



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555-0001

October 1, 1993

The Honorable Joseph I. Lieberman, Chairman  
Subcommittee on Clean Air and Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, DC 20510

Dear Mr. Chairman:

The NRC has sent to the Office of the Federal Register the enclosed final amendment to the Commission's rules in 10 CFR Part 72. This amendment is necessary to add the TN-24 dry spent fuel storage cask to the list of approved casks. This amendment will allow a nuclear power reactor licensee to store spent fuel in this approved cask at its reactor site under a general license.

The proposed amendment was issued for public notice and comment on June 26, 1992 with a 75-day comment period. After placing additional information on the TN-24 cask (previously categorized as proprietary) in the Public Document Room and all Local Public Document Rooms, the comment period was reopened on April 16, 1993, for an additional 30 days. All public comments and questions were considered and appropriate action was taken as described in the Analyses of Public Comments Section of the Federal Register Notice.

The Commission is issuing this final amendment to be effective 30 days after publication in the Federal Register.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dennis K. Rathbun".

Dennis K. Rathbun, Director  
Office of Congressional Affairs

Enclosure:  
Federal Register Notice

cc: Senator Alan K. Simpson

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

October 1, 1993

The Honorable Philip R. Sharp, Chairman  
Subcommittee on Energy and Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, DC 20515

Dear Mr. Chairman:

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Dennis K. Rathbun  
Office of Congressional Affairs

Enclosure:  
Federal Register Notice

cc: Representative Michael Bilirakis



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20565-0001

October 1, 1993

The Honorable Richard H. Lehman, Chairman  
Subcommittee on Energy and Mineral Resources  
Committee on Natural Resources  
United States House of Representatives  
Washington, DC 20515

Dear Mr. Chairman:

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Sincerely,

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Dennis K. Rathbun, Director  
Office of Congressional Affairs

Enclosure:  
Federal Register Notice

cc: Representative Barbara Vucanovich

October 1, 1993

The Honorable Joseph I. Lieberman, Chairman  
Subcommittee on Clean Air and Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, DC 20510

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Sincerely,

Original signed by/  
Dennis K. Rathbun, Director  
Office of Congressional Affairs

Enclosure:  
Federal Register Notice

cc: Senator Alan K. Simpson  
Distribution: [CONGRESS3.LET]  
Subj-circ-chron  
Reading Files\PLohaus  
EBeckjord  
CHeltemes  
BMorris  
FCostanzi  
RAuluck  
GGundersen  
DRathbun, OCA

Identical letters sent to Philip R. Sharp,  
Richard H. Lehman, Alan K. Simpson, Michael Bilirakis  
and Barbara Vucanovich,

Offc: RDB: DRA: RES *[initials]* RDB: DRA: RES RDB: DRA: RES DB: DRA: RES D: DRA: RES DD: DRA: RES D: RES *B*  
Name: GGundersen: JW RAuluck SBahadur FCostanzi BMorris CHeltemes EBeckjord  
Date: 6/16/93 6/16/93 6/16/93 9/7/93 9/7/93 9/14/93 9/14/93

Offc: OCA: *[initials]*  
Name: DRathbun  
Date: 10/1/93

NUCLEAR REGULATORY COMMISSION

10 CFR Part 72

RIN 3150-AE15

List of Approved Spent Fuel Storage Casks: Additions

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is amending its list of approved spent fuel storage casks to add one spent fuel storage cask (TN-24 cask) to the list of approved casks. This amendment will allow holders of power reactor operating licenses to store spent fuel in this approved cask under a general license.

EFFECTIVE DATE: (30 days from date of publication in the Federal Register).

ADDRESSES: Copies of the environmental assessment and finding of no significant impact are available for inspection and/or copying for a fee at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC. Single copies of the environmental assessment and the finding of no significant impact are available from the individuals listed under the next heading below.

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FOR FURTHER INFORMATION CONTACT: Mr. Gordon E. Gundersen, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 492-3803, or Mr. James F. Schneider, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 504-2692.

SUPPLEMENTARY INFORMATION:

Background

Section 218(a) of the Nuclear Waste Policy Act of 1982 (NWPA) directs that, "(T)he Secretary [of DOE] shall establish a demonstration program in cooperation with the private sector, for the dry storage of spent nuclear fuel at civilian nuclear power reactor sites, with the objective of establishing one or more technologies that the [Nuclear Regulatory] Commission may, by rule, approve for use at the sites of civilian nuclear power reactors without, to the maximum extent practicable, the need for additional site-specific approvals by the Commission." After subsequent DOE technical evaluations and based on a full review of all available data, the Commission approved dry storage of spent nuclear fuel in a final rule published in the Federal Register on July 18, 1990 (55 FR 29181). The final rule established a new Subpart K within 10 CFR Part 72 entitled "General License for Storage of Spent Fuel at Power Reactor Sites."

Irradiated reactor fuel has been handled under dry conditions since the mid-1940's when irradiated fuel examinations began in hot cells. Light water reactor fuel has been examined dry, in hot cells since approximately 1960.

