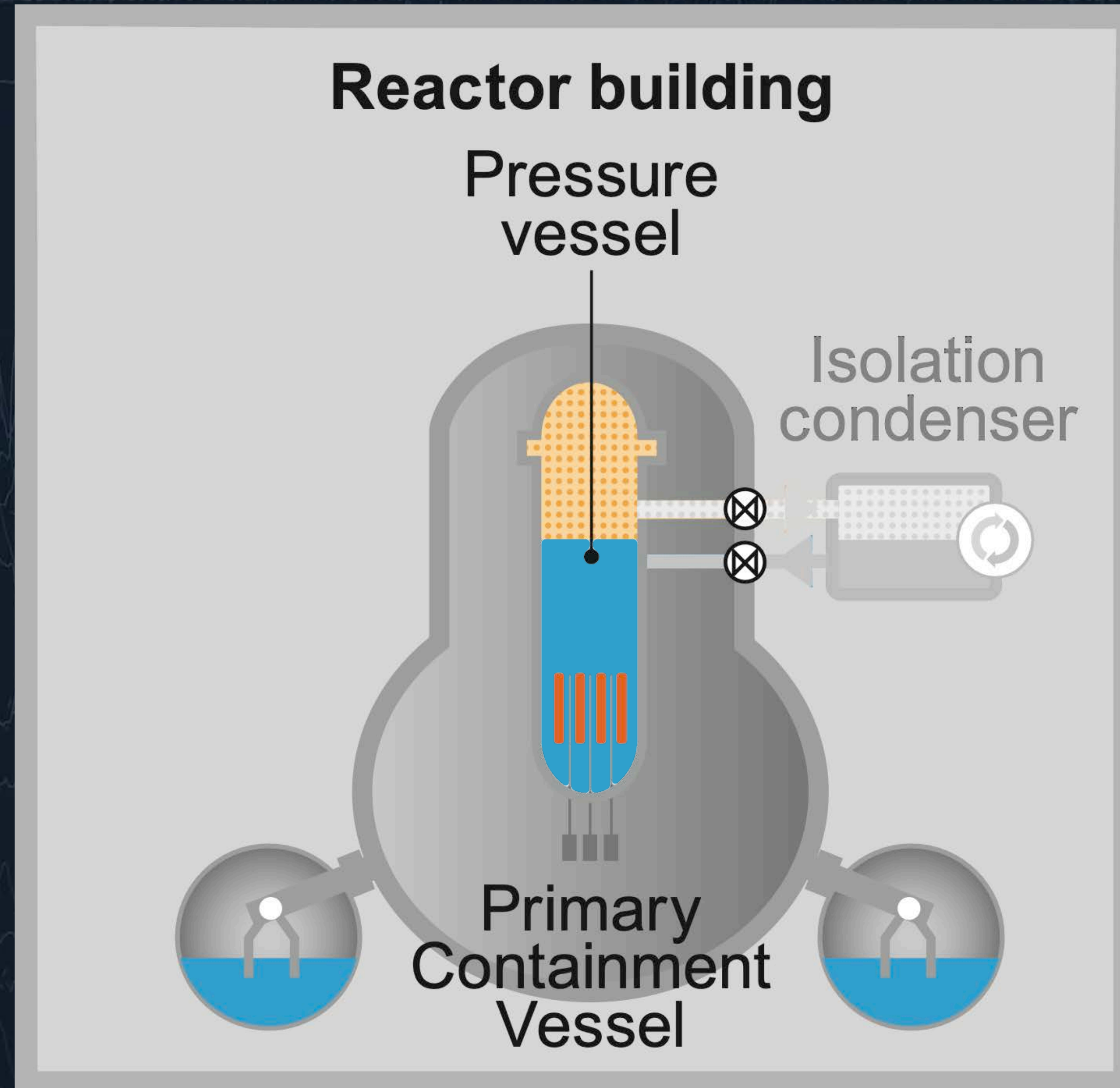
Unit 2 Power Supply Room



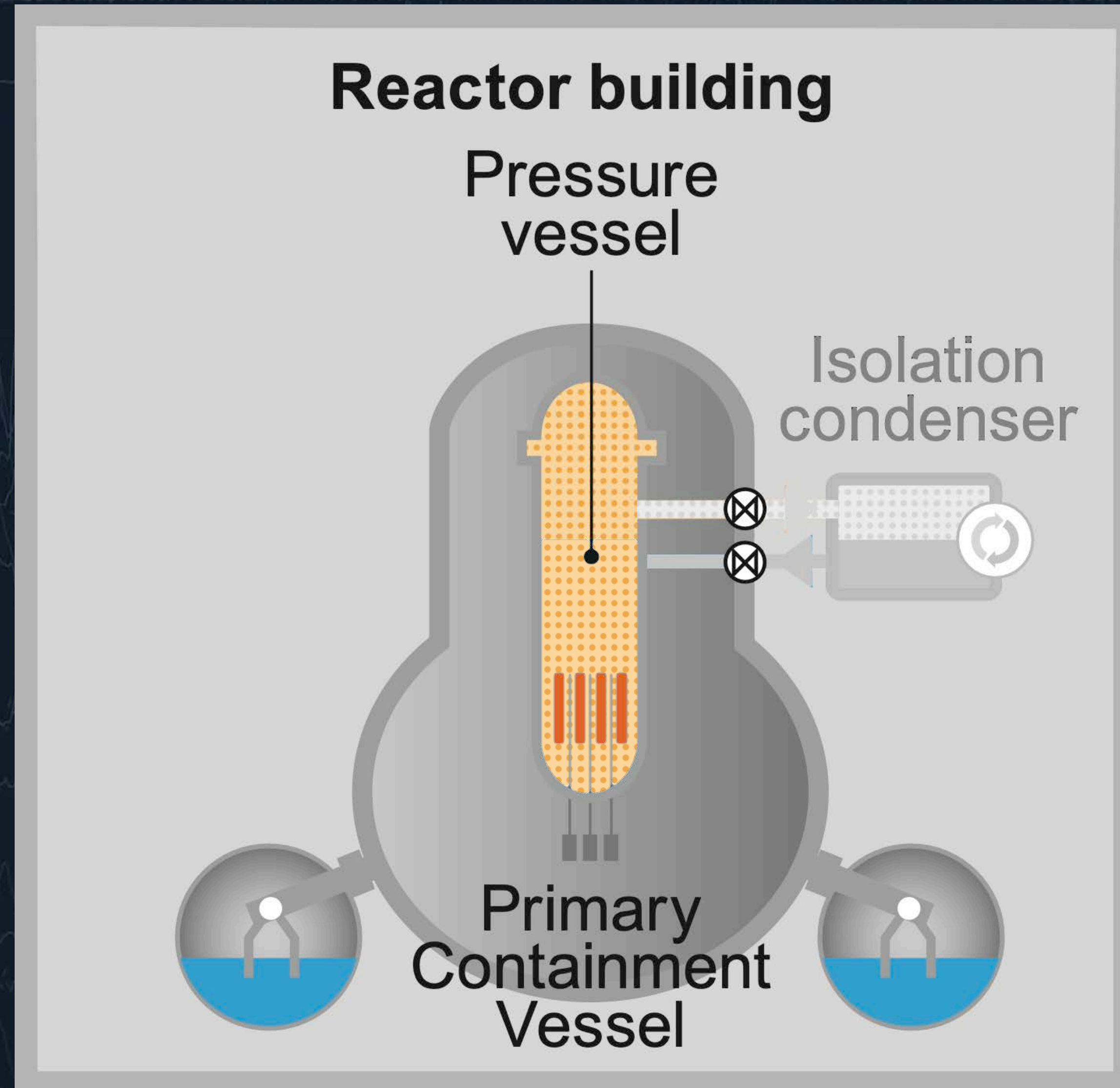
Passive Cooling: Unit 1



Passive Cooling: Unit 1



Passive Cooling: Unit 1



Unit 1 Recovery: Instrumentation



Unit 1 Recovery: Re-Establish Cooling



Unit 1 Recovery: Re-Establish Cooling



Unit 1 Recovery: Re-Establish Cooling



Unit 1 Recovery: Instrumentation





