Administrator determines that waiving the requirement will not significantly affect accomplishment of RUS' objectives and if the requirement imposes a substantial burden on the borrower. The borrower's general manager must request the waiver in writing.

§§ 1710.211–1710.249 [Reserved]

Dated: March 10, 2000.

Jill Long Thompson,

Under Secretary, Rural Development.

[FR Doc. 00–6761 Filed 3–17–00; 8:45 am]

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NUCLEAR REGULATORY COMMISSION

10 CFR Part 72

RIN 3150–AG 18

List of Approved Spent Fuel Storage Casks: TN–32 Addition

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is amending its regulations to add the Transnuclear TN–32 cask system to the list of approved spent fuel storage casks. This amendment allows the holders of power reactor operating licenses to store spent fuel in this approved cask system under a general license.

EFFECTIVE DATE: This final rule is effective on April 19, 2000.

FOR FURTHER INFORMATION CONTACT: Merri Horn, telephone (301) 415–8126, e-mail mlh1@nrc.gov of the Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001.

SUPPLEMENTARY INFORMATION:

Background

Section 218(a) of the Nuclear Waste Policy Act of 1982, as amended (NWPA), requires that ''[t]he Secretary [of Energy] shall establish a demonstration program, in cooperation with the private sector, for the dry storage of spent nuclear fuel at civilian nuclear reactor power 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.'' Section 133 of the NWPA states, in part, ''[t]he 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.''

To implement this mandate, the NRC approved dry storage of spent nuclear fuel in NRC-approved casks under a general license, publishing a final rule in 10 CFR Part 72 entitled ''General License for Storage of Spent Fuel at Power Reactor Sites'' (55 FR 29181; July 18, 1990). This rule also established a new Subpart L within 10 CFR Part 72 entitled, ''Approval of Spent Fuel Storage Casks'' containing procedures and criteria for obtaining NRC approval of dry storage cask designs.

Discussion

This rule will add the Transnuclear TN–32 cask system to the list of NRC approved casks for spent fuel storage in 10 CFR 72.214. Following the procedures specified in 10 CFR 72.230 of Subpart L, Transnuclear submitted an application for NRC approval with the Safety Analysis Report (SAR) entitled, ''TN–32 Dry Storage Cask Topical Safety Analysis Report (TSAR).'' The NRC evaluated the Transnuclear submittal and issued a preliminary Safety Evaluation Report (SER) and a proposed Certificate of Compliance (CoC) for the Transnuclear TN–32 cask system. The NRC published a proposed rule in the **Federal Register** (64 FR 45923; August 23, 1999) to add the TN–32 cask system to the listing in 10 CFR 72.214. The comment period ended on November 8, 1999. Four comment letters were received on the proposed rule.

Based on NRC review and analysis of public comments, the NRC staff has modified, as appropriate, its proposed CoC and the Technical Specifications (TSs) for the TN–32 cask system. The NRC staff has also removed the bases section from the TSs. The NRC staff has modified its preliminary SER. The NRC staff has also modified the rule language by changing the word ''Certification'' to ''Certificate'' to clarify that it is the Certificate that expires.

The proposed CoC has been revised to clarify the requirements for making changes to the CoC by specifying that the CoC holder must submit an application for an amendment to the certificate if a change to the CoC, including its appendices, is desired. The CoC has also been revised to delete the proposed exemption from the requirements of 10 CFR 72.124(b) because a recent amendment of this regulation makes the exemption unnecessary (64 FR 33178; June 22, 1999). The staff has also updated the CoC, including the addition of explicit conditions governing acceptance tests and maintenance program, approved contents, design features, and authorization, and has removed the bases section from the TSs attached to the CoC to ensure consistency with NRC's format and content. In addition, other minor, nontechnical changes have been made to CoC 1021 to ensure consistency with NRC's new standard format and content for CoCs.

The NRC finds that the TN–32 cask system, as designed and when fabricated and used in accordance with the conditions specified in its CoC, meets the requirements of 10 CFR Part 72. Thus, use of the TN–32 cask system, as approved by the NRC, will provide adequate protection of public health and safety and the environment. With this final rule, the NRC is approving the use of the TN–32 cask system under the general license in 10 CFR Part 72, Subpart K, by holders of power reactor operating licenses under 10 CFR Part 50. Simultaneously, the NRC is issuing a final SER and CoC that will be effective on April 19, 2000. Single copies of the CoC and SER are available for public inspection and/or copying for a fee at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC.

Summary of Public Comments on the Proposed Rule

The NRC received four comment letters on the proposed rule. The commenters included the applicant, a user's group, and two letters from members of the public. Copies of the public comments are available for review in the NRC Public Document Room, 2120 L Street, NW (Lower Level), Washington, DC 20003–1527.

Comments on the TN–32 Cask System

The comments and responses have been grouped into nine subject areas: general, radiation protection, accident analysis, criticality analysis, thermal, materials, design, technical specifications, and miscellaneous issues. Several of the commenters provided specific comments on the draft CoC, the NRC staff's preliminary SER, and the TSs. To the extent possible, all of the comments on a particular subject are grouped together. The listing of the TN–32 cask system within 10 CFR 72.214, ''List of approved spent fuel storage casks'' has not been changed as a result of the public comments. A review of the comments and the NRC staff's responses follow:

A. General

Comment A.1: One commenter stated that the NRC is certifying more casks generically rather than on a site-specific basis. This is not consistent with the Nuclear Waste Policy Act (NWPA) guidance and results in more site specific changes or amendments, confuses workers in the industry, complicates the approval process, requires significant NRC resources to address problems as casks get loaded, and requires special NRC inspection teams to address new cask problems. The commenter further suggested that a standard design should be developed by having DOE, NRC, Congress, and other organizations work together to choose the best design proposed by vendors. The commenter asked how many designs the NRC would ultimately certify, their compatibility with the total transport and disposal system and the time and money that will be spent approving so many designs.

Response: The NRC disagrees with the comment. The NWPA directs the NRC to establish one or more technologies and does not include specific guidance on the number and types of cask designs that should be considered, approved, or used. The NRC does not require that a cask be universal or be useable at every reactor site. This comment is beyond the scope of this rule that is focused solely on whether to place a particular cask design, the TN–32 cask system, on the list of approved casks.

Comment A.2: One commenter stated that having different designs at one site confuses workers because of the need for different procedures and the need to be aware of all changes made to the CoC, the SAR and amendment changes. Further, the commenter stated that multiple designs will add the potential for human error and could have an adverse affect on public health and safety and that the NRC should evaluate how multiple cask systems used at one plant can affect safe operations at the plant.

Response: This comment is beyond the scope of this rule that is focused solely on whether to place the TN–32 cask system on the list of approved casks.

Comment A.3: One commenter stated that regulations should be written more simply to enhance successful implementation.

Response: The NRC agrees with the commenter that the regulations should be easy to understand; however, the commenter did not offer any specifics as to what in the regulation was confusing. The actual rule change is the addition of the TN–32 cask system to the listing of approved casks. The NRC staff is committed to issuing its regulations in plain English including this rule.

Comment A.4: One commenter stated that the NRC should form a committee to consider the nuclear waste ''picture'' based on current NRC practices and how it will change in the future.

Response: This comment is beyond the scope of this rule.

Comment A.5: One commenter stated that NRC approving a large number of casks generically results in more site specific changes and amendments being needed, confuses workers in the industry, complicates the approval process, requires significant NRC resources to address problems as casks get loaded, and requires special NRC inspection teams to address new cask problems.

Response: This comment is beyond the scope of this rule.

Comment A.6: One commenter stated that allowing TN–32 casks to be fabricated by exemption adds risk to the public because they will be used with as little change as possible. The commenter further stated that no TN–32 casks should have been built until a generic certification is issued and the documents are finalized and accurate.