Some of these fuels have been stored continuously at hot cells under dry conditions for approximately two decades. Experience with storage of spent fuel in dry casks is extensive (54 FR 19379; May 1989). Further, the United States has extensive experience in the licensing and safe operation of independent spent fuel storage installations (ISFSI's). At the beginning of 1993, the following five site specific licenses for dry cask storage had been issued: Virginia Power Surry Station, issued July 2, 1986; Carolina Power and Light (CP&L) HB Robinson Station, issued August 13, 1986; Duke Power Oconee Station, issued January 29, 1990; Public Service of Colorado Fort St. Vrain Facility, issued November 4, 1991; and Baltimore Gas and Electric (BG&E) Calvert Cliffs station, issued November 25, 1992. All have commenced operation and loaded fuel with the exception of BG&E. Two hundred and fifty-two assemblies are in storage at Virginia Power, 56 assemblies are in storage at CP&L, 96 assemblies are in storage at Duke Power, and 1482 fuel elements are in storage at Public Service of Colorado; BG&E anticipates loading fuel later in 1993.<sup>1</sup>

As a result of the growing use of dry storage technology, NRC has gained over 25 staff years of experience in the review and licensing of dry spent fuel storage systems. To further support the NRC technical staff, the agency draws upon the knowledge and experience of outside scientists and engineers recognized as experts within their respective fields in the performance of the independent safety analysis of the systems and components submitted by applicants for dry cask licenses or certification. Reviews of numerous applications, seeking either site-specific ISFSIs, certificates of compliance

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<sup>1</sup> EIA Service Report SR/CNEAF/92-01 Spent Fuel Discharges from U.S. Reactors 1990, March 1992.

or approval of a topical report, have been conducted over the past seven years.

Section 133 of the NWPA states, in part, that "the Commission shall, by rule, establish procedures for the licensing of any technology approved by the Commission under Section 218(a) for use at the site of any civilian nuclear power reactor." This directive was implemented on July 18, 1990, (55 FR 29181) by the publication in the Federal Register of a final rule establishing new Subparts K and L within 10 CFR Part 72 entitled, respectively, "General License for Storage of Spent Fuel at Power Reactor Sites," and "Approval of Spent Fuel Storage Casks." As a result of that 1990 rulemaking, four casks were listed in § 72.214 of Subpart K as approved by the NRC for storage of spent fuel at power reactor sites under the general license.

More recently, the NRC published a notice of proposed rulemaking in the Federal Register on June 26, 1992 (57 FR 28645) which would have amended 10 CFR 72.214 to include two additional spent fuel storage casks (i.e., the Transnuclear, Inc., TN-24 cask and the Pacific Sierra Nuclear Associates, VSC-24 cask) on the list of approved spent fuel storage casks that power reactor licensees may use under the provisions of a general license issued by NRC in 10 CFR Part 72, Subpart K.

Subsequent to the expiration of the 75-day public comment period on September 9, 1992, NRC took steps to implement the provision of § 2.790(c) of its regulations (41 FR 11808; March 22, 1976) which requires that "information submitted in a rulemaking proceeding which subsequently forms the basis for the final rule will not be withheld from public disclosure by the Commission." The NRC bifurcated the rulemaking proceeding into two separate rulemakings for



the TN-24 and VSC-24 casks, respectively. Accordingly, on January 21, 1993, additional information relating to the VSC-24 cask, which was previously categorized as vendor proprietary information, was placed in the NRC's Public Document Room (PDR) in Washington, DC, and all NRC Local Public Document Rooms. In addition, the comment period for the June 26, 1992, proposed rule was reopened to provide opportunity for public comment on the additional information relating to the VSC-24 cask (January 21, 1993; 58 FR 5301). This comment period expired on February 22, 1993, and the NRC published a notice of final rulemaking in the Federal Register on April 7, 1993 (58 FR 17948) which added the VSC-24 cask to the list of approved spent fuel storage casks.

On April 16, 1993, additional information relating to the TN-24 cask, which was previously categorized as vendor proprietary information, was placed in the NRC PDR in Washington, DC, and all NRC Local Public Document Rooms. In addition, the comment period for the June 26, 1992, proposed rule was reopened for public comment on the additional information relating to the TN-24 cask (April 16, 1993; 58 FR 19786). The reopened comment period expired on May 17, 1993. This notice of final rulemaking deals exclusively with the TN-24 cask. It addresses the general comments on dry cask storage, as they relate to the proposed addition of the TN-24, and the specific comments on the TN-24 cask. This notice does not address the VSC-24 cask.

Transnuclear Inc. submitted to the NRC, a revised Topical Safety Analysis Report (TSAR) entitled "TN-24 Dry Storage Cask Topical Report" dated December 11, 1989. On July 5, 1989, the NRC issued a Safety Evaluation Report (SER) approving the TSAR. The NRC conducted additional evaluations and issued a draft Certificate of Compliance dated April 1992, in support of the notice of proposed rulemaking published in the Federal Register on June 26, 1992.

The paramount objective of 10 CFR Part 72 is to protect the public health and safety by providing for the safe confinement of the fuel and preventing the degradation of the fuel cladding. The review criteria used by the NRC for review and approval of dry cask storage under 10 CFR Part 72 consider the following factors: siting, design, quality assurance, emergency planning, training, and physical protection of the fuel. Included in the review of a specific system, either for a certificate of compliance or a site specific license, are the following phenomena: earthquakes, high winds, tornados, tornado driven missiles, lightning, and floods. In addition, applicants must demonstrate to NRC's satisfaction that their proposed dry cask system will resist man-made events such as explosions, fire, and drop or tipover accidents.<sup>2</sup>

Based on further staff review and analysis of public comments, both the SER and Certificate of Compliance for TN-24 were modified. The TN-24 cask, when used in accordance with the conditions specified in its Certificate of Compliance meets the requirements of 10 CFR Part 72. Thus, use of the TN- cask, as approved by the NRC, will provide adequate protection of the public health and safety and the environment. With this rulemaking, NRC is approving the use of the TN-24 cask under a general license by the holders of power reactor operating licenses under 10 CFR Part 50. Simultaneously, NRC is issuing a final Certificate of Compliance. A copy of the Certificate of Compliance is available for public inspection and copying for a fee at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC.

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<sup>2</sup> The design bases for these events and accidents are contained within 10 CFR Part 72.