Naoto Kan

Japanese Prime Minister
June 2010 - Sept. 2011

Photo: Government of Japan [CC BY 4.0]

Unit 1 Recovery: Planning the Vent



Kan's Press Conference



Photo: Associated Press [Fair Use]

Fukushima Prepares for the Visit



Kan Arrives



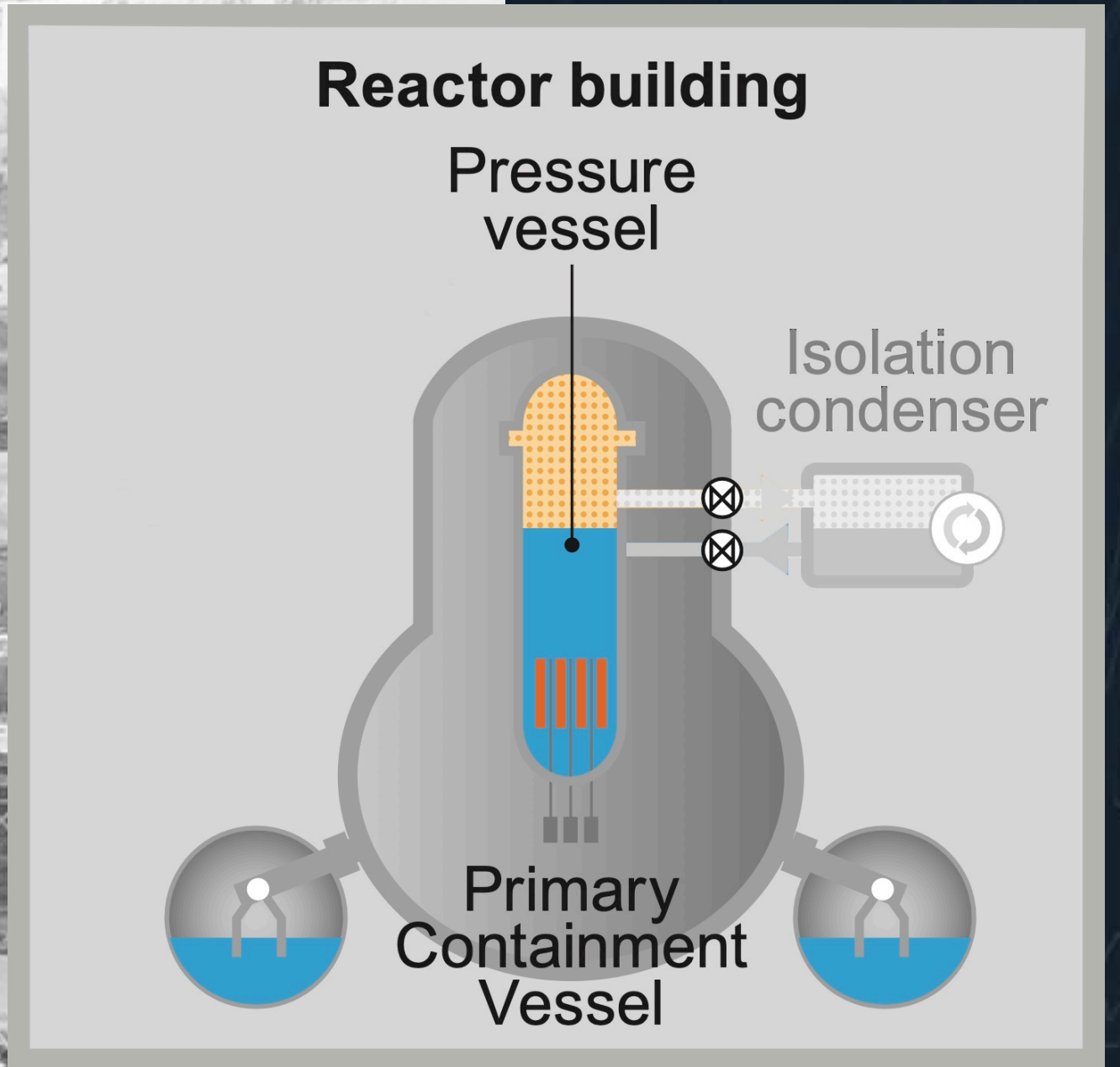
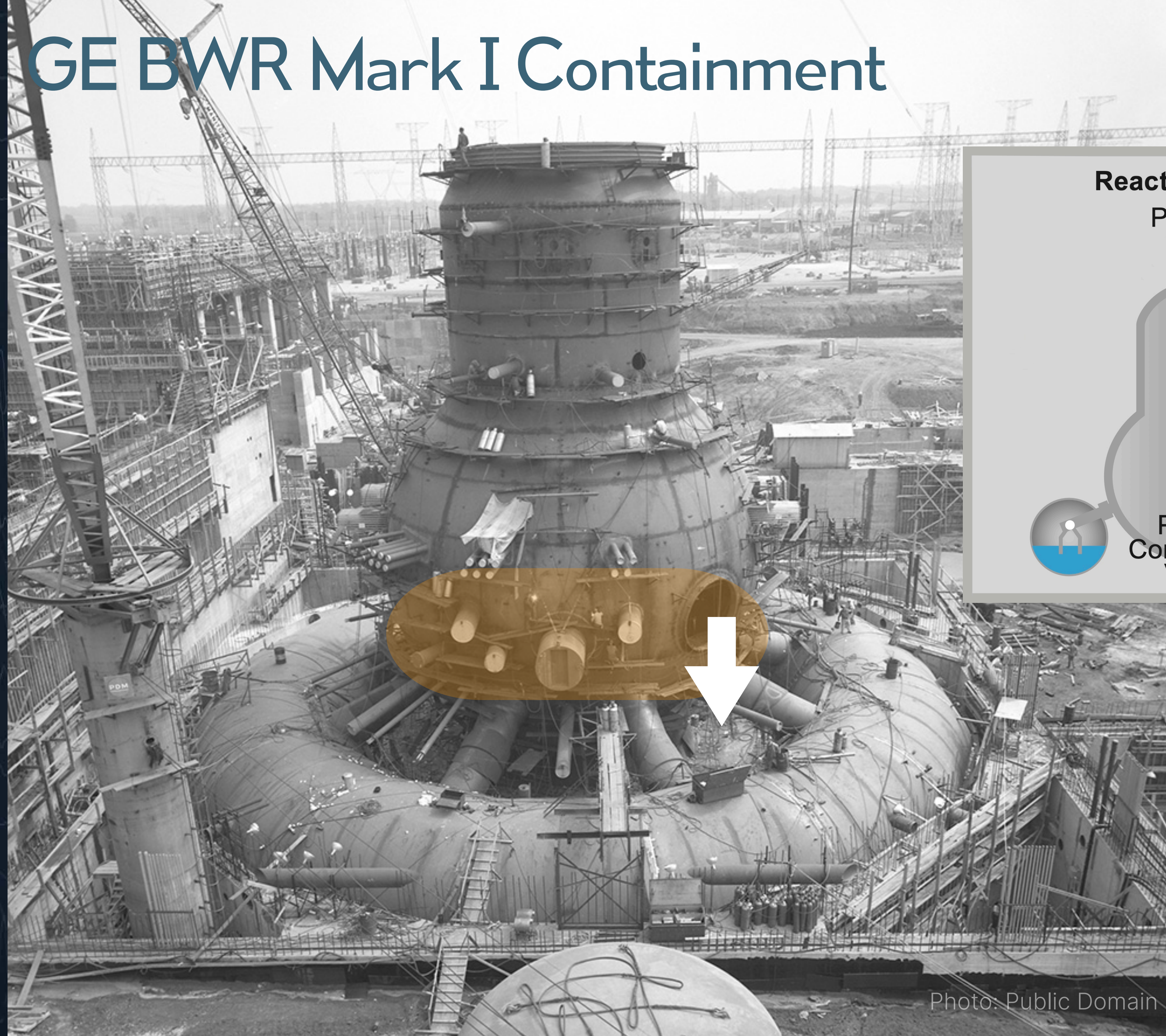
Yoshida briefs Kan