Response: The NRC exemption that allows the casks to be fabricated before the design being approved included a technical evaluation of the impacts of this action. This evaluation reflected that fabrication of the casks with no fuel loading does not add any measurable risk to the public. Casks are not used (loaded) until they conform to the final NRC approval in the form of an issued CoC or site-specific license.

Comment A.7: One commenter discussed the Wisconsin Public Service Commission (WPSC) lack of concern about TN not having to use positive means to verify continued efficacy of the neutron absorbing material in the casks.

Response: Issues related to WPSC are beyond the scope of this rule.

Comment A.8: One commenter asked if a generic TN–32 had ever been built and tested, if there are similar designs being used at the Surry nuclear plant and if the Surry casks are site-specific designs, if Wisconsin Electric Power Company (WEPCO) has built similar cask designs, if any similar designs have been loaded, what the track record has been for similar designs, how long the casks have been used at other sites, whether closure seals have been replaced and where, whether exemptions were required elsewhere, and whether these other casks will need changes to meet the current proposed design.

Response: As noted in the SAR in Chapter 1, the standard TN–32 cask was approved by the NRC as a Topical Report in 1996 for reference in site-specific applications. Currently there are nine TN–32 casks located at the Surry site that were first loaded in 1996 and five at the North Anna site first loaded in 1998. A successful dry run was performed before the first loading at each site. WEPCO has the VSC–24 design casks at its Point Beach site that is a different design than the TN–32. O-rings have been replaced on casks on the Surry site. Exemptions have been granted to other cask designs and are publically available. There will be no requirements to change already approved cask designs to meet the specifications of the design being approved by this rule, because there has been no NRC finding as part of the current review that calls into question any NRC safety findings on previous TN–32 designs.

Comment A.9: One commenter stated that the environmental assessment (EA) using the tiered approach on past environmental analysis is not valid and an environmental impact analysis should be performed for the TN–32 and every other new cask design.

Response: The NRC disagrees with the comment. The EA and finding of no significant impact (FONSI) for this rule are limited in scope to the TN–32 in a generic setting. The NRC has given specific consideration of environmental impacts of dry storage and has not found any new information affecting the conclusion that these impacts are expected to be extremely small and not environmentally significant. Therefore, the NRC believes that meaningful new environmental insights would not be gained by performing an environmental impact analysis for each new cask that is certified. The EA covering the proposed rule, as well as the FONSI prepared and published for this rulemaking, fully comply with NRC's environmental regulations in 10 CFR Part 51. 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 of Environmental Quality (CEQ). The EA and FONSI prepared for the TN–32, as required by 10 CFR Part 51, conform to NEPA procedural requirements. Tiering on past environmental Impact Statements (EISs) and EAs is a standard process under NEPA. As stated in CEQ's ''Forty Frequently Asked Questions,'' the tiering process makes each EIS/EA of greater use and meaning to the public as the plan or program develops, without duplication of the analysis prepared for the previous impact statement.

Comment A.10: One commenter provided a number of comments and questions on the use of TN–32 casks by WEPCO. The commenter asked about why casks may be made in Japan and who would regulate this process. This commenter also expressed concern about the increased costs for the TN–32 over that of the VSC–24.

Response: These comments are beyond the scope of this rule that is focused solely on whether to place the TN–32 cask system on the list of approved casks. Decisions made by specific utilities on why a specific cask is chosen over another design are beyond the scope of this rule. If WEPCO chooses to use the TN–32 cask design at the Point Beach site, the licensee will be required to perform an evaluation in accordance with 10 CFR 72.212 to determine whether activities related to storage of spent fuel under the general license would involve any unreviewed safety question as provided under 10 CFR 50.59. In accordance with this regulation, the licensee would make changes to existing lifting systems and any physical changes to the facility as necessary to accommodate new cask designs. Each of these changes would need to be evaluated per 10 CFR 50.59 to determine their impact on other systems and on existing safety analyses. The NRC does not have a role in selecting particular manufacturers for a cask. Each CoC holder and licensee is responsible for ensuring that the quality assurance requirements for a cask are met by the fabricator. The cost of cask fabrication is beyond the scope of this rule.

Comment A.11: One commenter stated an opinion that burnable poison rod assemblies (BPRAs) and thimble plug assemblies (TPAs) should not be placed in casks but should be shipped in low level waste containers to low level waste storage facilities. This would make the shipping process less costly and would result in simpler procedures and analyses.

Response: The NRC disagrees with this comment. The inclusion of BPRAs and TPAs in the spent fuel casks provides better protection by limiting potential radiation exposure for the plant workers and the public than handling these items separately. Even though the radiation source term in the casks due to BPRAs and TPAs is higher, the user at each site must take steps and measurements to ensure that the regulatory limits on dose rates are met. The cask users will have procedures to address the differences in handling casks with and without BPRAs and TPAs. Storage of spent fuel assemblies and their associated hardware that includes BPRAs and TPAs in a cask is not prohibited by NRC regulations. The comment about storage of BPRAs and TPAs at a low level waste facility is beyond the scope of this rule.

Comment A12: One commenter asked who verifies that fabricators are qualified to build casks and suggested that the NRC set up evaluation criteria and enforcement programs to bar unqualified companies. The commenter also voiced a concern that vendors and subcontractors are new to the nuclear industry and require strong and effective quality assurance.

Response: The CoC holder and licensee are responsible for verifying that fabricators are qualified. The choice of who fabricates a container is a business decision made by the licensee or certificate holder seeking to build containers. The CoC holder and licensee must have an NRC-approved Quality Assurance (QA) Program that is approved as part of the licensing or CoC issue process. This QA program must meet the requirements of 10 CFR 72.148 and 10 CFR 72.154 for the selection of fabricators. Also, the procurement documents issued to the fabricator must comply with 10 CFR 21.31. These requirements are passed onto fabricators as part of a contract or through other procurement documents. The licensee/CoC holder is required to verify that all regulations applicable to the container are met. The NRC inspects the licensee/CoC holders and fabricators to verify compliance as well. The NRC has a defined process for taking enforcement actions against those that do not comply with NRC regulations.

Comment A.13: One commenter recommended that the NRC certify only dual purpose casks in the future.

Response: This comment is beyond the scope of this rule. The current regulatory framework does not preclude an applicant from requesting certification of either a transport, storage, or dual purpose cask. The NRC may approve any one of these designs.

Comment A.14: One commenter disagreed with the NRC position that the independent spent fuel storage installation (ISFSI) must be designed to withstand the same safe shut down earthquake as for the adjacent nuclear power plant. Instead, this commenter recommended that an ISFSI pad should be required to have its own specific seismic analysis because the reactor and the ISFSI may be located on different types of soil or land forms.

Response: The NRC disagrees with the recommendation that each ISFSI pad be required to have a specific seismic analysis. Before using the TN–32 cask, the general licensee must evaluate the site to determine whether or not the chosen site parameters are enveloped by the design bases of the approved cask as required by 10 CFR 72.212.

Comment A.15: One commenter addressed the references included in the NRC SER. This commenter suggested that all references should be dated and that more current versions of references should be listed.

Response: The NRC agrees with this comment. Reference dates have been added and more current versions of references have been added to the SER where appropriate.

Comment A.16: One commenter stated that the utility should not decide the amount of dose to the public that will be generated by the casks and that there should be a public hearing for each design that is proposed for use by a utility. The commenter further stated that the public knows nothing about how utilities choose cask designs at most locations, does not read the **Federal Register**, and feels incapable of reading NRC documents. The commenter added that the public should be given a choice as to what they want to be placed on a pad in the vicinity of their homes.