## Public Responses

In response to the June 26, 1992 and April 16, 1993 Federal Register Notices, 250 comments were received from individuals, public interest groups, environmental groups, associations, industry representatives, Congressional Representatives and States. Although a number of the comments were received after the respective September 9, 1992 and May 17, 1993 comment closure dates for the two notices, NRC has considered all comments received including those received after the comment closure dates. A number of comments that addressed the VSC-24 cask exclusively, were fully considered by NRC in the VSC-24 proceeding (58 FR 17948) and accordingly, are not addressed in this notice on the TN-24 cask.

A number of comments, which responded to the proposed addition of the TN-24 cask, related to disposal of high-level waste and the use of dry cask storage technology in general. Examples of these comments include:

- The Federal Government's failure to resolve questions about the permanent storage of nuclear wastes leaves both the plant and public with limited options: additional storage in pools, additional storage in dry casks or plant shutdown. The Federal Government has an obligation to resolve the issue of permanent or interim storage. It would be difficult to overstate the need for the dispatch in doing so, as hundreds of American communities will eventually face this problem.

- Ten years ago, there was an erroneous assumption that the search for and construction of a final resting place for high-level waste would be much

swifter than it has been. A "demonstration" program required by law was supposed to have been for temporary storage. Because of the societal and technical obstacles which radioactive waste disposal presents, even a temporary "demonstration" program is likely to have much longer-term implications. Temporary dry cask storage should not become de facto permanent disposal.

These comments deal with broad policy and program issues relating to the storage and disposal of high-level radioactive waste including the Department of Energy's repository program. However, although comments do not directly deal with the TN-24 cask, commenters will find a summary of relevant information on many of these broad issues in the response to comments presented in response to comment numbers 11 and 18 in the following analysis of comments.

Many of the comment letters addressing the proposed addition of the TN-24 cask contained comments that were similar in nature. These comments have been grouped as appropriate and addressed as single issues. In this notice on the TN-24 cask, the NRC has identified and responded to 19 separate issues that include the significant points raised by each commenter.

In addition to or in lieu of comments on the TN-24 cask, many commenters discussed topics that were not the subject of this rulemaking and thus were not specifically addressed by the NRC as a part of this final rulemaking action. These comments expressed opposition to the use of dry cask storage and included suggestions such as the following:

- (1) Nuclear plants generating radioactive waste should be shut down;

(2) The production of radioactive waste should be stopped when the existing spent fuel pool (and off-load-reactor capacity) is full;

(3) A formal hearing should be required at each site using dry storage casks;

(4) The use of nuclear power should be stopped and existing sites cleaned up;

(5) A research and development program should be conducted on productive uses of spent fuel and on alternative energy sources.

Finally, many commenters expressed concern over the ability of dry cask storage designs, presumably including the TN-24 cask, to safely store spent fuel. The following responses to these comments reflect a small but important portion of NRC's review of health, safety, and environmental aspects of the TN-24 cask, to ensure that the cask is designed to provide protection of the public health and safety and environment under both normal conditions and severe, unlikely, but credible accident conditions. Dry cask storage systems are massive devices, designed and analyzed to provide shielding from direct exposure to radiation, confine the spent fuel in a safe storage condition, and prevent releases of radiation to the environment. They are designed to perform these tasks relying on passive heat removal and confinement systems without moving parts and with minimal reliance on human intervention to safely fulfill their function for the term of storage. The designs include margins of safety under both normal and accident conditions to provide additional assurance of protection for the public health and safety, the common defense and security and the environment.

## Analyses of Public Comments

1. Comment. One commenter stated that bolted closures with metal O-rings have shown poor operating characteristics (i.e. leaky) at Surry and in Idaho. Double seal welds at H.B. Robinson and Oconee have shown good operating characteristics. The commenter suggested that all closures should be double seal welds.

Response. Several casks with metallic O-rings have been in operation for at least seven years. Licensees are required to file formal reports if problems with O-rings occur. The NRC has not received any reports concerning O-ring problems. Similarly, there were no reports of problems with metallic O-rings during testing at Idaho National Engineering Laboratory (INEL). However, the NRC discussed this issue with personnel at Virginia Power who are knowledgeable of the cask leak tests at Surry and personnel who worked on tests of the TN-24 cask at INEL. These individual said that they did not have any problems with metallic O-rings leaking on any of the casks that they loaded.

The metallic O-ring seals may not necessarily last the 20 year term of the Certificate of Compliance. That is why double seals are used with a higher pressure between the O-rings with pressure monitoring equipment to quickly detect a seal failure. Failed seals can readily be replaced.

2. Comment. One commenter stated that the TN-24 cask is seriously flawed. Test and operation at Idaho showed the TN-24 storage sleeves to be subject to warpage after only a few years storage. A fuel assembly became stuck in the TN-24 cask while trying to remove it. It could not be removed and it was forced back into the cask.

Response. The NRC discussed this issue with personnel at INEL who worked on the tests of the TN-24 cask and other casks. These individuals said that a canister of consolidated fuel, not a fuel assembly, got stuck in the TN-24 cask. The canister was larger than a fuel assembly and, unlike a fuel assembly, it had many screws and nuts protruding from it. The storage sleeves in the TN-24 Basket did not warp. The individuals suspect that one of the screws or nuts got caught on an interlocking plate in the basket of the TN-24. The Certificate of Compliance does not allow the storage of consolidated fuel in canisters. Additionally, the basket of the TN-24 tested at INEL is slightly different from the one which Transnuclear plans to use in its certified cask.

3. Comment. Some commenters speculated that a catastrophic release of radiation may occur from a possible explosion caused by spontaneously flammable uranium hydride in the presence of oxygen. It is postulated that the temperature inside the cask will be hot enough to rupture fuel rods which will, in turn, cause the presence of hydrogen to create uranium hydride.

