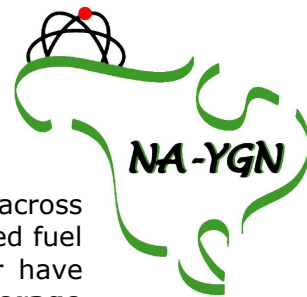


# Used Fuel Storage for Commercial Nuclear Energy

Prepared by the Carolina Chapter of North American Young Generation in Nuclear



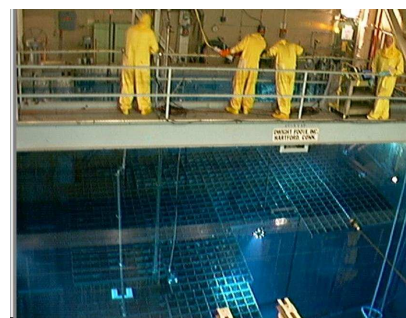
Used nuclear fuel is currently stored at 65 commercial nuclear power facilities across the United States. Historically, there have been no incidents at commercial used fuel storage facilities that have affected the health and safety of the public, nor have there been any known or suspected sabotage attempts. **Hardened storage structures, extensive safety studies, and rigorous government oversight ensure that onsite commercial used fuel storage is safe and secure.**

## ☼ What is nuclear fuel?

U.S. nuclear fuel consists of hard ceramic pellets (about the size of the tip of one's finger) encased in long metal tubes and bundled into groups to create fuel assemblies. Every 12 to 24 months, U.S. plants are shut down and the oldest fuel assemblies are removed and replaced. Used fuel exits the reactor in the same state as it enters – as hard ceramic pellets.

## ☼ What is a used fuel pool?

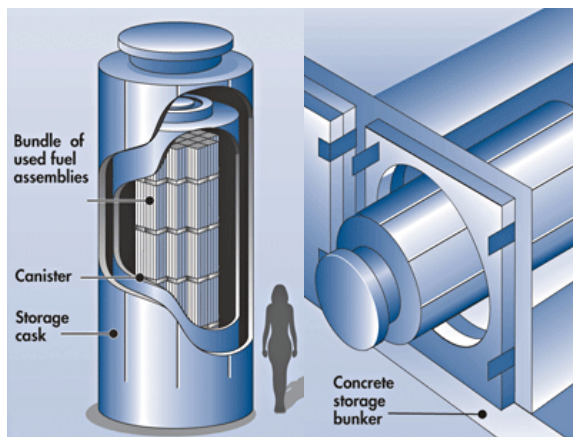
The fission process stops once the used fuel is removed from the reactor, but the used fuel assemblies still generate significant amounts of radiation and heat. These used fuel assemblies are placed in a used fuel pool to allow the fuel time to cool off and decay (become less radioactive). Used fuel pools are constructed of very thick steel-reinforced concrete walls with stainless steel liners and are located inside of plant protected areas. Many used fuel pools are located below ground level, many are shielded by other structures, and many have intervening walls that would obstruct an aircraft's or other object's impact. In these used fuel pools, water acts both as a natural radiation barrier and as a coolant. The water in used fuel pools is isolated and never leaves the confines of the structure<sup>[1]</sup>.



Accident scenarios for used fuel pools have been extensively analyzed using sophisticated computer models. The resulting worst case scenario, an ignition of the zirconium material present in the pools, has been determined to have an extremely low probability of occurrence<sup>[2]</sup>.

## ☼ What is dry cask storage?

When used fuel decays to a suitable level of radioactivity, it can be removed from used fuel pools and placed in above-ground, dry storage facilities. Dry storage containers are made of steel or steel-reinforced concrete, 18 inches (or more) thick, as well as various radiation-shielding materials (such as lead). Once loaded with used fuel, the containers are placed in concrete vaults or placed upright on a thick concrete pad<sup>[1]</sup>.



Dry cask storage systems are designed to resist floods, tornadoes, projectiles, temperature extremes, and other unusual scenarios. Dry casks have been extensively tested, both physically and with computer models, to verify their ability to resist such scenarios<sup>[3]</sup>.

The maximum heat generated from 24 fuel assemblies stored in a cask is typically less than that given off by a home heating system over the same period of time<sup>[3]</sup>.

There are three sites with dry cask storage facilities in the Carolinas: Oconee, McGuire, and Robinson, and three planned sites: Brunswick, Catawba, and VC Summer<sup>[4]</sup>.

For a list of references please refer to the back of the page



## References

1. Nuclear Regulatory Commission, *NRC Fact Sheet on Spent Nuclear Fuel*, viewed 11 October 2006, <<http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/storage-spent-fuel-fs.html>>.
2. Nuclear Regulatory Commission Papers, *SECY-01-0100 Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools (WITS 200000126)*, viewed 6 November 2006, <<http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2001/secy2001-0100/2001-0100scy.html>>.
3. Nuclear Regulatory Commission, *Backgrounder on Dry Cask Storage of Spent Nuclear Fuel*, viewed 6 November 2006, <<http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/dry-cask-storage.html>>.
4. Nuclear Energy Institute, *Status of Used Nuclear Fuel Storage at U.S. Commercial Nuclear Plants*, viewed 31 October 2006, <[http://www.nei.org/documents/Fact\\_Sheet\\_Status%20of%20Used%20Nuclear%20Fuel%20Storage\\_1005.pdf](http://www.nei.org/documents/Fact_Sheet_Status%20of%20Used%20Nuclear%20Fuel%20Storage_1005.pdf)>.

## About North American Young Generation in Nuclear

### YOUNG PROFESSIONALS

NA-YGN's members are individuals age 35 and under working throughout the fields of nuclear science and technology.

### BELIEVE

NA-YGN's members share a personal conviction that nuclear science and technology make important and valuable contributions to our society and will continue to do so in the future.

### WORKING TOGETHER

NA-YGN brings together the different sectors of nuclear science and technology to speak with a united voice for a common goal, and to provide professional development opportunities for its members.

### SHARE THEIR PASSION

NA-YGN shares its passion for nuclear science and technology by communicating with the public about the many ways in which these technologies impact their daily lives.

### ALIVE AND KICKING

Nuclear science and technology is alive and kicking, making tremendous advances in some areas and brimming with possibilities in others.

### **Contact Us:**

**[PublicInfo@carolina-naygn.org](mailto:PublicInfo@carolina-naygn.org)**