



Fukushima's Ice Wall: An Analysis

Zack McKinzie (BME), Garrett Brogan (CHE),
Francis LaRovere (ME), Casey Magrath (BME)

Advisor: Professor Jill Rulfs (Biology), Helen Vassalo (Business)

Abstract

Following the meltdown at the Fukushima nuclear reactor, irradiated ground water began to leak into the ocean. A permafrost wall was proposed as a possible solution to the problem. We utilized SWOT analysis to determine whether or not the permafrost wall is an effective and efficient solution. After consideration we have determined that the strengths and opportunities outweigh the weaknesses and threats.

Methods

- SWOT analysis was performed
- Strengths, Weaknesses, Opportunities, Threats
- Fukushima site compared to Oak Ridge National Labs; previous experimental site³
- Data collected, interpreted, and compared; climate conditions, precipitation rates, and soil compositions
- Strengths and Opportunities weighed against Weaknesses and Threats



Background

- Earthquake on March 11, 2011 creates massive tsunami
- Shuts down back-up power to three reactors at Fukushima Daiichi nuclear power plant
- Lack of power results in meltdown
- Ground water flowing under reactors carries irradiated water to the ocean¹
- TEPCO, the company in charge of the reactors, plans to construct permafrost wall by 2015²

Strengths

- Success with previous trial⁴
- Reversibility⁵
- Quick reconstruction if necessary⁶

Weaknesses

- Pipe corrosion
- Could be breached⁹
- Power taxing¹⁰
- Inexperienced constructors¹¹

Opportunities

- Similar climate to successful trial⁷
- Saturated ground
- Higher precipitation⁸

Threats

- High seismic activity¹²
- Heavy rain during hottest season¹³
- All the eggs are in one basket

Conclusion

Our research has led us to determine that the proposed permafrost wall is a good idea. The strengths and opportunities outweigh the weaknesses and threats. The lack of any other method to deal with the radiation means that a temporary solution is required so that the radiation can be contained and processed some day. A permafrost wall is the best solution to the problem at this time.

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