Personal Dosimeter



GE BWR Mark I Containment



Making Another Plan



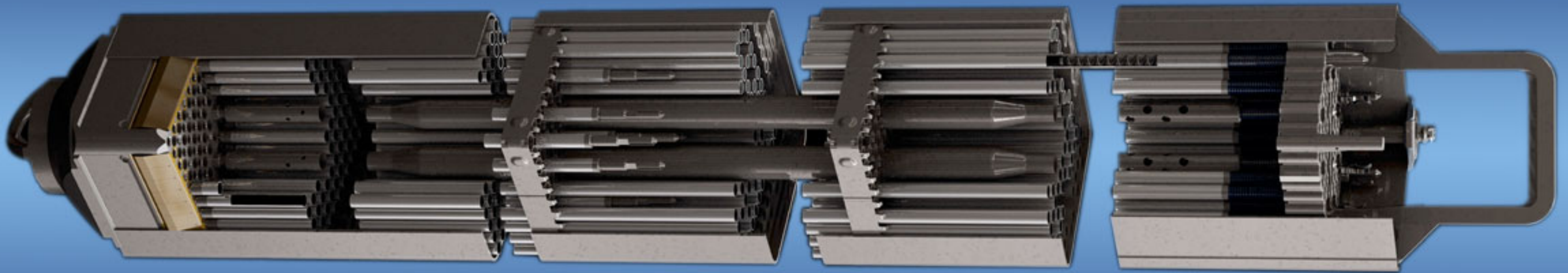
Venting



Unit 1



BWR Fuel Bundle



Hydrogen Explosion



Photo: ©TEPCO [Non-commercial Usage Allowed]