Response: This comment is beyond the scope of this rule. The NRC is not involved in the decision process used by utilities to select a cask design. A utility may choose any certified cask design for spent fuel storage. However, the potential dose to the public from the cask use may not exceed NRC regulatory dose limits. The rulemaking process used by the NRC for generic approval of casks is the regulatory vehicle used to obtain public input and ensure protection of public health and safety and the environment. This final rule adds the TN–32 cask design to the list of approved casks available for use by a power plant licensee under the conditions of the general license in 10 CFR Part 72. Those conditions require each licensee to determine if the reactor site parameters are encompassed by the cask design bases considered in the cask SAR and SER.

Comment A.17: One commenter stated that the computer based safety analysis that is discussed in SER Chapter 6 is not a realistic way of dealing with the design and accidents and requested that actual conditions be evaluated.

Response: The NRC disagrees with this comment. As stated in SER Section 6.3.1, the most limiting conditions are combined and bound all credible conditions. The NRC staff accepts analytic conclusions based on sound engineering methods and practices. NRC accepts the use of computer modeling codes to analyze cask performance. The NRC found the computer codes and models used by TN to be appropriate as discussed in the SER.

Comment A.18: One commenter asked who would be responsible for conducting a heat load test following a cask design change. The commenter suggested that a cask user would probably evaluate the design change under 10 CFR 72.48 rather than conducting a heat load test. The commenter also stated that the use of 10 CFR 72.48 results in ''goofing up'' design documents.

Response: The comment on the 10 CFR 72.48 process affecting design document quality is beyond the scope of this rule. As required by the TN–32 Certificate of Compliance (CoC), prior to loading a cask with a heat load equal to or greater than 23.7 kilowatts, the heat transfer performance of a cask shall be verified by a thermal test. The CoC also requires that any changes to the fabrication process be evaluated for thermal impact. If the change is found to be significant, the heat transfer performance of a modified cask shall be verified by an additional thermal test prior to loading a modified cask with a heat load equal or greater than 23.7 kilowatts. If the heat load exceeds the CoC specified value, there is no option to use 10 CFR 72.48 to avoid performing a repeat test.

Comment A.19: One commenter asked how the NRC will ensure that TN will independently verify the adequacy of the cask design and that changes to design documents will be reviewed and approved by the same organizations who performed the original design.

Response: Independent design verification reviews and reviewing design changes are governed by an NRC-approved QA program. The NRC performs inspections to verify that a CoC holder meets its approved QA program requirements. 10 CFR 72.232, ''Inspection and Tests'' provides the NRC permission to perform inspections and tests at any time. The NRC will be able to determine the adequacy of the independence of TN's cask design verification through the inspection program.

Comment A.20: One commenter stated that design records should be legible because their use is important during emergency situations, that the requirement for independent inspections should be emphasized in documentation and enforced, that calibration records are of grave importance and need constant verification that each action was completed, and that verifications should be done in a timely manner.

Response: The NRC agrees that design records must be legible and should be complete and accurate. Several regulations address the quality of records that are maintained by applicants and licensees. Each CoC holder must have an NRC-approved QA program. An NRC-approved program includes specific requirements for quality assurance records, independent inspection and testing, and control of measuring and test equipment. Ultimately, according to their approved QA program, the licensee/CoC holder must maintain necessary and sufficient records as evidence of activities affecting quality under routine and emergency conditions.

Comment A.21: One commenter asked what the standard industry decommissioning practices are for decommissioning (referred to on Page 14–1 of the SER), asked if implementation of decommissioning will be a big problem for the TN–32 design, how wet transfer will be dealt with for casks in the future, and when a dry transfer method will be used along with dual purpose casks. Also, the commenter asked if there is a proposal for a dry storage method with an associated dry transfer process and what the results were from the Transnucleaire of France report to DOE and EPRI on dry transfer.

Response: The phrase ''standard industry decommissioning practices'' in the SER refers to general practices of decontamination, cask disassembly with adequate radiological and occupational safety controls, fuel handling procedures, and safe component transportation and disposal. Decommissioning implementation will be addressed as a site-specific issue. The remaining portions of this comment are beyond the scope of this rule.

Comment A.22: One commenter stated that the review should consider the ultimate disposal of the spent fuel.

Response: This comment is beyond the scope of this rule. The CoC for the TN–32 is intended for the interim storage of spent fuel. Use of the TN–32 cask design for disposal at a high-level waste repository is beyond the scope of this rule. DOE has not yet made final decisions regarding cask design or deployment for the cask design to be used in the high-level waste repository.

Comment A.23: One commenter asked if the TN–24 design had ever been used and why it is not in production currently. Also, the commenter asked why casks holding 24 and 32 assemblies are being approved and used while the Yucca Mountain facility description discusses casks with a 21 assembly capacity.

Response: The comments on the TN–24 design are beyond the scope of this rule. A final decision on the design of storage casks for disposal at Yucca Mountain has not been made.

Comment A.24: One commenter stated that unloading procedures should be placed in the NRC public document room.

Response: The NRC disagrees with the comment. Detailed loading and unloading procedures are developed and evaluated on a site-specific basis by the licensee using the cask. There is no requirement to have detailed procedures placed in the public document room.

Comment A.25: One commenter stated that the NRC should always remember that the priority is public and worker safety, not keeping the plants operating; and that the NRC should do the certifications of new cask designs very carefully and not as fast as the utility schedule demands.

Response: The NRC's highest priority is to protect health and safety of the public including those working at a nuclear plant. Each cask certification requires a thorough and careful review of the design details and how each design complies with existing regulations. The NRC is aware of utility schedules but the NRC completion of certifications is based on available resources, the adequacy and completeness of applicant submittals, and the complexity of identified technical issues.

B. Radiation Protection

Comment B.1: One commenter stated that the assumptions of ranges of cobalt impurities included in the SAR are too great and that more current and accurate information should be used. The commenter also asked why the value for grid spacers is 4700 ppm and if anyone really knows what an accurate measurement is for all of the cobalt in the cask. The commenter stated that if the NRC confirmatory calculations resulted in 15% lower values for cobalt source terms, then there was a mistake.

Response: The NRC disagrees with the comment. The measurement data cited in the SER on cobalt impurity levels in fuel assembly hardware was collected before the effects of cobalt impurity were fully appreciated. More recently, cobalt impurity levels have been controlled during the fabrication process and typically do not exceed 1200 ppm. The assumed impurity value of 4700 ppm is accepted as a bounding value that will cover past, present, and anticipated future fabrication practices for Inconel hardware, and is conservative.

The difference between the applicant's and NRC staff's calculations for the cobalt source term is not a mistake. The methods available for estimating the Co-60 source term are not exact and the results depend on the assumed reactor operating conditions that change over time and vary from plant to plant. Some variation in results is expected. The fact that the NRC staff's values were lower for the Co-60 source term show that the applicant's calculations for this term were bounding.

Comment B.2: One commenter noted that in the SER the NRC stated that the integration of the neutron source as a function of axial position resulted in a 28% larger total neutron source than that given in Table 5.2–3 of the SAR . The commenter asked if the applicant's calculations were wrong. Further the commenter suggested that a cask design should not just meet requirements but should be ''ALARA-not up to the limit.''

Response: The NRC disagrees with the comment. The calculations of the neutron source term made by the applicant are correct. The methods available for calculating neutron source terms as well as gamma-ray source terms are not exact and some variation between code results is expected. The neutron dose rate on the surface of the neutron shield is only 10 percent to 15 percent of the total dose from the cask. The difference in neutron source term was offset by the higher gamma-ray source term estimate by the applicant. Overall, the applicant provided a bounding shielding analysis.