Response. The NRC does not believe that an explosion inside a storage cask caused by flammable uranium hydride in the presence of oxygen is credible for the following reasons. Oxygen gas is not expected to be present because all casks are designed to have an inert atmosphere. Further, the formation of uranium hydride is not credible because of the lack of a significant source of hydrogen. Finally, all casks are designed so that the internal temperature will not cause the fuel rods to rupture. Therefore, the conditions necessary for this scenario to occur would not exist.

4. Comment. A number of comments related to gaseous releases from dry storage casks. The commenters asked the following questions. What happens to

gaseous components of the decay chain? Are they released to the environment? If not, is pressure buildup over time being considered? A commenter expressed the opinion that casks should have individual radionuclide emission monitoring. An issue was raised about the effects of release of Krypton-85 (Kr-85) gas on electric conditions in the atmosphere.

Response. The gaseous components of the decay chain are expected to be retained within the matrix of the spent fuel or within the fuel rod. In the case of pinhole leaks in the fuel rod cladding, the cask is designed as a secondary confinement barrier to retain gaseous products. Therefore, gaseous components are not released to the environment, and routine monitoring is not required. Pressure build-up of gaseous components in the cask is not significant due to the age of the fuel and integrity of the fuel rod cladding. However, the cask has been analyzed for a hypothetical condition in which all the fuel rods rupture. The resulting pressure within the cask is negligible. The purpose of maintaining an inert atmosphere in the cask is to ensure that fuel rod cladding degradation does not occur, thereby preventing gross fuel rod cladding rupture. In addition to ensuring that new pin hole leaks do not develop in the fuel clad during the storage period, the licensee is responsible for monitoring the environment within the cask prior to its opening to ensure that no unplanned release of radioactive material takes place. The amount of Kr-85 that could be potentially released from dry cask storage is so small that it would not significantly affect the physics or chemistry of the atmosphere.

5. Comment. The general licensee must have specific plans for the constant and careful monitoring of the casks and for the safeguarding of the waste to prevent catastrophic accidents or terrorism.



Response. In accordance with § 72.212(b)(5), each reactor licensee must have a physical security organization and program to detect intrusion into the protected area including acts of terrorism, and to take any corrective action. The physical security program, as well as environmental monitoring and radiation protection programs for each reactor facility, provide the necessary monitoring for the casks and safeguarding of the spent fuel. Thus, the licensee will be able to determine when corrective action needs to be taken to maintain safe storage conditions to protect the public health and safety. (Also see response to comment number 6).

6. Comment. Some commenters expressed concern that no evacuation plan was required. They also stated that there is a lack of contingency planning for catastrophic events. They noted these events could include but would not be limited to:

- a. Direct or indirect lightning strikes on the casks;
- b. Plane crash into the casks;
- c. Sabotage;
- d. Earthquakes;
- e. Fire; and
- f. Emergency planning for cask malfunctions.

A commenter wanted the utility to notify either State or local governments before loading casks to make sure local services know what is going on and know how to respond if necessary under the emergency plan.

Response. The NRC regulations in 10 CFR Parts 50 and 72 require that nuclear plant structures, systems, and components important to safety be designed and appropriately protected against dynamic effects, including the effects of tornado-driven missiles, that may result from events and conditions

outside the nuclear power unit. If appropriate, this requirement also applies to the effects of possible airplane crashes.

The licensee's site evaluation for a nuclear plant also considers the effect of nearby transportation and military activities. A licensee proposing to use the TN-24 cask is required to evaluate and verify that the Final Safety Analysis Report for the facility encompasses the design basis analysis performed for the TN-24 or any certified cask. Generally, a cask's inherent design will withstand tornado missiles and other design loads and thus, it would be expected that it would also provide protection against the collision forces imposed by light general aviation aircraft (i.e. 1500-2000 pounds) which constitute the majority of aircraft in operation today. NUREG-0800, Section 3.5.1.6 "Standard Review Plan for Light Water Reactors," contains methods and acceptance criteria for determining whether the probability of an accident involving larger aircraft (both Military and civilian) exceeds the acceptable criterion. It is incumbent upon the licensee to determine whether or not the reactor site parameters including analysis of earthquake intensity and tornado missiles are enveloped by the cask design basis as required by § 72.212(b)(3). This would include, an evaluation demonstrating that the requirements of § 72.106 (controlled area for an ISFSI) have been met.

NRC reviewed potential issues related to possible radiological sabotage of storage casks at reactor site ISFSIs in the 1990 rulemaking that added Subparts K and L to 10 CFR Part 72 (55 FR 29181). NRC regulations in 10 CFR Part 72 establish physical protection and security requirements for an ISFSI located within the owner controlled area of a licensed power reactor site. Section 72.212(b)(5) requires that the spent fuel in the ISFSI be protected against the design basis threat for radiological sabotage using provisions and

requirements comparable to those applicable for other spent fuel at the associated reactor subject to certain additional conditions and exceptions described in § 72.212. Each utility licensed to have an ISFSI at its reactor site is required to develop security plans and to install a security system that provides high assurance against unauthorized activities which could constitute an unreasonable risk to the public health and safety. The security systems at an ISFSI and its associated reactor are similar in design features to ensure the detection and assessment of unauthorized activities. All alarm annunciations at the ISFSI are monitored by the security alarm stations at the reactor site. Response to intrusion is required. Each ISFSI is periodically inspected by NRC and annually audited by the licensee to ensure that the security systems are operating within their design limits. The validity of the threat is continually reviewed, with a formal evaluation by the NRC every six months.

An adequate evacuation plan exists for the use of certified casks because the existing reactor emergency plan covers the entire site. In addition, contingency planning for the events described exists because these events are covered within the emergency plans of the reactor facilities which will use the cask. In accordance with § 72.212(b), the reactor licensee must review the emergency plan to ensure it provides adequate protection. The licensee's emergency plan provides for responsive action if an event has happened which has the possibility of creating an emergency or after an actual emergency has occurred. Through communications between the utility and State and local governments, the contents of the emergency plan and the actions to be executed by each entity for various situations are understood. In

addition, the utility is required to conduct a periodic emergency exercise involving the utility and government agency staff.

