12/9/99

BWR

After 1 yr   1,869 w/assy $11 \frac{\text{kw}}{\text{Mt}}$

24 assy's.

$$\frac{24{,}000 \text{ w}}{24 \text{ assy's}} = 1{,}000 \frac{\text{w}}{\text{assy}}$$

for a BWR $$11 \frac{\text{kw}}{\text{Mt}} \cdot \frac{1000 \frac{\text{w}}{\text{assy}}}{1869 \text{ w/assy}} = 5.89 \frac{\text{kw}}{\text{Mt}}$$

At what kw/Mt do they put it into dry storage casks?

B/48

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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DRY CASK STORAGE OF SPENT FUEL FROM NUCLEAR REACTORS

Nuclear reactors periodically need to unload about one-third of their nuclear fuel and replace it with fresh fuel. Initially the unloaded used fuel, known as "spent fuel," was stored temporarily in water pools at the reactor. It was anticipated that the spent fuel would be reprocessed, with usable portions of the fuel to be recycled and the rest to be disposed of as waste. However, reprocessing did not successfully develop commercially.

Congress gave the Department of Energy (DOE) responsibility for developing permanent disposal capacity for the spent fuel and other high-level nuclear waste. At the present time, DOE, as directed by Congress, is investigating a site in Yucca Mountain, Nevada, for a possible disposal facility, which would be built and operated by DOE and licensed by the Nuclear Regulatory Commission (NRC), if found appropriate.

Until the repository is approved and constructed, spent nuclear fuel is being stored primarily in specially designed, water-filled basins at individual reactor sites around the country. This storage is authorized under the same license that authorizes reactor operation.

In the late 1970's and early 1980's the need for alternative storage began to grow when water pools at many nuclear reactors began to fill up. Utilities began looking at options for increasing spent fuel storage capacity. Current regulations permit reracking and rod consolidation to increase the amount of fuel that can be stored in the pool. Both of these methods are constrained by the structural limitations of the pool.

Another option for increased storage capacity is storage in an independent spent fuel storage installation (ISFSI). Such storage may be either at the reactor site or elsewhere. The spent fuel may be stored in wet or dry ISFSI's. Over the last decade there has been rapid growth in utility interest in dry cask on-site storage, which has become the principal option for utilities needing additional storage capacity.

In 1982, Congress passed the Nuclear Waste Policy Act, which addressed the spent fuel storage problem. The Act directed NRC to approve means of interim dry storage and to do so by rulemaking, omitting site-specific evaluations "to the maximum extent practicable."

The NRC has done this with a technical review and approval of dry storage casks intended to ensure that casks are safe and acceptable at any licensed nuclear power plant site in the country. The regulations now authorize nuclear power plant licensees to store spent fuel on reactor sites in NRC-approved dry storage casks under a general license, without submitting an application for a specific license to store the fuel at a particular site. The NRC-approved cask designs are listed in the regulations.

While the argument is made that the lack of a site-specific approval is a defect, it could be argued equally that the NRC cask approval results in a better cask than one tailored to one specific site alone. The NRC knows of no safety or environmental reason why a site-specific analysis is required.

Use of NRC-certified dry storage casks at a reactor is included within the envelope of the previously approved nuclear power plant site, with all the seismic studies, environmental evaluations, security plans, etc. applicable to the nuclear plant.

The casks are designed to resist floods, tornado missiles, temperature extremes, etc. They will receive spent fuel already cooled in the reactor spent fuel pool for at least 5 years. Typically, the maximum heat generated from the 24 fuel assemblies in each cask will be less than that given off by 240 100-watt light bulbs, and even that decreases with time.

Before using the cask, a utility must verify that the various conditions expected at that specific reactor site (including earthquakes, tornadoes, etc.) fit within the general set of conditions reviewed by the cask vendor and by NRC in approving the cask design. The utility must also know that it will satisfy the conditions specified by the NRC approval of the cask in the Certificate of Compliance, issued to the cask vendor by the NRC staff at the conclusion of the rulemaking, and binding on any utility using the cask at any specific reactor.

All of the utility's actions at the site take place subject to NRC inspection and under the eyes of the NRC inspector. This process further ensures public protection and is consistent with the Congressional scheme, which NRC has followed.

Dry storage in NRC-approved casks is therefore considered to be safe and environmentally sound, and it is also becoming cheaper and may provide, in some cases, substantial cost benefits for a utility and its ratepayers.

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