Unit 3 Cooling



Unit 3 Cooling



Unit 3 Cooling



State of the Plant



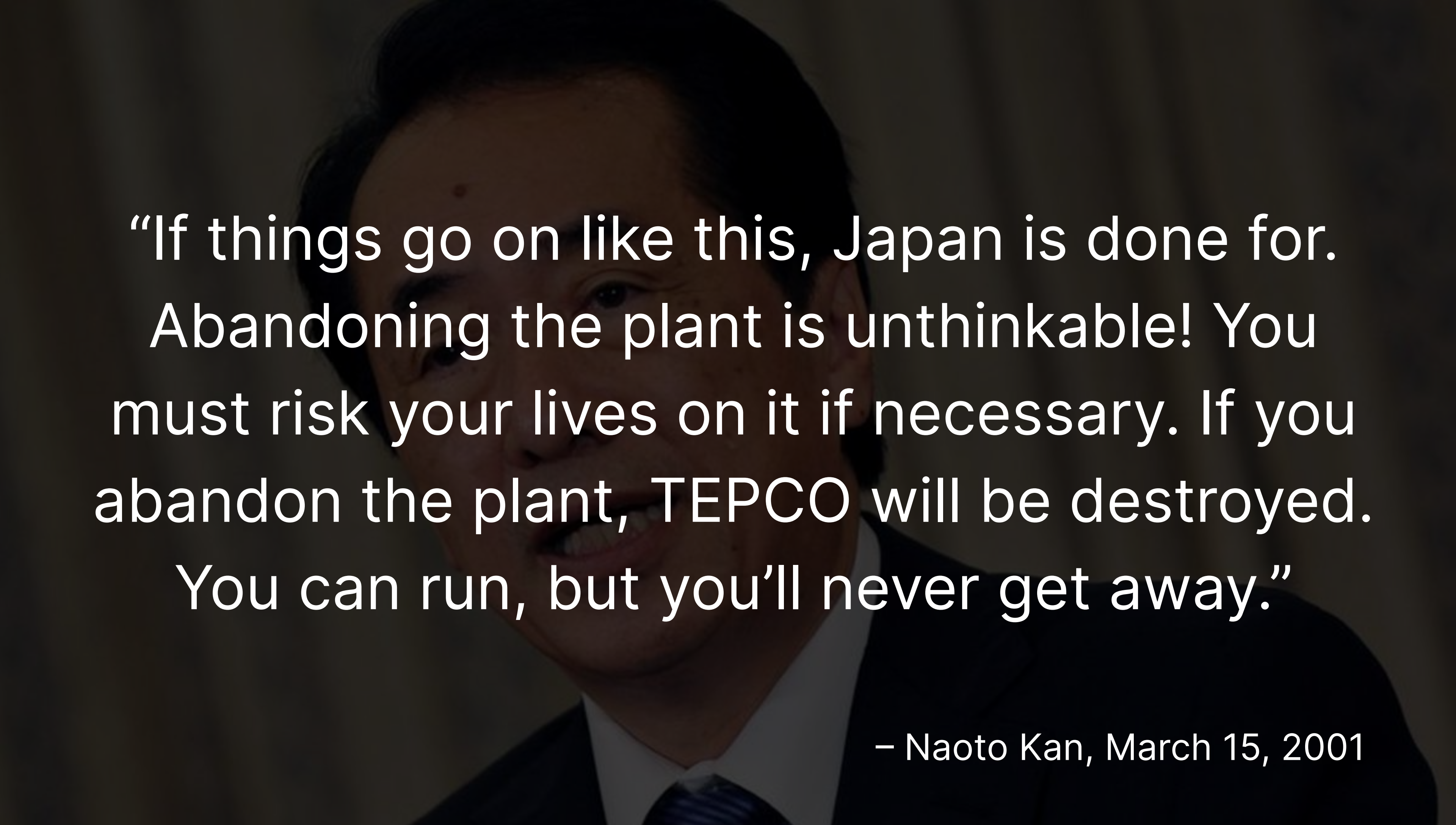
The Fukushima 50



The Last Straw



The Last Straw



“If things go on like this, Japan is done for. Abandoning the plant is unthinkable! You must risk your lives on it if necessary. If you abandon the plant, TEPCO will be destroyed. You can run, but you’ll never get away.”

