Recommendations for United States Energy Policy

Alexander Fischer, United States Secretary of Energy
Department of Energy of The United States of America

Executive Summary

This summer, a nuclear meltdown in Nevada killed 19 people and hospitalized 143. Emergency response has cost $280 billion. The Secretary of Energy was tasked with analyzing the effects of a potential moratorium on the construction of four new nuclear plants. Due to the realities of current energy policy, the benefits of nuclear expansion, the safety of nuclear power, the lack of viable alternatives, and the associated costs, this Agency concludes that the long-term energy policy of the United States must be based on nuclear fuel, and these four plants are critical to this goal. We recommend the completion and operation of the facilities.[1]

[1] This work is intended only for the use of the Roger and Ann Worthington essay contest, The University of Texas at Austin, October 2010.

Contents

Background

Four new nuclear energy facilities are scheduled to commence operation by January 1, 2018. In determining whether to recommend a moratorium on the completion of these facilities, the Department of Energy (DOE) assessed the long-term success of U.S. energy policy, rather than simple immediate necessity. It is vital that this decision be analyzed holistically, as part of the overall U.S. energy policy; it would be a mistake to focus narrowly on these four plants.

The DOE and its director recommend the completion of the plants as scheduled due to the long-term benefit they will provide their regional and national communities.

A Second Lockdown

Our first goal is to prevent the specific failures that characterized the Lohman disaster from recurring. Many proponents of a moratorium suggest that construction of these four plants be halted until the problems that caused the Lohman meltdown are fixed nationwide. Their concern is reasonable.

A moratorium, however, is not. After the disaster, every nuclear facility in the country immediately locked down and ceased operation as required by standard U.S. Nuclear Regulatory Commission (NRC) procedure.[2] Nuclear activity and development has already been dormant for weeks. It cannot resume until every issue is resolved and every solution tested and implemented.[3] This loss of nuclear power, which has provided one-fifth of the nation's electricity[4] since the late 2000's, has already led to the use of U.S. strategic energy reserves.

The decision whether to enact a moratorium cannot be made until the issues of the Lohman disaster are solved. This report assumes the successful completion of that process.

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[2] Flores.
[3] Ibid.
[4] Nuclear Energy Institute.

Physical and Fiscal Benefits of Plants

The plants in question would provide significant quantities of environmentally friendly, reliable energy at a comparatively low cost.

Nuclear power is the cleanest form of energy capable of satisfying a significant part of U.S. need. It produces no emissions, and therefore neither aggravates climate change nor threatens individual health. In the last year for which data is available, U.S. electricity generation was responsible for 2.3635 billion metric tons of carbon dioxide emission.[5] Solar and wind power are also emission-free, but they are unreliable. Solar power depends on prolonged daylight and wind farms fail to produce energy during calm weather, which often coincides with the hottest months and greatest strain on the power grid.[6] In 2009 President Barack Obama called for a U.S. greenhouse gas emission reduction of 80% by 2050,[7] a goal that only nuclear power can realize while providing sufficient energy.[8]

Nuclear power production is also inexpensive:

Table 1: U.S. average production cost[9]

Energy Source	**Avg. production cost, per Kilowatt hour**
Oil	$0.123
Natural gas	$0.05
Coal	$0.03
Nuclear	*$0.0203*

Additionally, the cost of nuclear production tends to remain fairly static, unlike coal or natural gas, whose raw materials are more susceptible to market forces.[10] Though nuclear plants are more expensive than gas or coal plants, nuclear investment pays for itself.[11]

Proponents of a moratorium are rightly concerned about nuclear waste; however, it is clean and safe. Spent fuel rods are decontaminated and welded inside steel containers

[5] Environmental Protection Agency (data from 2008).
[6] Walters.
[7] "The Obama-Biden Plan."
[8] Kaplan.
[9] Flores (data from 2009).
[10] Flores.
[11] Ibid.

filled with inert, non-flammable helium, which are moved into concrete casks and placed on a concrete pad. All runoff is contained; storage of nuclear waste has no environmental impact.[12]

Safety of Nuclear Power

The safety of U.S. energy sources is critical, and nuclear energy is the safest; it boasts an impeccable long-term record and an unparalleled ability to evolve in pursuit of perfection.