Provided the applicant's design meets the regulatory limits for off-site dose, the NRC finds this acceptable. Doses to individuals will be determined when the cask is used at an actual site. Each general license user of the cask will have a radiation protection program that seeks to identify operational alternatives to keep the dose to workers as low as reasonably achievable (ALARA).

Comment B.3: One commenter noted that the NRC concludes in the SER that because the aluminum tubes containing the neutron shield material have a wall thickness of only 1/8 inch and actual measurements have not detected streaming, that streaming through the aluminum wall is not significant. The commenter asked who did the measurements and if the streaming evaluation was carefully performed. Also, the commenter asked who developed the information in Appendix 5A, whether this was the source of the measurements, and if the measurements were accurate.

Response: Appendix 5A does not address the streaming issue and was initially provided to support an analysis in a second appendix that was later deleted. However, the applicant left Appendix 5A in the SAR for informational purposes only. In response to a request for additional information on the potential for streaming, the applicant cited other measured dose rates around the TN–24P (EPRI NP–5128), the TN–40 and TN–32 casks, that, ''have shown no streaming effects in moving circumferentially around the neutron shield.'' This information was considered during the NRC staff's review. Measurements by licensees are subject to NRC inspection and no further investigation of their accuracy was deemed necessary.

Comment B.4: One commenter asked why the radial neutron shield is not the full length of the cask because dose rates can be higher above and below the shield and BPRAs and TPAs have higher doses. The commenter also asked what the real dose a person inspecting the cask can be expected to receive near the trunnion area above and below the neutron shield especially to the head and feet (not just the average dose to a person working near the side of the cask).

Response: The radial neutron shield runs the full length of the active fuel region of the fuel assemblies that is the location of the neutron source term. The peak surface dose rates at the top and bottom edges of the neutron shield are very localized and drop off rapidly as one moves away from the shield edge. The applicant's estimate of worker exposure did account for the higher doses at the edges of the neutron shield coupled with the number and duration of tasks necessary in those regions. The estimated dose for loading operations around the upper corner of the cask is 2.9 person-rem. The user's ALARA program is established to identify local hot spots such as the trunnion area and take measures to avoid worker proximity to those areas as much as possible. The ALARA program will control the actual doses when the casks are loaded at the plant.

Comment B.5: One commenter stated that the accident dose would be much less if BPRAs were not loaded in the casks. The commenter asked how the BPRAs affect the total dose to the public in a full cask array, how close the calculated doses are to regulatory limits, and how the doses compare to those of other approved casks.

Response: The data provided in the SAR show a less than 20 percent increase in the normal and accident doses due to the presence of BPRAs. For normal conditions, each general licensee who uses the TN–32 cask must perform an evaluation to show that the regulatory off-site dose limits will be met at the licensee's site. Thus, a direct comparison to the regulatory limits will depend on site-specific conditions and usage. The analysis of a typical cask array shows that the dose limit to a public resident is met at a distance of approximately 450 meters from the storage pad. The accident dose at 100 meters from a cask is estimated to be approximately 15 percent of the regulatory limit. Because the NRC evaluates the cask design versus the regulatory limits, comparison of the TN–32 design to other approved cask designs is beyond the scope of this rule.

Comment B.6: One commenter stated that the casks are really site-specific from a dose perspective because the dose from everything at a site needs to be considered including effluents, low level waste, old steam generators, etc. The commenter suggested that a berm would be needed, especially to minimize the dose to the public. The commenter also asked who evaluates this (the licensee or the utility) and if NRC checks the dose calculations.

Response: The NRC agrees that the actual doses are a site-specific issue that will be addressed by the cask users ALARA program. Under 10 CFR 72.212(b)(2), each general licensee who uses the TN–32 cask must perform an evaluation to show that the regulatory off-site dose limits are met at the licensee's site. The evaluations are made available for NRC inspection and review.

Comment B.7: One commenter asked if the total dose of 4.25 person-rem per cask is acceptable to the NRC, if other cask designs have much lower total doses, and if the total dose may exceed this value in the future. The commenter suggested that an acceptable dose is one that is closest to the minimum.

Response: Although acceptable, the operational dose estimates in the application are considered to be bounding values (conservative overestimates) and actual doses are expected to be lower. Occupational dose limits are set in 10 CFR Part 20. The total dose received during cask loading will be shared by a number of workers and is monitored by the user's radiation protection program. That program must ensure that occupational doses do not exceed regulatory limits. One component of an approved radiation protection program is an ALARA program and is subject to NRC inspection. Because the NRC evaluates the cask design versus the regulatory limits, comparison of the TN–32 design to other approved cask designs is beyond the scope of this rule.

Comment B.8: One commenter asked if Regulatory Guide 8.8, ''Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low as Reasonably Achievable'' applies to doses to the public.

Response: The Regulatory Guide does not directly address dose to the general public. It specifically addresses occupational doses to reactor station personnel.

Comment B.9: One commenter asked for the dose rate under the bottom plates and how radioactive the pad would become by the time the pad is decommissioned.

Response: The applicant estimated a dose rate of 498 mrem/hour on the bottom surface of the cask for a full load of design basis fuel assemblies. The amount of activation in the pad is expected to be small and will depend on the actual fuel loaded and time of storage. At the time of final decommissioning, the cask user will be required to measure any induced radiation in the pad and activated material will be handled according to the regulatory requirements.

Comment B.10: One commenter asked why the shielding analysis is based on nominal uranium content that is slightly less than the specified values.

Response: For a given fuel design, there will be slight variations in the uranium content due to occasional minor modifications made to meet the special needs of the buyer for a particular batch of fuel. The range of variations is much less than the accuracy of the methods currently available for the analysis and will not change the finding of reasonable assurance for approval of the design. The maximum limits on uranium content specified in TS 2.1.c are set to bound all potential variations for the particular design. The values used in the analysis are more representative of the fuel most likely to be stored in the cask.

Comment B.11: One commenter asked how hard it is to decontaminate the outside of the TN–32 after being in the pool. The commenter further inquired as to the extra dose received by the worker in decontaminating the cask.

Response: Decontamination is not a particularly difficult task but does take some time and care. Steps are performed to aid the process of decontamination as the cask is placed in the pool. Tests are performed to determine that effective decontamination is achieved and additional decontamination will be performed when needed. Decontamination is estimated in the SAR to take 1.5 hours with a maximum worker dose of 0.27 person-rem.

Comment B12: This commenter asked if the expected dose rates for the TN–32 would be three times that of the VSC–24.

Response: The projected annual dose from one TN–32 loaded cask is described in Table 10.2–1 in the SER and shows what the dose would be at different distances. This dose for this design is within regulatory limits. The NRC does not conduct its dose review on a comparative basis considering other cask designs. The expected doses from other approved designs are reflected in SARs from those designs and are publically available.

C. Accident Analysis

Comment C.1: One commenter stated that the 15 minute transporter fuel fire should not be the bounding fire accident and recommended that the NRC evaluate a large airplane crashing into a full array of casks, a lightening strike induced fire, a fuel fire fed by aircraft fuel, or a missile that causes a fire at the pad breaking up casks, and burning the plastic, seals, and resins. The commenter also asked what the total amount of material that could be off-gassed, melted, and burned up if several casks were hit by an airplane; what an emergency crew would be expected to do given a catastrophic crash into a cask array; what a fire crew should spray or dump on a fire to mitigate its severity; how one would move and unload a cask with a destroyed neutron shield and burned out seals; and whether local emergency crews have action plans for such severe fires at a storage pad.