– Naoto Kan, March 15, 2001

The Last Straw



Fukushima Daiichi Today

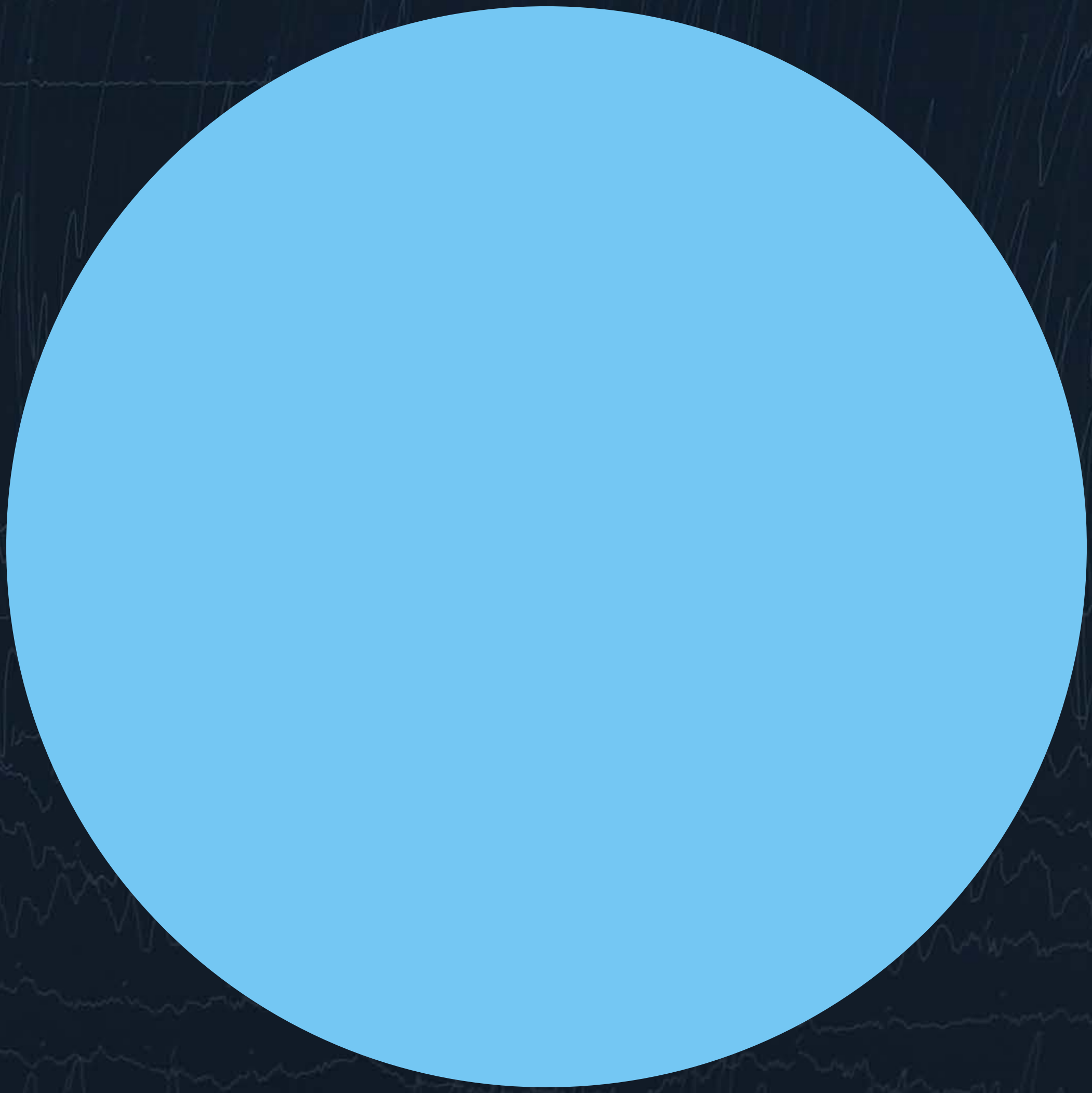


Putting Fukushima Daiichi in Context



Three Mile Island
626,000,000 Bq

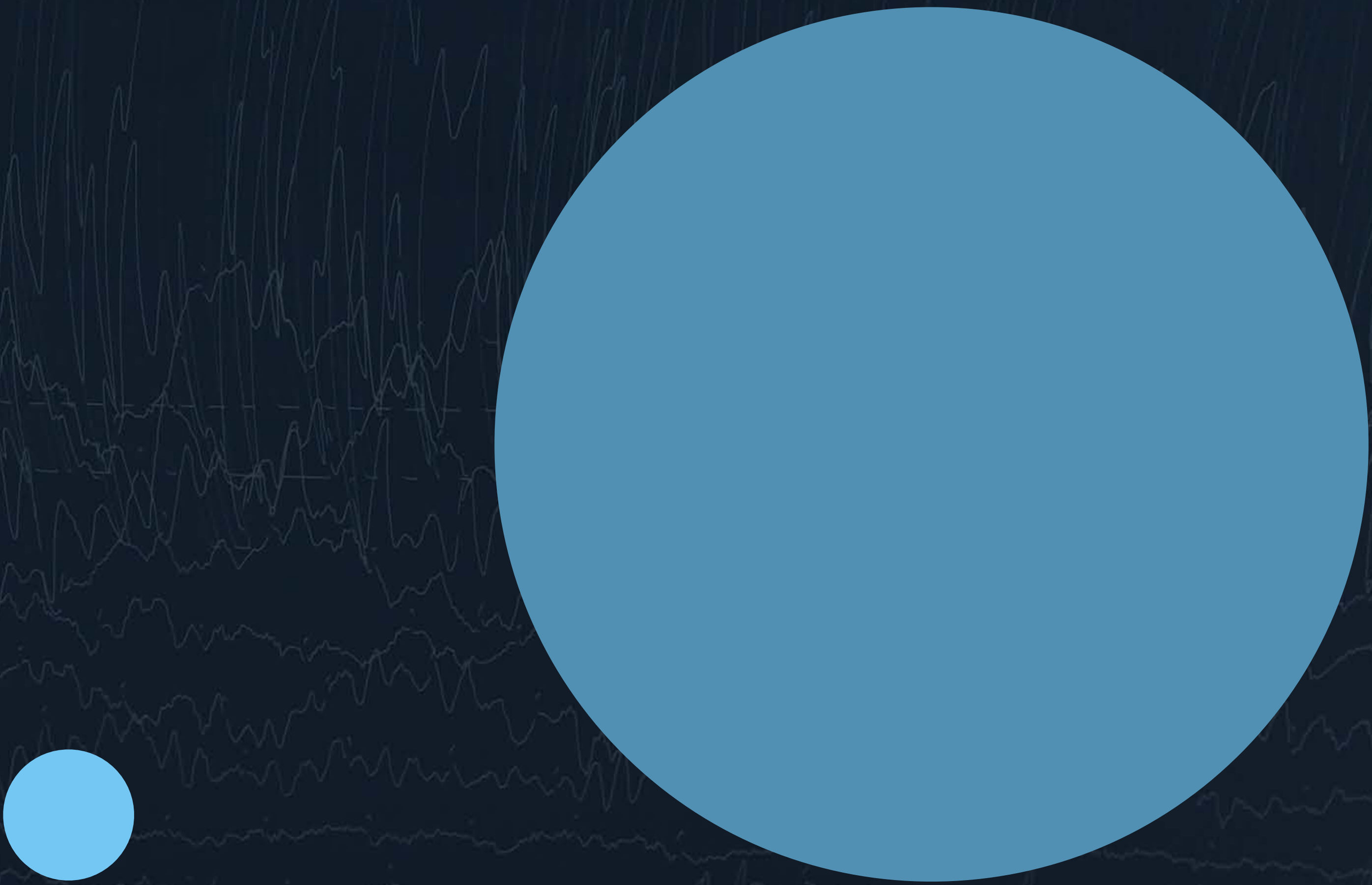
Putting Fukushima Daiichi in Context



Three Mile Island
626,000,000 Bq

Fukushima Daiichi
780,000,000,000,000,000 Bq

Putting Fukushima Daiichi in Context

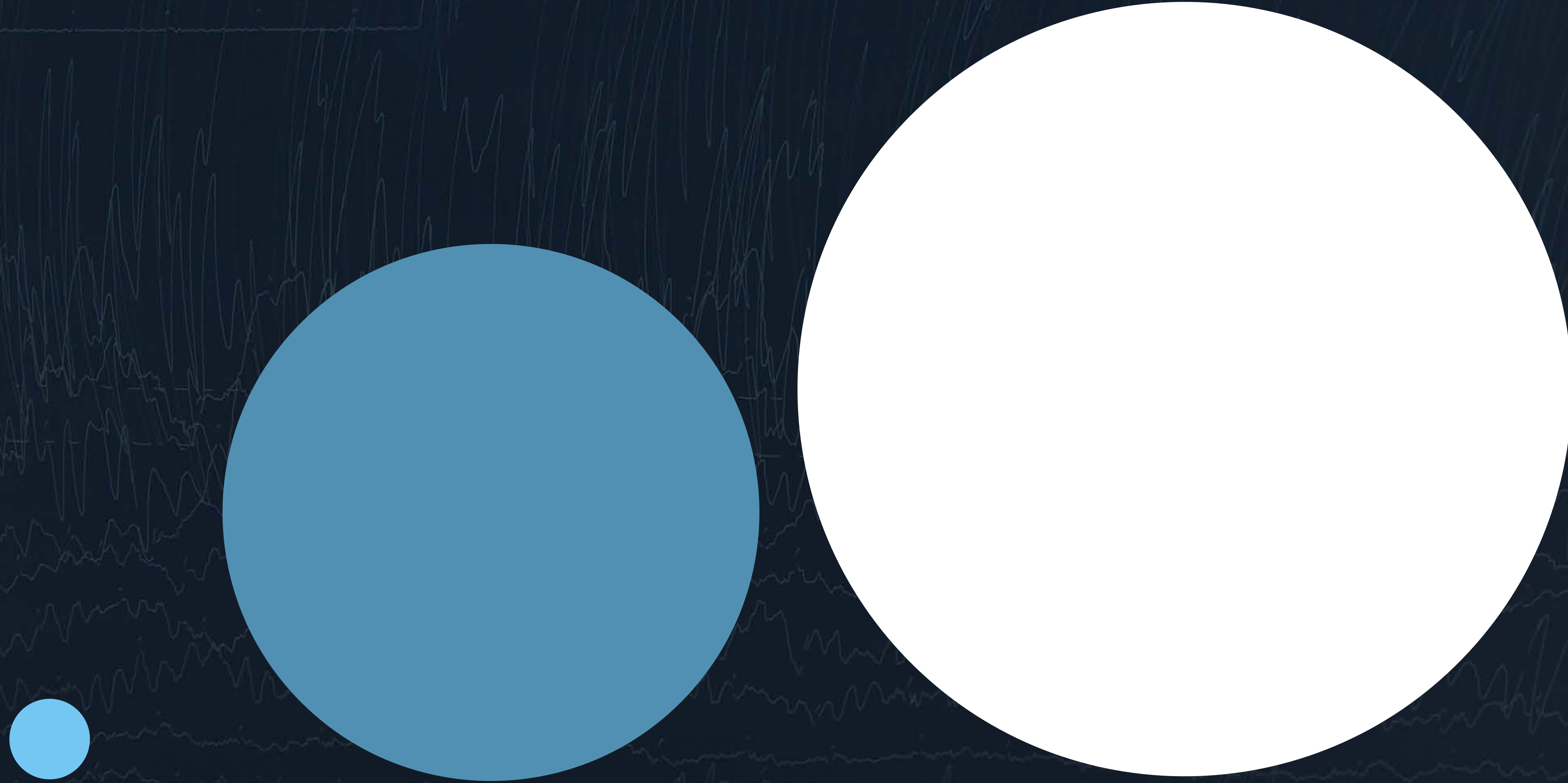


Three Mile Island
626,000,000 Bq

Fukushima Daiichi
780,000,000,000,000,000 Bq

Chernobyl
5,200,000,000,000,000,000,000 Bq

Putting Fukushima Daiichi in Context



Three Mile Island
626,000,000 Bq