7. Comment. One commenter stated that there was no contingency for accidents except to reload the spent fuel back into the pool which may not be possible because of lack of pool storage space or impact on the spent fuel because of the accident.

Response. Because of the design features, as well as the procedures and requirements discussed elsewhere in this response and the associated safety analysis, the likelihood of an accident occurring which will require removal of the spent fuel from the cask is very small. However, even if such an unlikely accident occurs, the cask design is required to have capability to allow ready retrieval of the spent fuel for further processing or disposal (10 CFR 72.122(l)). The NRC does not require a licensee to maintain a specified reserve capability in the spent fuel pool. Many licensees may do so, and they would, therefore, have the option of returning the fuel to the pool in the unlikely event of an accident requiring removal of fuel from the cask. In addition, licensees will have other options available to cover this unlikely contingency including temporary storage in a spare storage cask or use of an existing certified transportation cask. Licensees would have to consider these, and other available options, in such an unlikely event.

8. Comment. One commenter noted that the NRC does not specifically require inspections against 10 CFR 72.236(j)-(m).

Response. The NRC ensures compliance with 10 CFR 72.236(j) and (k) through inspections, and ensures compliance with 10 CFR 72.236(l) and (m) through the cask approval process. These inspections will identify different

areas that may need correction. If a violation of the requirements is detected, the NRC can impose penalties, or even stop work.

9. Comment. Some commenters expressed concern that the measurement of actual effectiveness of a technology in delivering stated requirements must be demonstrated empirically, and that the NRC has not demonstrated the goal of this technology, defined acceptance criteria, or specified how compliance is demonstrated.

Response. For the issue of acceptance criteria, the NRC has established specific requirements in 10 CFR Part 72 that must be met in order to obtain a Certificate of Compliance for a cask. The details of the review and bases for the NRC concluding that the cask meets the requirements of 10 CFR Part 72 is provided in the SER. The goal of dry cask storage technology is to store spent fuel safely. That goal, and the effectiveness of the technology, has been demonstrated empirically and experimentally. Different cask designs may require different types of analysis to demonstrate their safety. Therefore different review methods may be appropriate to reach that conclusion. In each case, the level of review performed is the level necessary to provide assurance of adequate protection of the public health and safety.

10. Comment. One commenter requested that the proceeding be stopped until the NRC revises all regulatory requirements pertaining to the storage of high-level waste and spent fuel to require testing procedures which include testing to destruction.

Response. The NRC does not require testing to destruction or other tests if we have confidence in the analyses which are done or if the design relies on nationally recognized codes and standards that have been accepted by

the NRC. Testing to destruction is an option that can be used to confirm design adequacy. However, destructive tests of an entire cask are not necessary to evaluate a design when other non-destructive tests or destructive testing of the components will provide the necessary information to evaluate a design.

11. Comment. Some commenters suggested that the NRC should consider limiting the cask storage time and expressed concern that cask storage could become permanent if the DOE does not accept fuel as they are required to do. Commenters also noted that the NRC requirement that cask viability be evaluated for "at least" 20 years, does not, in itself, guarantee safety in the apparently likely event that the casks remain years or decades beyond the original intended duration.

Response. By approval of the Certificate of Compliance, the NRC has limited the cask storage time to 20 years. After the 20-year period the certificate can be renewed with each renewal period not to exceed 20 years, upon demonstration of continued protection of the public health and safety and the environment. In the event that safe storage of spent fuel in a particular cask cannot be demonstrated beyond 20 years, an alternate means of storage will be required. Finally, the DOE is required by the Nuclear Waste Policy Act of 1982 to accept spent fuel for ultimate disposal. As one commenter noted, DOE proposed a new strategy last winter in which Congress would authorize it to select a site in time to receive spent fuel for interim storage by 1998.

12. Comment. A number of commenters requested a public hearing on this rulemaking. Over half of the commenters requested that a full public hearing

be held at each reactor facility site prior to the use of dry cask storage at that site.

Response. Consistent with the applicable procedure, the NRC does not intend to hold formal public hearings on the TN-24 cask rule or separate hearings at each reactor site prior to use of the dry cask technology approved by the Commission in this rulemaking. Rulemaking procedures, used by the NRC for generic approval of the TN-24 cask, including the underlying NRC staff technical reviews and the opportunity for public input, are more than adequate to obtain public input and assure protection of the public health, safety and the environment.

Section 133 of the Nuclear Waste Policy Act of 1982 authorizes NRC to approve spent fuel storage technologies by rulemaking. When it adopted the generic process in 1990 for review and approval of dry cask storage technologies, the Commission stated that "casks. . . [are to] be approved by rulemaking and any safety issues that are connected with the casks are properly addressed in that rulemaking rather than in a hearing procedure." 55 FR 29181 (July 18, 1990). Rulemaking under NRC rules of practice described in 10 CFR 2.804 and 2.805, provides full opportunity for expression of public views, but does not require formal hearings of the type requested by commenters.

In this proceeding, rulemaking clearly provided adequate avenues for members of the public to provide their views regarding NRC's proposed approval of the TN-24 cask, including the opportunity to participate through the submission of statements, information, data, opinions and arguments. In this connection, the NRC staff prepared for public examination two separate technical evaluations for the TN-24 dry cask, each time making detailed,

documented findings of compliance with NRC safety, security, and environmental requirements. The NRC staff's first evaluation, prepared in July 1989, reviewed and approved the TN-24 for reference in a site-specific application for an independent spent fuel storage installation. In April 1992, the NRC staff reviewed the TN-24, and approved the design for purposes of initiating this rulemaking to grant a generic approval of the design. In addition, the NRC staff conducted a third review in response to the public comments on the TN-24 in this rulemaking, again finding compliance with NRC requirements as set forth in this notice of final rule and response to comments.