Response: The NRC disagrees with this comment. The basis for the 15-minute fire is associated with the time it would take to burn approximately 200 gallons of fuel, presumably carried by the transporter. The analyzed fire is assumed to burn at 1550 °F and is assumed to produce the worse case scenario of fire/heated air for the TN–32. The fire is assumed to fully engulf the cask, thus maximizing the heat input into the cask. Fire of this duration exposed to the outside of the cask would have little effect on the contents due to the thermal inertia of the cask. The weather cover o-ring and neutron shield may burn or char if exposed to the design basis fire. Complete combustion of the weather cover o-ring would contribute an insignificant amount of heat to the TN–32 and would not affect any components that are important to safety. The radial neutron shield is a polyester material which includes about 50 percent fire retardant fill, which makes it self-extinguishing when exposed to fire. The top neutron shield is polypropylene which is slow burning or may not burn at all in a fire environment. The applicant has added information to the SAR to address the combustibility of the neutron shield.

Other external sources of heat associated with the TN–32 are solar insolation and ambient temperatures. These sources are included in the thermal analysis in section 4 of the TN–32 SAR. External pressure sources include normal atmospheric conditions, flood submersion, and explosions. These sources are included in the safety analysis in Sections 2, 3, and 11 of the TN–32 SAR.

The applicant's evaluation of a lightning strike is provided in section 2.2.5.2.8 of the TN–32 SAR. No significant thermal effect was identified since the electricity would be conducted through the metal components to ground. Other vehicles causing the fire (such as airplanes, trains, delivery trucks or missiles) are not plausible and are beyond the scope of this rule. However, the applicant did evaluate the design capability to withstand an explosion with a force up to 25 psi of external pressure. (See also discussion for Comment C.7.)

Before using the TN–32 casks, the general licensee must evaluate the site to determine whether or not the chosen site parameters are enveloped by the design bases of the approved cask as required by 10 CFR 72.212(b)(3). Included in this evaluation is the verification that no credible source of an external explosion that would produce an external pressure above 25 psi and that any cask handling equipment used to move the TN–32 cask to the pad is limited to 200 gallons of fuel (refer to Technical Specification 4.3.5—Site Specific Parameters and Analyses). Also, when a general licensee uses the cask design, it will review its emergency plan for effectiveness in accordance with 10 CFR 72.212. This review will consider interdiction and remedial actions to address accidents of all types and coordination with local emergency response teams.

Comment C.2: One commenter questioned what tornados, lightning, fire, and puncture damage would do to the effectiveness of the neutron shield. The commenter also questioned whether the plastic seals burn easily.

Response: The top neutron shield and the radial neutron shield have not been designed to withstand all of the hypothetical accident loads. There may be local damage due to accidents such as tornado missiles, fire, etc. Therefore, cask structural analyses have been performed assuming that the neutron shield is completely removed during the accident conditions. The results indicate that the cask without the neutron shield is adequately designed to withstand various load combinations of the accident condition as presented in Sections 2, 3, 4, and 11 of the SAR. The lid seals are metal. The design has been found capable of maintaining the confinement of radioactive material under the identified credible accident conditions even with the loss of the neutron shield. Thus, any dose to the public is controlled and would be within regulatory limits.

Comment C.3: One commenter stated that casks should not be permitted to slide at all or much less than the 7.88 in. discussed in the SER. Further, the commenter suggested that the analysis should assume that the casks could slide in more than one direction. The commenter also asked if sliding affects other casks already certified.

Response: The NRC disagrees. The TN–32 cask will not tipover or slide due to tornado and wind loading as analyzed in Section 2 of the SAR. The SAR indicates that the cask may slide 7.88 in. due to a 4,000 lb. missile (in this case, an automobile) impacting below the center of gravity of the cask at 126 mph. This is much smaller than the approximately 94 inch distance between casks. In the unlikely event that two 4,000 lb missiles were to impact below the center of gravity of two adjacent casks from opposite directions, the two casks still would not collide with each other. Furthermore, the automobile is conservatively assumed to be rigid and absorbs no energy in the analysis. In reality, upon impact the majority of the energy will be absorbed by the crushing of the automobile rather than moving of the cask. The NRC has not identified any design issues in the TN–32 review which affect any other casks previously approved.

Comment C.4: One commenter asked that during a tornado, what structures are near the casks that could hit one of them and whether a meteorological analysis had been done to evaluate the effects of tornados on the casks.

Response: This is a site-specific issue. The cask user will have to address this issue in its 10 CFR 72.212 evaluation.

Comment C.5: One commenter asked about how a cask could become buried and what assumptions were used for causes for the burial accident.

Response: TN–32 SAR Section 11.2.10 provides possible causes for accidental cask burial such as an earthquake.

Comment C.6: One commenter stated that the unloading function is not given much attention in the full safety analysis of the cask for accidents.

Response: General procedure descriptions for these operations are summarized in Section 8.2 of the SAR. These procedure descriptions were reviewed by the NRC. As discussed in Section 8 of the SER, the NRC concluded that these procedure descriptions were acceptable for use in developing detailed site-specific procedures. Detailed loading and unloading procedures will be developed on a site-specific basis by the cask user.

Comment C.7: One commenter asked a number of questions relating to the accident analysis assumptions for explosions involving combustible materials shipped to reactor sites and on transportation links near nuclear power plants. Specifically, the commenter asked about controls over what is shipped near the Point Beach plant and a number of other potential sources of explosion.

Response: This comment about Point Beach is beyond the scope of this rule. The applicant, Transnuclear, did evaluate the TN–32 cask design for its capability to withstand an explosion with a force up to 25 psi of external pressure. Further, the NRC has evaluated the effects of a truck bomb located adjacent to storage casks. The use of a generally licensed cask by a utility requires that the user ensure that the site is not subject to any potential accident that has not been analyzed. This would include any potential active or passive source of explosion at or near the pad.

Comment C.8: One commenter stated that consideration of a sabotage threat is not up to date for ISFSI designs.

Response: The NRC disagrees with the comment. The NRC reviewed potential issues related to possible radiological sabotage of storage casks at reactor site ISFSIs in the 1990 rule that added Subparts K and L to 10 CFR Part 72 (55 FR 29181; July 18, 1990). The NRC still finds the results of the 1990 rule current and acceptable. In addition, each Part 72 licensee is required by 10 CFR 73.51 or t 73.55 to develop a physical protection plan for the ISFSI. The licensee is also required to install systems that provide high assurance against unauthorized activities that could constitute an unreasonable risk to public health and safety.

D. Criticality

Comment D.1: One commenter stated that in the KENO input file of page 6.6–7, the last zero in the unit cell resonance correction input should be changed to a 3.

Response: The NRC agrees with the typographical correction suggested by the commenter. The correct unit cell data was used in the NRC staff's confirmatory calculations and demonstrated that this error had a negligible effect on the criticality safety analysis results. The SAR has been revised as appropriate.

Comment D.2: One commenter asked a question about what confirming demonstration and analysis the NRC used to show that ''significant'' degradation of the neutron absorbing material used in each cask can not occur over the life of the facility. The commenter also disagreed with the NRC statement in the SER that neutron absorber plates would have a continued efficacy over the 20 year cask life because there is no knowledge basis for this and fabricators do not meet perfection in their products.

Response: The NRC staff does not consider the loss or degradation of fixed neutron poisons credible after installation into the cask because the poisons are fixed in place and contained. The neutron absorber is designed to remain effective in the TN–32 system for a storage period greater than 20 years and there are no credible means to lose the neutron absorber. Section 6.3.2 of the TN–32 SAR describes the neutron absorber and its environment, and evaluated boron depletion due to neutron absorption. Section 9.1.7 of the SAR describes the testing procedures for the neutron absorber material that will be manufactured and tested under the control and surveillance of a quality assurance and quality control program that conforms to the requirements of 10 CFR Part 72, Subpart G. The compositions and densities for the materials in the computer models were reviewed by the NRC staff and determined to be acceptable. The NRC staff notes that these materials are not unique and are commonly used in other spent fuel storage and transportation applications.