In 1979, after a successfully contained partial meltdown at the Three Mile Island (TMI) nuclear facility in Pennsylvania, President Jimmy Carter's Kemeny Commission recommended the formation of a nonprofit agency to standardize nuclear safety. The industry created the Institute of Nuclear Power Operations (INPO).[13] Nuclear corporations pay INPO's salaries and the fees necessary for continual oversight and training. The Nuclear Regulatory Commission (NRC) inspects nuclear licensees about 2000 times per year;[14] it scrutinizes safety, training, management, and organizational development. It conducts mock evacuations in each nuclear county with local officials every five weeks and employs interns from nuclear facilities around the country to implement cutting-edge safety practices.[15]

The nuclear industry adapts to changes in safety standards or new information more quickly than any other. Any incident, no matter how minor, is shared across the industry between competitors and non-competitors to ensure that the entire industry operates with the greatest possible knowledge and safety. No other power source is managed so well.[16]

Spent fuel rods require an extended period of time to lose radioactivity, and critics fear their potential explosion during storage. The individual spent fuel storage environment (ISFSE), however, is safe. A monitored security fence surrounds the ISFSE. A monitored nuisance fence surrounds the security fence. Concrete blocks, located a specific

[12] Montgomery.
[13] Institute of Nuclear Power Operations.
[14] "Inspection."
[15] Flores.
[16] Ibid.

safe blast distance from the ISFSE, surround the nuisance fence. The perimeter also includes blast-resistant enclosures with 24-hour armed security. The ISFSE can withstand a direct impact from an aircraft.[17]

Nuclear disaster is a threat of "infinity times zero."[18] Admittedly, any accident carries the possibility of Lohman-style catastrophe, but the likelihood of such an occurrence is closer to zero than the incidence rate of any other energy industry.[19] With the Lohman incident in mind, however, it is easy to understand the fearful mindset that propagates the impression that nuclear power is extremely dangerous. People are unfamiliar with the specifics of nuclear power and the prospect of being surrounded by invisible, harmful radiation is frightening.[20]

However common, fear of nuclear power must not supplant scientific analysis in determining the future of U.S. energy policy. Every plant is fitted with multi-level automated safety redundancies that prevent harmful discharges and blast domes designed to withstand greater pressure than a meltdown would produce.[21]

Some of these measures failed in the Lohman disaster. However, the nuclear industry has demonstrated the ability to efficiently share information and solve problems; because of this accident, nuclear power will become safer and more reliable. Though no viable electricity source is fully without danger, nuclear power is closest.[22]

Alternatives to Nuclear

Instituting a moratorium on the four nuclear plants would necessitate increased production to compensate for the lost 5 GW. This, in itself, would not be difficult; 5 GW represents a small portion of U.S. energy needs each year.[23]

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[17] Montgomery.
[18] Walters.
[19] Ibid.
[20] Flores.
[21] Ibid.
[22] Kaplan.
[23] Ibid.

Natural gas plants, cheaper and more rapidly built than coal, are the best alternative. After nuclear, gas has the lowest mercury, sulfur dioxide, and nitrous oxide pollutant profiles. Gas is currently plentiful because of recent shale discoveries.[24]

But alternate plants would need to be built at an impossible speed. Before construction begins, specific sites must be licensed and permits obtained, a process that takes up to three years. Then, no matter where the alternate plants are built, construction takes a minimum of two years.[25] Furthermore, if the plants are located in states with deregulated energy markets, corporations will not freely choose to foot the bill,[26] and the DOE lacks the money to guarantee them a sound investment. As a result, plants could not begin generating energy until at least 2022. In the meantime, U.S. strategic reserves would be used to provide power, but the surpluses from the 2000's recession[27] have diminished. Current reserves cannot make up for all the lost energy.

Furthermore, it would take five natural gas plants to make up the lost 5 GW, and each costs about $1.2 billion.[28] Meanwhile, $40 billion has been sunk into the four nuclear facilities. Nuclear plant construction takes 9-10 years; these facilities, scheduled to operate in just months, are essentially finished. If that investment produces no return because of a moratorium, corporations will go bankrupt after defaulting on massive loans. In the face of a collective $40 billion shortfall, the banks that loaned to them will fail.[29] The economic impact of past bank failure has been severe and widespread.

Conclusion

Even if alternatives could supply the lost 5 GW, they would be incompatible with an energy policy focused on safety, reliability, and environmental soundness.

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[24] Ibid.
[25] Diermann.
[26] Walters.
[27] Kaplan: the economic downturn that began in 2007 generated energy surpluses as consumption diminished.
[28] Diermann.
[29] Ibid.

After the Three Mile Island incident, fear of catastrophe buried U.S. nuclear development for decades;[30] no applications for licensing a new nuclear plant were submitted to the NRC between 1979 and 2007.[31] The United States cannot afford to let this happen again. This decision requires the DOE to take into account more than just the circumstances of the four plants in question; by themselves the facilities are advantageous, but as the key to the future of United States energy policy they are vital.

The Secretary of Energy of the United States unequivocally recommends operation of all nuclear facilities as scheduled. Nuclear power must comprise the foundation of U.S. energy policy, and the future begins with these four plants.

[30] Kaplan.
[31] "The Pros and Cons of Nuclear Power."

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