Fukushima Daiichi
780,000,000,000,000,000 Bq

Chernobyl
5,200,000,000,000,000,000 Bq

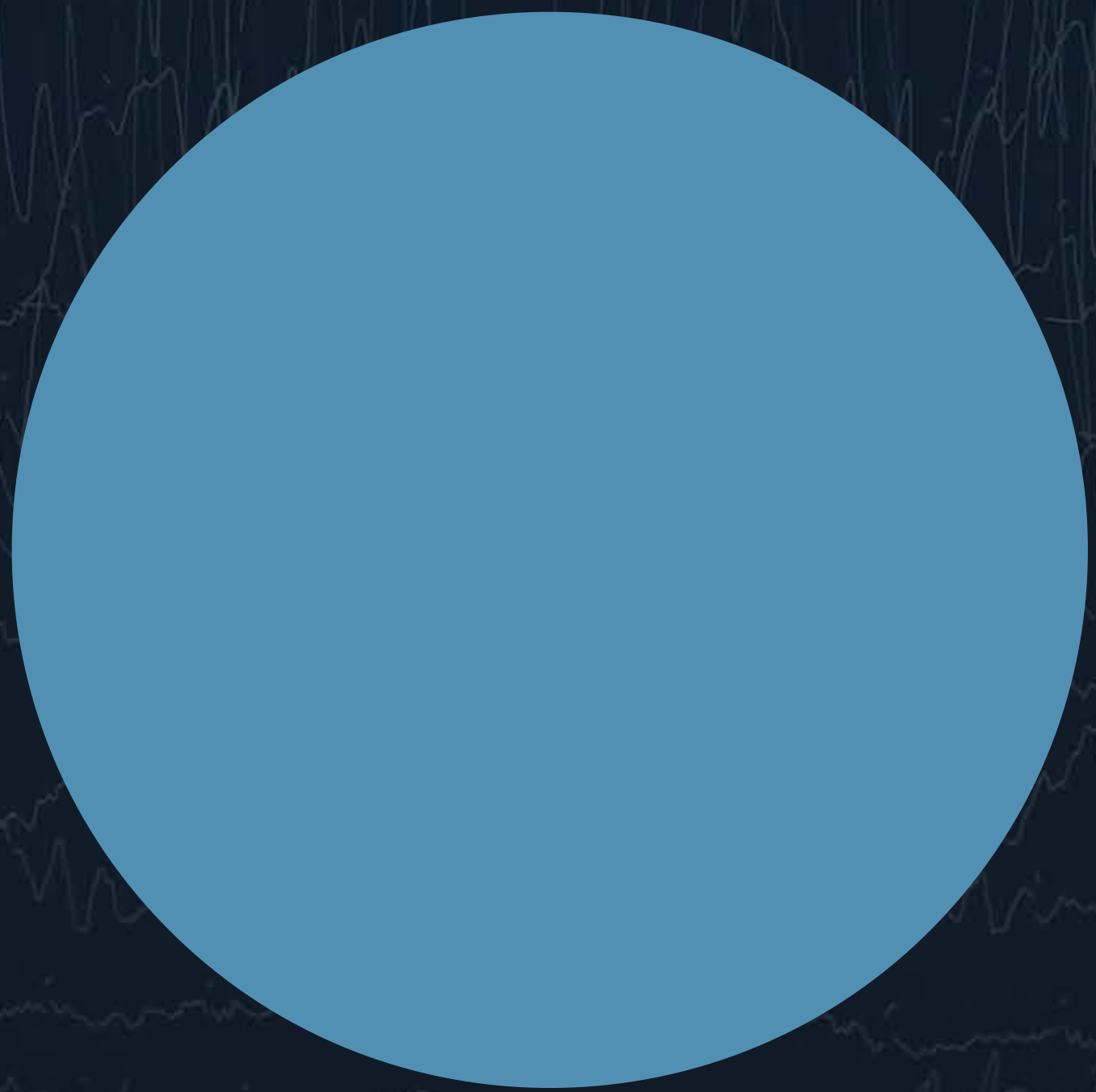
Uncontained Fukushima Daiichi
7,500,000,000,000,000,000,000 Bq

Fukushima's Heroes



Putting Fukushima Daiichi in Context

Success!



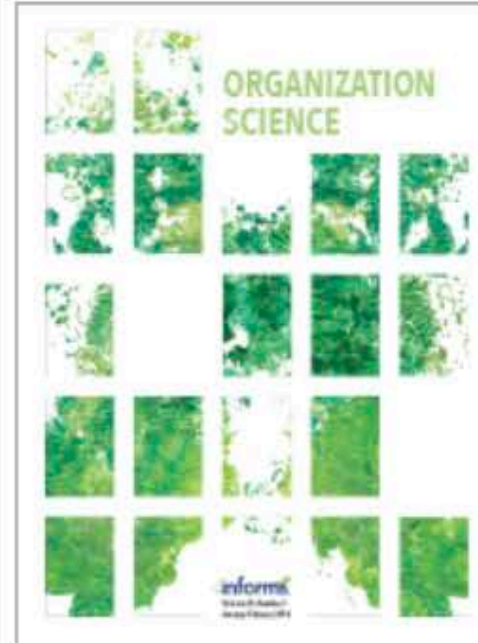
Three Mile Island
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Fukushima Daiichi
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Chernobyl
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Moving off the Map: How Knowledge of Organizational Operations Empowers and Alienates

Ruthanne Huising

To cite this article:

Ruthanne Huising (2019) Moving off the Map: How Knowledge of Organizational Operations Empowers and Alienates. Organization Science 30(5):1054-1075. <https://doi.org/10.1287/orsc.2018.1277>

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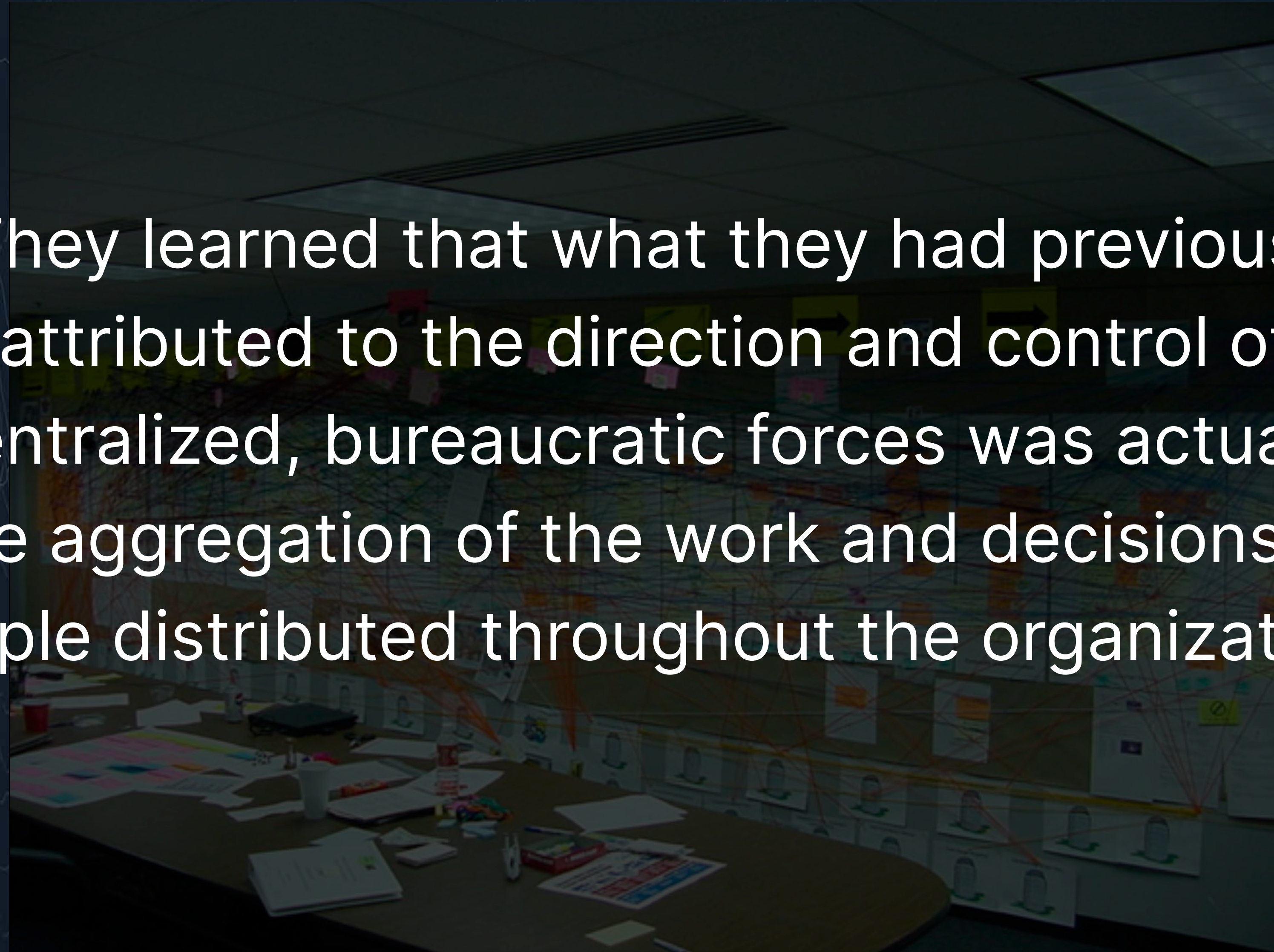
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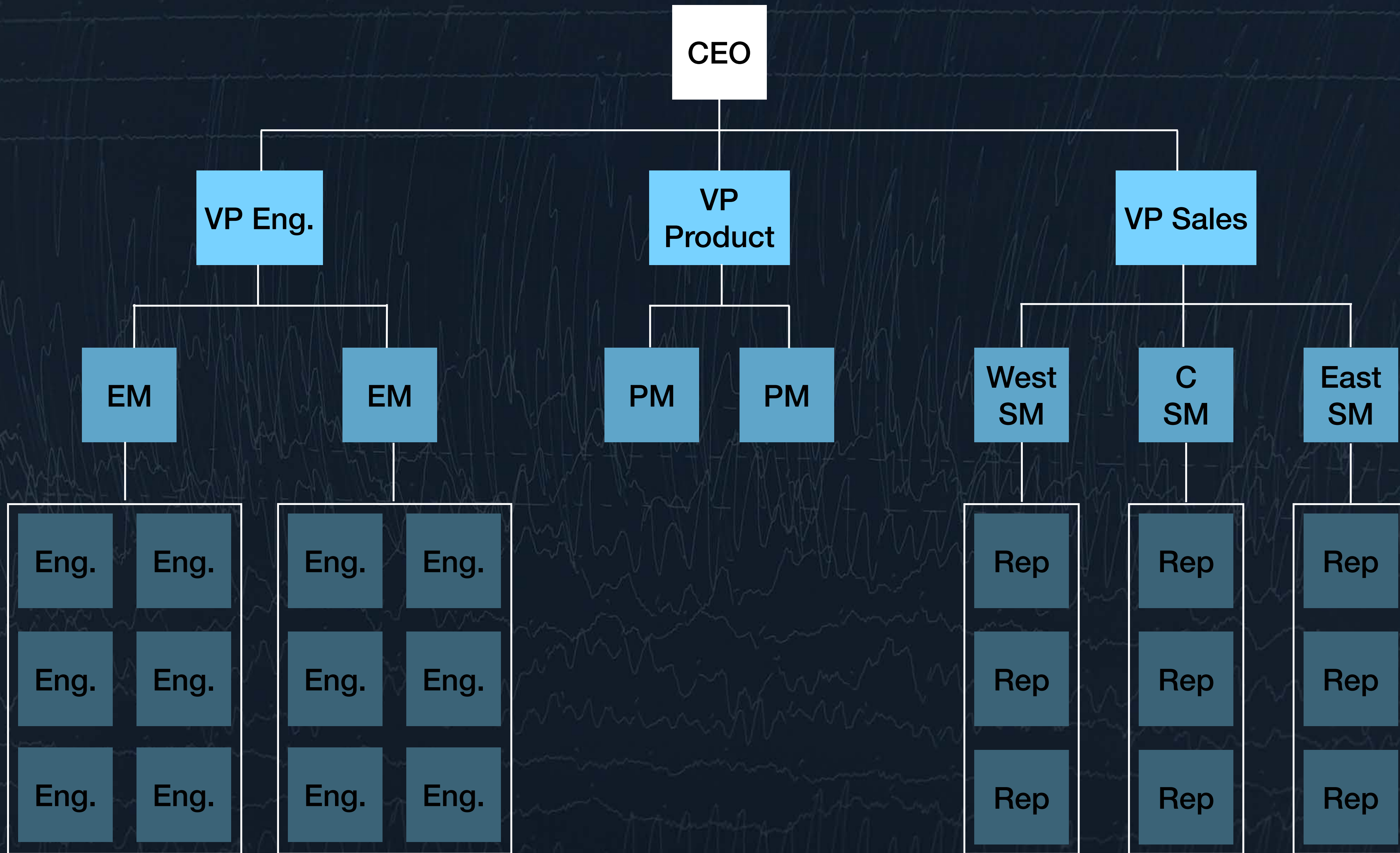
Process Mapping