In addition to reviewing systematically and in depth the technical issues important to protecting public health, safety and the environment, the NRC has taken extra steps to obtain and fully consider public views on the TN-24 cask, and has made every effort to respond to public concerns and questions about the TN-24 cask's compliance with NRC safety, security and environmental requirements. The initial public comment period opened on June 26, 1992, and closed on September 9, 1992. In addition, NRC received a number of comments after the close of that period, all of which were fully considered. Subsequently, NRC extended the period for submission of public comments until May 17, 1993. Thus, the public comment period for this rule has effectively been almost 11 months. In addition, the NRC staff made every effort to consider comments received after May 17, 1993.

Under these circumstances, formal hearings would not appreciably add to NRC's efforts to ensure adequate protection of public health, safety and the environment, and are unnecessary to NRC's full understanding and consideration of public views on the TN-24 cask.



13. Comment. Some commenters believed that a full democratic process is needed in this decision.

Response. Because this rulemaking was conducted pursuant to the procedures for approving dry storage casks for use under a general license as required by Congress in the Nuclear Waste Policy Act of 1982 and pursuant to public notice and comment procedures of the Administrative Procedure Act, the resulting final rule approving the TN-24 cask is the product of a process prescribed by law.

14. Comment. Some commenters requested that the NRC prepare an environmental impact statement (EIS) and update the Generic EIS for the handling and storage of spent fuel.

Response. The potential environmental impacts of utilities using the TN-24 cask (or any of the other spent fuel casks approved by NRC (10 CFR 72.214)) have been fully considered and are documented in a published Environmental Assessment (EA) covering this rulemaking. Further, as described below, the EA indicates that use of the cask would not have significant environmental impacts. Specifically, the EA notes the 30-plus years of experience with dry storage of spent fuel, identifies the previous extensive NRC analyses and findings that the environmental impacts of dry storage are small, and succinctly describes what impacts there are including the non-radiological impacts of cask fabrication (i.e., the impacts associated with the relatively small amounts of steel, concrete, and plastic used in the casks are expected to be insignificant), the radiological impacts of cask operations (i.e., the incremental offsite doses are expected to be a small fraction of and well within the 25 mrem/yr limits in NRC regulations), the potential impacts of a possible dry cask accident (i.e., the impacts are expected to be

no greater than the impacts of an accident involving the spent fuel storage basin), and the potential impacts due to possible sabotage (i.e., the offsite dose is calculated to be about one rem). All of the NRC analyses collectively yield the singular conclusion that the environmental impacts and risks are expected to be extremely small.

The absence of significant environmental impacts from dry cask storage at a reactor site is also the conclusion of other NRC EA's for previously approved dry casks analyzed in earlier rulemakings addressing Part 72, and in the Commission's Waste Confidence decisions in 1984 (August 31, 1984; 49 FR 34658) and 1989 (September 29, 1989; 54 FR 39765). In the 1984 Waste Confidence decision, the Commission concluded there was reasonable assurance that spent fuel can be safely stored at reactor sites without significant environmental impacts, for at least 30 years beyond expiration of NRC reactor operating licenses. The 1989 Waste Confidence decision review reaffirmed prior Commission conclusions on the absence of significant environmental impacts.

Thus, given the Commission's specific consideration of the environmental impacts of dry storage summarized above, and given the absence of any new information casting doubt on the conclusion that such impacts are expected to be extremely small and not environmentally significant, no meaningful environmental insights are likely to be gained from further preparation of either an EIS or an updated GEIS for the dry storage methodology.

The EA covering the proposed rule, as well as the finding of no significant impact (FONSI) prepared and published for this rulemaking, fully comply with the NRC environmental regulations in 10 CFR Part 51. Moreover, since the Commission's environmental regulations in Part 51 implement the

National Environmental Policy Act (NEPA) and give proper consideration to the guidelines of the Council on Environmental Quality, they assure that the EA and the FONSI conform to NEPA procedural requirements, and that further analyses are therefore not legally required.

In connection with the EA and FONSI, it bears emphasizing that 10 CFR Part 72, Subpart K already authorizes dry cask storage and already approves dry casks for use by utilities to store spent fuel at reactor sites. See 10 CFR 72.214 for a listing information on Cask Certificate Nos. 1000 through 1003 and 1007. The present rulemaking is accordingly for the limited purpose of adding one more cask to the list of casks already approved by NRC. Furthermore, the cask to be added to the NRC list by this rulemaking, will comply with all applicable NRC safety requirements.

Finally, this rulemaking applies to cask use by any power reactor licensee within the United States. Therefore, it is not dependent on any one individual State's actions including preparation of a separate EIS by any State. Further, nothing in this rulemaking would preclude any State from implementing its environmental statutes and regulations as may otherwise be permitted by law.

15. Comment. Some commenters believed that a cost/benefit analysis should be prepared.

Response. A Regulatory Analysis which considers both benefits and impacts of adding the TN-24 cask to the list of NRC-approved casks under 10 CFR Part 72, Subpart K, was prepared in support of this rulemaking action. It was included as part of the notice of proposed rulemaking and is also included in this final rulemaking notice. This regulatory analysis reflects the limited economic scope of this rulemaking.

16. Comment. Some commenters indicated that operating procedures, evaluation reports, and training programs should be submitted to the NRC, state and local government authorities, and placed in local libraries near such facilities.