Comment D.3: One commenter asked what the comprehensive fabrication test was that is capable of verifying the presence and uniformity of the neutron absorber and if any of these tests really exist.

Response: As stated in SER Sections 6.1 and 6.3.2, the fabrication requirements and neutron and visual acceptance tests that must be performed are described in SAR Section 9.1.7. In SER Section 9.1.5, the NRC staff found the tests are adequate to validate the specified boron content and fabrication quality.

Comment D.4: One commenter asked why the applicant did not perform a calculation to verify that criticality safety is maintained for each type of fuel with TPAs that will be stored in the cask versus relying on a bounding analysis for fuel containing BPRAs.

Response: In SAR Section 6.4.2, the applicant explicitly evaluated all of the proposed fuel types to determine the most reactive fuel configuration. The most reactive fuel type was then used in the remainder of the criticality safety evaluation. The SAR shows that displacement of highly borated water within the active fuel region causes a slight increase in reactivity for this cask under the conditions evaluated. The BPRAs bound the TPAs. A fuel assembly can only contain either a BPRA or a TPA. The BPRAs extend down into the active fuel region and, as stated in SAR Section 2.3.4.1, they displace more borated water than the TPAs.

Comment D.5: One commenter asked about the fuel pin pitch parameter role in the calculation of k_{eff}, if the NRC understands what happens as it varies, and if the NRC expects different effects on k_{eff} than the applicant does. The commenter also asked if the fuel pins ''straighten up'' and become ''more centered'' as water comes in around them, and stated that there are a lot of unknowns about fuel behavior in dry casks.

Response: The pin pitch is the distance between fuel pins and can decrease if the fuel assembly grid spacers fail as evaluated in SAR Section 6A. The NRC staff compared the effects of varying the amount of borated water between an array of fuel pins and varying the amount of borated water between fuel assemblies in a TN–32 cask. As pin pitch is reduced for assemblies in a TN–32 cask, the amount of borated water between assemblies increases, resulting in a decrease in reactivity.

Comment D.6: One commenter asked what operating experience in cask unloading is used to establish the frequency for checking the boron concentration.

Response: The frequency for checking the changes to the water boron concentration is based on spent fuel pool operating experience that does not require experience in cask unloading. There is significant spent fuel pool operating experience that supports the TS frequency for checking the boron concentration of the water.

E. Thermal

Comment E.1: One commenter asked why the maximum fuel cladding temperature had been reduced from 348 °C [as approved in another cask design] to 328 °C [for the TN–32 design].

Response: The fuel cladding temperature is established to protect the cladding from failure during the storage lifetime. This temperature limit is based on several factors including the cladding hoop stress and the length of time the fuel has been cooled. Cladding hoop stress is related to the rod internal pressure. The rods are pressurized by gas present in the plenum and gap. Because casks certified under 10 CFR 72 Subpart L have a broad range of applicability and in response to the NRC staff comments, the applicant selected an upper-bound rod internal pressure to develop the clad temperature limits. The resulting maximum cladding temperature limit was 328 °C. The temperature limit is based on the methods given in PNL–6189, Levy, I.S., et al., Pacific Northwest Laboratories, ''Recommended Temperature Limits for Dry Storage of Spent Light-Water Zircaloy Clad Fuel Rods in Inert Gas'' May 1987. The limit was found acceptable by the NRC staff in the TN–32 Preliminary SER. The methods in PNL–6189 are also referenced in NUREG–1536, ''Standard Review Plan for Dry Cask Storage Systems'' January 1997.

Comment E.2: One commenter asked why SAR Revision 11A on page 4–1 was referenced for this design while Revision 9A was used in a previous SAR for the TN–32, and asked if there was a problem with the previous analysis and what substantial thermal changes had been included in the new analysis.

Response: The TN–32 SAR Revision 11A, was the version of the SAR reviewed and approved by the NRC staff as part of the process of cask certification under 10 CFR 72, Subpart L. SAR Revision 9A was the version reviewed by the NRC staff for site-specific licensing for casks used at Surry and North Anna. The information included in SAR Revision 9A was not applicable to the TN–32 thermal design and was not reviewed by the NRC staff for this current design approval. Therefore, the differences in thermal design between the two designs are beyond the scope of this rule. The NRC staff did not identify any safety issues in Revision 11A that applied to any other cask designs.

Comment E.3: One commenter asked that the NRC define clearly what is meant by ''short term'' for the temperature limit of 1058 °F on page 4–1 of the SER.

Response: The short term temperature limit is applicable to temporary spikes in cladding temperature such as those that may occur in some accidents or during operations like vacuum drying. The NRC agrees that this term is unclear and has adopted the concept of a transient temperature limit. Guidance on the application of the transient temperature limit (referred to as ''short term'') is discussed in NUREG–1536, Section 4,V.1. The basis of the 1058 °F temperature limit for zirconium alloy clad fuel, given in NUREG–1536, is from A.B Johnson and E.R. Gilbert, Pacific Northwest Laboratories, ''Technical Basis for Storage of Zircaloy-Clad Spent Fuel in Inert Gases'' PNL–4835, September 1983. Experimental data in that report demonstrated no damage to zirconium alloy cladding when subjected to 1058° F for 30 days. The basis for the temperature limit is to avoid conditions that could cause a rod to burst due to excessive internal pressure and to limit the amount of creep that may occur at the elevated temperatures.

For spent fuel storage, the NRC staff generally expects the length of time the cladding would be at elevated temperatures above the long term limit to be much less than 30 days. This expectation is consistent with technical specification actions to implement temporary cooling of the fuel or to establish acceptable conditions for normal storage within periods that are much less than 30 days. These actions typically limit the time fuel is allowed to approach and remain at the transient temperature limit. In addition, if suitable long term storage conditions do not exist or cannot be established, the technical specifications may also require further actions such as removal of the fuel from the cask within 30 days. This expectation is also consistent with the assumptions for accident durations of 30 days or less.

Comment E.4: One commenter asked a number of questions concerning the cask heat up model discussed on pages 4–4 through 4–8 of the SER. Specific comments addressed: whether BPRAs and thimble plugs were included in the model for weight inputs and for radiation hot spots; why the model assumes gaps between the basket and cask bottom, between the basket and rails, and between the rails and cavity wall; and whether the gaps really exist or are added for conservatism.

Response: The heat contribution from the BPRAs and thimble plugs was considered in the cask analysis. Rather than explicitly modeling the fuel assemblies, BPRAs, and thimble plugs, they were modeled as homogenized units that had equivalent heat transfer characteristics. The weights of various fuel assemblies including the heaviest BPRAs for storage in the TN–32 cask are presented in Table 2.1–1 of the SAR. In SAR Table 5.1–2, the applicant provided the incremental dose rate resulting from the BPRAs and TPAs at the same locations around the cask as for the fuel assemblies including the hot spots above and below the neutron shield. Gaps are assumed in the modeling as discussed in the response to Comment E.5.

Comment E.5: One commenter stated opposition to the thermal performance of the cask design being based on the gap size in the cask body layers. The commenter stated that fabricators will not be able to control the gap size to 0.04 inch that errors will occur, and that the limit is not conservative enough, adding risk to public safety. Further, the commenter noted that requiring only one demonstration test of conformance to the gap limit by the applicant will not guarantee that the other casks used will meet the same limit.