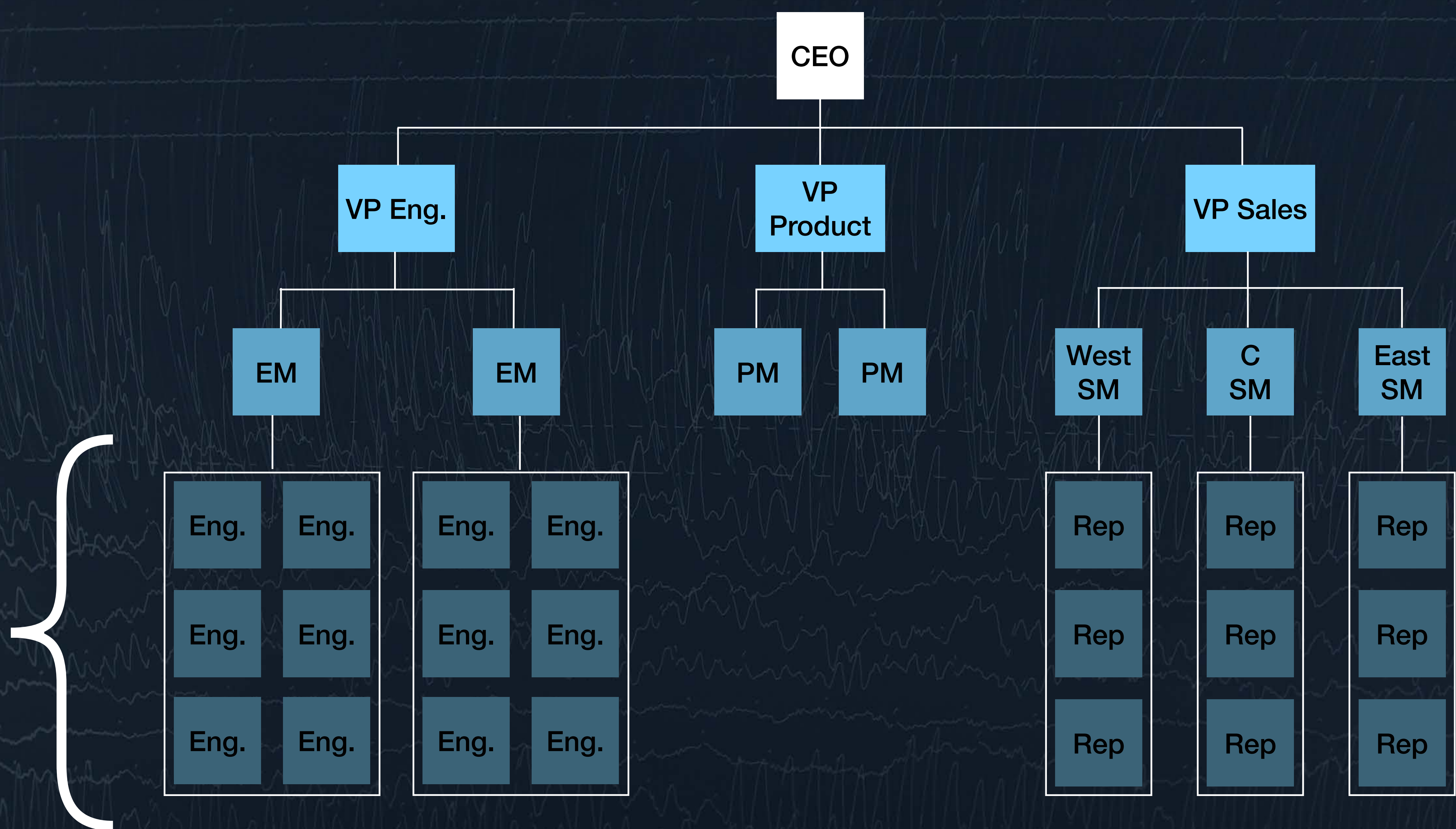


Moving off the Map

“They learned that what they had previously attributed to the direction and control of centralized, bureaucratic forces was actually the aggregation of the work and decisions of people distributed throughout the organization.”









Masao Yoshida

Fukushima Daiichi Plant Director

Photo: ©KYODO [Fair Use]



Naoto Kan
Japanese Prime Minister
June 2010 - Sept. 2011



Masao Yoshida
Fukushima Daiichi Plant Director

Photo: ©KYODO [Fair Use]



Naoto Kan



Masao Yoshida

Westrum Organizational Typology Model



Pathological
(Power oriented)

Bureaucratic
(Rule oriented)

Generative
(Performance oriented)

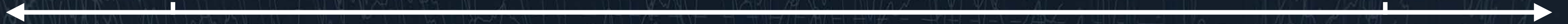


Naoto Kan



Masao Yoshida

Westrum Organizational Typology Model



Pathological
(Power oriented)

Bureaucratic
(Rule oriented)

Generative
(Performance oriented)

Low cooperation

Modest cooperation

High cooperation



Eng. Eng. Eng. Eng.

Naoto Kan

Japanese Prime Minister
June 2010 - Sept. 2011

CEO

VP
Product

PM

PM



Rep Rep Rep

Masao Yoshida

Fukushima Daiichi Plant Director



Eng. Eng. Eng. Eng.

Naoto Kan

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The Magnitude 9.1 Meltdown at Fukushima

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