Response. These documents expand on generically approved procedures in the SAR and Certificate of Compliance. In accordance with the NRC requirements, licensees are not required to submit this information to the NRC or other government authorities. Rather, this information is evaluated by the licensee and is available for inspection by the NRC. The NRC's inspection program includes requirements to inspect these procedures and these inspection reports are available in the NRC Public Document Room.

17. Comment. One commenter believed that the Certificate of Compliance should list all NRC regulations controlling the use of the specific cask for the storage of spent fuel.

Response. The Certificate of Compliance contains a general reference to the provisions of 10 CFR Part 72, which includes in Subpart K, the regulations relevant to the storage of spent fuel under a general license. A specific reference to each regulation section is, therefore, unnecessary.

18. Comment. Some commenters believed that it is not acceptable to increase the number of approved cask designs. Some suggested that alternative actions to dry cask storage should be considered.

Response. The NRC, in implementing the Nuclear Waste Policy Act of 1982, has an obligation to approve the use of casks for the storage of spent fuel, provided these casks meet applicable regulatory requirements. The NRC agrees with the commenter that these casks should contain radioactivity and protect workers, the public, and the environment. The previous rulemaking

(55 FR 29181; July 18, 1990) found that spent fuel stored in dry storage casks designed to meet the NRC regulatory requirements can contain radioactivity safely. This rulemaking adds one cask design, which meets the safety requirements previously developed. The previous responses to comments, as well as the detailed safety and environmental analyses underlying this rulemaking, and described elsewhere in this document, all reveal that the TN-24 cask will conform to NRC requirements, and that its use should not pose the potential for significant environmental impacts.

The principal alternatives available to the NRC would be procedural in nature, whereby dry cask spent fuel storage could be approved under other existing or new parts of Title 10, Code of Federal Regulations. Regardless of the method selected to approve such dry cask spent fuel storage, all would have similar environmental impacts.

The NWSA directed that the NRC approve one or more technologies, that have been developed and demonstrated by DOE, for the use of spent fuel storage at the sites of civilian nuclear power reactors without, to the extent practicable, the need for additional site-specific review. The NWSA also directed that the NRC, by rulemaking, set forth procedures for licensing the technology. Regulations for accomplishing this are in place. Therefore, the no action alternative is not acceptable.

Consideration of alternative spent fuel storage technologies is beyond the scope of this rulemaking. This action is being taken in response to Section 218(a) of the Nuclear Waste Policy Act of 1982 which specifies dry storage.

19. Comment. Some commenters asked who would be responsible for oversight of fuel stored in casks after decommissioning of the reactor,

shipment of the fuel off-site, and for decommissioning of the casks after stored fuel was shipped off-site.

Response. In accordance with § 50.54(bb), all operating nuclear power reactor licensees are required, no later than 5 years prior to the expiration of the operating license, to provide the NRC, for review and approval, the licensee's program to manage and provide funding for the management of all irradiated fuel. NRC's review of the licensee's fuel management program will be undertaken as part of continued licensing under the provisions of Parts 50 and 72 of the Commission's regulations.

With respect to decommissioning, the licensee may select a decommissioning alternative that will:

1. Allow storage of spent fuel in the spent fuel pool, in which case the licensee will be required to maintain its Part 50 license;
2. Allow storage of fuel in a certified cask under the provisions of Part 72 as long as the Part 50 license remains in effect; or
3. Allow storage in an on-site independent spent fuel storage installation under the site specific licensing provisions of Part 72.

For any of the above alternatives, the licensee will be responsible for safe storage of spent fuel during the period of storage, for later shipment off-site for further storage or disposal by the Federal Government and for final decommissioning of the reactor spent fuel pool, dry storage cask or ISFSI to a level permitting unrestricted release of the site facility. The requirements for decommissioning are provided in § 72.30, the section that defines decommissioning planning, financial assurance, and recordkeeping provisions.

Finding of No Significant Environmental Impact: Availability

Under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in Subpart A of 10 CFR Part 51, the Commission has determined that this rule is not a major Federal action significantly affecting the quality of the human environment and, therefore, an environmental impact statement is not required. This final rule adds an additional cask to the list of approved spent fuel storage casks that power reactor licensees can use to store spent fuel at reactor sites without additional site-specific approvals by the Commission. The environmental assessment and finding of no significant impact on which this determination is based is available for inspection at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC. Single copies of the Environmental Assessment and the Finding of No Significant Impact are available from Mr. Gordon E. Gundersen, Office of Nuclear Regulatory Research, U. S. Nuclear Regulatory Commission, Washington, DC, 20555, telephone (301) 492-3803.

## Paperwork Reduction Act Statement

This final rule does not contain a new or amended information collection requirement subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget approval number 3150-0132.

### Regulatory Analysis

On July 18, 1990 (55 FR 29181), the Commission issued an amendment to 10 CFR Part 72, which provided for the storage of spent nuclear fuel under a general license. Any nuclear power reactor licensee can use these casks if: (1) They notify the NRC in advance; (2) The spent fuel is stored under the conditions specified in the cask's Certificate of Compliance; and (3) The other conditions of the general license are met. As part of the 1990 rulemaking (55 FR 29181), four spent fuel storage casks were approved for use at reactor sites, and were listed in 10 CFR 72.214. That rulemaking envisioned that storage casks certified in the future could be routinely added to the listing in § 72.214 through rulemaking procedures. Procedures and criteria for obtaining NRC approval of new spent fuel storage cask designs were provided in 10 CFR 72.230. On April 7, 1993 (58 FR 17948), a fifth storage cask was added to that list.