Response: Gaps between the various cask components were assumed in the analysis to account for fabrication and assembly tolerances and uncertainties. The NRC staff expects that the as-built casks will have gaps that are less than or equal to those assumed in the analysis. The implemented QA program at the fabricator's facility provides reasonable assurance that this will occur. However, to demonstrate the adequacy of the fabrication process and to provide defense-in-depth, the NRC will require thermal testing of a single cask by each agent or subcontractor authorized by the certificate holder to complete final assembly of the TN–32 cask body. This test shall be performed before the first loading of any cask assembled by that agent and/or subcontractor with a heat load equal to or greater than 23.7 kilowatts. The test will evaluate thermal performance for a range of heat loads up to and including the maximum authorized heat load of 32.7 kilowatts. Further, any changes to the fabrication process are required to be evaluated for thermal impact. If the change is found to be significant, the heat transfer performance of the modified cask must be verified by an additional thermal test.

Comment E.6: One commenter suggested that the vendor or applicant should conduct tests of the unloading process and full scale testing of the cask with a complete load and a representative fuel basket before the design is certified by rulemaking. Further, the commenter suggested that the test results should be presented to a public service commission hearing before a utility decides which cask to purchase and use, that the NRC should specify criteria on how the approval process is to be conducted and what specifications should be included in the SAR and other design documents, and that the NRC should specify that vendors and applicants will be fined or contracts will be terminated if fabricators do not meet the design criteria. Also, the commenter asked why the applicant does not know the thermal responses for the design and if the thermal test will be conducted with both sets of trunnions for thermal results.

Response: The NRC disagrees with the comment. The TN–32 storage cask design has been reviewed by the NRC. The basis of the safety review and findings are clearly identified in the SER and CoC. Testing is normally required when the analytic methods have not been validated or assured to be appropriate and/or conservative. In lieu of testing, the NRC finds analytic conclusions that are based on sound engineering methods and practices to be acceptable. The NRC staff has reviewed the analyses performed by the applicant and found them acceptable. The authority of a public service commission to approve a design or the use of tests is beyond the scope of this rule. The NRC has issued a number of guidance documents including NUREG–1536, ''Standard Review Plan for Dry Cask Storage Systems'' that provide information about the criteria used by the NRC to approve spent fuel storage cask designs. The design approval process is outlined in 10 CFR Part 72. It is the vendor's or applicant's responsibility who contracts with a fabricator to ensure that the casks and components are built in accordance with the approved design specifications and criteria, and in accordance with the CoC holder's QA program. If the NRC determines through inspection or other means that a cask has been fabricated that does not meet design criteria, then the NRC will take necessary enforcement action against the CoC holder or utility that is using the cask. The SAR provides a thermal analysis acceptable to the NRC staff as discussed in the TN–32 SER, Section 4. The purpose of the thermal test is discussed in the response to Comment E.5 above.

F. Materials

Comment F.1: One commenter stated that the use of a coating on the carbon steel in the cask design will cause problems and stated that stainless steel should be used in fabrication.

Response: The NRC disagrees with this comment. The materials used in the fabrication of the cask are described in Chapters 1 and 3 of the SAR and discussed in Section 3.1.4 of the NRC SER. Materials have been found to have properties that are acceptable as they meet the requirements for their respective applications in the cask system. The coating on the cask interior is flame sprayed aluminum that is a tightly adherent and stable coating in the spent fuel storage environment. These materials have been found to be suitable for the expected loading and storage in wet and dry environments, including corrosion and galvanic effects as discussed in Section 3.2.1 of the SER. There is no requirement for designers to select materials from a given class, e.g. stainless steels.

Comment F.2: One commenter stated that freeze-thaw causes icicles to hang down from the top of cask and have covered outlets on a VSC–24 cask at Point Beach and at Fort Saint Vrain. The commenter then asked if this can occur on a TN–32 cask and cause dripping along the neutron shield; if the resins in the shield can become water saturated; if the aluminum sleeves are water tight; if chemical reactions can occur; if snow, ice, and water can enter cracks or flaws in the gamma shield and reach the containment outer wall; if gaps exist in the trunnion area where water can enter; and if corrosion of carbon steel is a concern in this design. The commenter also asked if fog, rain, mist, and air pollution can affect these casks over time.

Response: The TN–32 design does not include vents, and therefore, there is no concern about ice formation. The outer shell of the neutron shield consists of a cylindrical shell section with closure plates at each end. The closure plates are welded to the surface of the gamma shield. The resins are encased (on all sides) with aluminum or steel. Therefore, it is unlikely that water will come in contact with resins. However, if water contacted the resin, there is no concern because the neutron shielding materials are common plastics that are inert with respect to water. The carbon steel is painted to prevent corrosion and the integrity of that paint will be monitored by the cask user, and repairs will be made if needed.

Comment F.3: One commenter asked if the quenching effect on BPRAs and thimble plugs has been evaluated; if the BPRAs and plugs absorb water, expand, and add weight when the cask is reflooded; if the BPRAs or plugs fall apart or depressurize, will that affect the removal of assemblies from the cask; if pinhole and hairline cracks in the fuel rods will absorb water and then later expand as the rods are dried out; and if the reflooding water is factored into the lifting weight of the cask. Further, the commenter asked if fuel rods absorb water, will that prevent removal after long term storage. Lastly, the commenter recommended that tests include unloading of a real cask at Surry or elsewhere and that an inspection be conducted to determine what has happened to the fuel pellets, zircaloy, etc.

Response: BPRAs rods are constructed in a manner similar to fuel in that the neutron absorbing material is placed in sealed tubes made of either stainless steel or zirconium alloy. The thimble plug devices are solid stainless steel rods. Both BPRAs rods and thimble plug rods are attached to a stainless steel baseplate. The NRC staff has not identified any conditions in spent fuel dry storage, including quenching, that would cause failures of BPRAs or thimble plugs that would allow them to absorb water or break apart and affect unloading. Further if they are assumed to break apart, the NRC staff has concluded there are no adverse safety consequences. Table 1.2–1 in the TN–32 SAR provides the cask weight when filled with water.

Comment F.4: One commenter stated that the applicant should know the actual Charpy data rather than providing preliminary data; the flaw should not be parallel, radial, or in a line; the flaw depth and width should be known; and a special examination of the gamma shield is necessary even if the identified flaw size is less than the allowable. The commenter also asked how the Charpy V-notch testing will be verified before the tested materials are to be used in fabrication, and that the NRC clarify just what it is allowing and why.

Response: The NRC disagrees with the comment. The ''preliminary data'' is data based upon other plates and heats made to the same specifications as the gamma shield material, SA 266 Grade 2. The materials used in actual TN–32 casks will be tested before use in the cask to ensure that their properties meet or exceed what is required, as indicated in SER Section 9.1.1. The Charpy and other properties enumerated in the SER ensure safe performance under service thermal conditions. Charpy tests are always conducted using a standard ASTM method, E23, ''Standard Test Methods for Notched Bar Impact Testing of Metallic Materials.''

The gamma shield is a forged component. Flaws in forgings are very small. There is no safety related risk or materials problem related to the use of a forging in this application. Appendix 3E of the SAR specifies the allowable flaws for various orientations and locations. Flaws of these sizes will not propagate under service conditions. Any flaw in the gamma shield will be smaller than these sizes.

Comment F.5: One commenter noted that the NRC stated in a November 1, 1996, letter that aluminum oxide flaking might occur in the cask during initial heating and cooling, and that the flakes would most likely fall to the bottom of the cask and not come in contact with the fuel basket. The commenter disagreed with this statement because cask transportation and unloading evolutions could cause the flaking to contact the basket. The commenter asked what the basis is for NRC's position discussed in the 1996 letter and recommended that further analysis be performed to determine what happens to the aluminum oxide at the end of cask life.