The present regulatory action is being taken to add a sixth storage cask to the listing in § 72.214 in response to the Congressional direction in Sections 133 and 218 of the Nuclear Waste Policy Act of 1982. The alternative to this action is to withhold certification of this new design and to consider



the granting of a site-specific license to each utility that applied for permission to use this new cask. This would be in direct conflict with Congressional direction to establish procedures for the licensing of technologies for the use of spent fuel storage at the sites of civilian nuclear power reactors without, to the extent practicable, the need for additional site reviews. Site-specific licenses alternative would be more costly and time consuming because each site-specific license would require a specific review. In addition, withholding certification would ignore the rulemaking procedures and criteria in 10 CFR Part 72, Subparts K and L, for the addition of new cask designs. Also, the alternative would exclude new vendor cask designs from the approved NRC list under Subpart K without cause and would arbitrarily limit choice of cask designs available to power reactor licensees.

This final rulemaking will eliminate the above problems. Further, this action will have no adverse effect on the public health and safety.

The benefit of this final rule to nuclear power reactor licensees is to make available a greater choice of spent fuel storage cask designs which can be used under a general license. However, the newer cask designs may or may not have an advantage over the existing designs in that power reactor licensees may or may not prefer to use the newer casks. The new cask vendors with casks to be listed in § 72.214 benefit by having to obtain NRC certificates once for a cask design which can then be used by many power reactor licensees under the general license. Vendors with cask designs already listed may be adversely impacted in that power reactor licensees may choose a newly listed design over an existing one. However, the NRC is required by its regulations and NWSA requirements to establish a procedure and

consider applications to certify and list approved casks. The NRC also benefits because it will be able to certify a cask design based on one generic safety and environmental review, for use by multiple licensees. This final rulemaking has no significant identifiable impact or benefit on other Government agencies.

Based on the above discussion of the benefits and impacts of the alternatives, the NRC concludes that the requirements of the final rule are commensurate with the Commission's responsibilities for protection of the public health and safety and the common defense and security. No other available alternative is believed to be as satisfactory, thus, this action is recommended.

#### Regulatory Flexibility Act Certification

In accordance with the Regulatory Flexibility Act, 5 U.S.C. 605(b), the Commission certifies that this rule will not have a significant economic impact on a substantial number of small entities. This amendment affects only licensees owning and operating nuclear power reactors and cask vendors. The owners of nuclear power plants do not fall within the scope of the definition of "small entities" set forth in Section 601(3) of the Regulatory Flexibility Act, 15 U.S.C. 632, or the Small Business Size Standards set out in regulations issued by the Small Business Administration at 13 CFR Part 121.

## Backfit Analysis

The NRC has determined that the backfit rule, 10 CFR 50.109, does not apply to this final rule, and, thus, a backfit analysis is not required for this final rule, because this amendment does not involve any provisions which would impose backfits as defined in § 50.109(a)(1).

### List of Subjects in 10 CFR Part 72

Manpower training programs, Nuclear materials, Occupational safety and health, Reporting and recordkeeping requirements, Security measures, Spent fuel.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 552 and 553, the NRC is adopting the following amendments to 10 CFR Part 72.

### PART 72--LICENSING REQUIREMENTS FOR THE INDEPENDENT STORAGE OF SPENT NUCLEAR FUEL AND HIGH-LEVEL RADIOACTIVE WASTE

1. The authority citation for Part 72 continues to read as follows:

**AUTHORITY:** Secs. 51, 53, 57, 62, 63, 65, 69, 81, 161, 182, 183, 184, 186, 187, 189, 68 Stat. 929, 930, 932, 933, 934, 935, 948, 953, 954, 955, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2071, 2073, 2077, 2092, 2093, 2095, 2099, 2111, 2201, 2232, 2233, 2234, 2236, 2237, 2238, 2282); sec. 274, Pub. L. 86-373, 73 Stat. 688, as amended (42 U.S.C. 2021); sec. 201, as

amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846); Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5851); sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332); secs. 131, 132, 133, 135, 137, 141, Pub. L. 97-425, 96 Stat. 2229, 2230, 2232, 2241, sec. 148, Pub. L. 100-203, 101 Stat. 1330-235 (42 U.S.C. 10151, 10152, 10153, 10155, 10157, 10161, 10168).

Section 72.44(g) also issued under secs. 142(b) and 148(c), (d), Pub. L. 100-203, 101 Stat. 1330-232, 1330-236 (42 U.S.C. 10162(b), 10168(c)(d)). Section 72.46 also issued under sec. 189, 68 Stat. 955 (42 U.S.C. 2239); sec. 134, Pub. L. 97-425, 96 Stat. 2230 (42 U.S.C. 10154). Section 72.96(d) also issued under sec. 145(g), Pub. L. 100-203, 101 Stat. 1330-235 (42 U.S.C. 10165(g)). Subpart J also issued under secs. 2(2), 2(15), 2(19), 117(a), 141(h), Pub. L. 97-425, 96 Stat. 2202, 2203, 2204, 2222, 2244 (42 U.S.C. 10101, 10137(a), 10161(h)). Subparts K and L are also issued under sec. 133, 98 Stat. 2230 (42 U.S.C. 10153) and sec. 218(a), 96 Stat. 2252 (42 U.S.C. 10198).

2. In § 72.214, Certificate of Compliance 1005 is added to read as follows:

§ 72.214 List of approved spent fuel storage casks.

\* \* \* \* \*

Certificate Number: 1005

SAR Submitted by: Transnuclear, Inc.

SAR Title: TN-24 Dry Storage Cask Topical Report

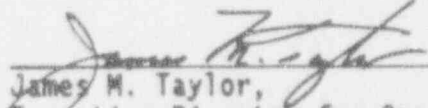
Docket Number: 72-1005

Certification Expiration Date: (20 years after final rule effective date)

Model Number: TN-24

Dated at Rockville, Maryland, this 23<sup>rd</sup> day of September, 1993.

For the Nuclear Regulatory Commission.

  
\_\_\_\_\_  
James M. Taylor,  
Executive Director for Operations.