Response: The comment about the November 1996 letter is beyond the scope of this rule. The letter is not related to this cask design. As discussed in the response to Comment I.13 the NRC staff expects no oxide flaking to occur in the cask.

Comment F.6: One commenter asked if aluminum flame spray induced stains can generate hydrogen or cause other chemical reactions that could cause problems, whether there is sufficient time in procedures to address this problem, if the NRC understands what the stain is, and if it could cloud the pool water and hinder unloading of the cask.

Response: There is no safety significant effect of the staining due to iron or other contaminants in the aluminum oxide. The concentration of impurities needed to lead to staining is believed to be so small that the NRC staff does not require analysis of chemical reactions that might result from the presence of these impurities. There is no expected effect on water quality or unloading operations.

Comment F.7: One commenter asked if basket support rails or the basket itself will yield and if an evaluation of the effects of yield, temperature changes and drying, and a side or vertical drop or tipover for unloading at the end of cask life has been conducted.

Response: The basket and the rails are evaluated in Appendix 3B of the SAR. The aluminum rail will not yield, even under vertical or tip-over conditions. The internals are always hot. There is no freeze-thaw condition. At the end of life, these internal components are expected to be in exactly the same condition as they were at the beginning of the storage period.

G. Design

Comment G.1: One commenter stated the assumption that the new top lifting trunnions are compatible with the Point Beach transporter and will be addressed by existing procedures. The commenter then asked if the TN–32 trunnions have been tested with the Point Beach transporter criteria, if there may be gaps and streaming at trunnion locations, what the dose effect may be, what heavy load criteria exist, and what testing will be done.

Response: The comment on the trunnion testing and compatibility with the Point Beach transporter is beyond the scope of this rule. Point Beach will have to address the issue in its site-specific evaluation under 10 CFR 72.212. Under a cask user's ALARA program to minimize worker exposure, localized radiation hot spots such as gaps and streaming around the trunnions will be avoided, or have temporary additional shielding during cask handling and preparation for transport to the storage pad.

Comment G.2: One commenter asked a number of questions about the fuel basket cavity that included: what the weight or total load that is transferred from the fuel basket cavity to the lip on the gamma shield shell is, and where the load is transferred; how the shrink fit works, how it is performed, why it is done, and if it has been tested; could water get between the containment shell and the gamma shield shell; what the potential is for corrosion between the two shells; whether an external event such as an airplane crash, tipover, or seismic event could cause the shells to separate; whether tests for freeze-thaw temperature changes for the life of the cask have been done; whether the two shells contract or expand together; if there is a way that pressure or stress can be transferred from one shell to the other and cause cracks in the welds or the containment wall; how much stress is created in the welds and on the bottom plate; and how the inner shell is lifted without removing the inner containment.

Response: The area referred to by the commenter as the ''lip on the gamma shield shell'' is interpreted by the NRC staff to be the confinement shell top forging. The fuel basket and fuel assemblies that weigh about 66,000 pounds rest directly on the bottom confinement plate. Therefore, the fuel basket and fuel assemblies weights are not transferred to the confinement shell top forging.

The shrink fit is established as follows: The gamma shield shell and the confinement shell are fabricated separately. In order to obtain a close fit between these two shells, the outside diameter of the confinement shell is slightly larger than the inside diameter of the gamma shield shell. The gamma shield is then preheated which causes it to expand before slipping on the confinement shell. After the gamma shield shell cools, it shrinks and tightly clamps onto the confinement shell. Therefore, the fit between these two shells is very tight and no water could migrate between the two shells over the life of the cask. Consequently, corrosion between the two shells is not a concern. An external event such as a fire, tipover, or seismic event would not cause the two shells to separate as demonstrated in Sections 3, 4, and 11 of the SAR.

Likewise, temperature effects on the cask are evaluated in Sections 3 and 4 of the SAR. Due to the similarity of materials, both shells will contract or expand together. The 1.5-inch thick confinement shell is supported by the 8-inch thick gamma shield shell. Under accident conditions, the gamma shield shell protects the confinement shell from damages. The amount of stresses that are created in the welds and on the bottom plate due to various service loading combinations are less than the ASME allowable values and are presented in Sections 3.4 and Appendix 3A of the SAR. The TN–32 cask has a confinement shell that can not be removed.

Comment G.3: One commenter stated that the shape of the cask is of concern because the neutron outer shell does not cover the gamma shell at the top and bottom. The commenter then asked if this is due to the location of the trunnions and suggested that in a drop accident, the bottom trunnions might crack off and the edge of the neutron shell could be easily crushed or smashed.

Response: The NRC does not agree with the comment. Radially, except at the trunnions, the neutron shield runs the full length of the active region of the spent fuel assemblies which is the source of neutron radiation. The accident analysis for the TN–32 cask assumes that the neutron shield and steel outer shell were removed completely. With this assumption, the accident analysis bounds any lesser damage to the neutron shield and shell, and the estimated dose is within regulatory limits.

Comment G.4: One commenter asked if the load bearing aluminum rails can be jammed during unloading, whether crud or paint particles can fall into the rail slots and cause a movement problem, what other movement problems exist, or whether there would ever be a reason to remove the basket.

Response: The aluminum rails are located outside the basket. They do not interfere with the unloading operation. The aluminum rails establish and maintain basket orientation, and enhance heat transfer. The rails that surround the basket are oriented parallel to the axis of the cask body and are attached to the inner cavity wall of the cask body. Consequently, lateral movement of the basket inside the cavity is restricted by the rails. Although the basket is not attached to the cask body, there is no need to remove the basket from the cask cavity during an unloading operation.

Comment G.5: One commenter stated that the TN–32 is designed not to be susceptible to brittle fracture in temperatures as low as 20°F and noted that this was a positive characteristic for storage in cold climates.

Response: No response is necessary.

Comment G.6: One commenter asked a number of questions on fuel rod gas including: why the assumption is made that fuel gas internal pressure is present when the NRC permits an unlimited number of pinhole leaks and hairline cracks that would apparently permit the gas to escape over the 20 year life of the cask; what happens to the gas and does it mix with the helium; what the gas is; and what chemical reactions it can cause inside the cask.

Response: Based on operational experience, only a very small fraction of the fuel rods develop leaks (pin holes, hairline cracks, etc.) during reactor operation and pool storage. At the time of dry storage, the majority of fuel rods are intact and contain pressurized gas. The gas present in the spent fuel rod after removal from the reactor is from two sources helium fill gas placed in the rod during manufacture and a fraction of the fission gases (mostly krypton, xenon, and tritium) produced and released from the fuel pellets during reactor operation. Maintenance of intact cladding and retention of the gases within the rods, throughout dry storage, is part of the cask design consideration to protect operational personnel from unnecessary dose during unloading and to provide defense-in-depth. If the unlikely release of gas from a rod were to occur, the gases would mix with the cask fill gas and remain within the confinement boundary. The bulk of these gases are chemically inert and will not react with materials inside the cask. The trace amounts of gases that are chemically reactive include cesium (a volatile expected to exhibit gas-like behavior at cask conditions). There may be some chemical reactions between these reactive materials and the zirconium and steel in the cask. These reactions would be minimal and would not adversely affect the functions of any components that are important to safety.

Comment G.7: One commenter asked a number of questions about fuel pellets including, what the basis is for determining the weight of the fuel pellets after reactor exposure and pool exposure; whether pellets crack or break up over time, whether the pellets can absorb or adsorb water coming in from pinhole leaks and hairline cracks, and how it is determined that the pellets are dry when put into storage.

Response: The fuel weight is based upon data supplied originally for new fuel. Increases in fuel weight due to service exposure are minimal because they are due to oxidation. The fuel is UO_2 and does not oxidize unless the fuel cladding fails in service. After exposure to oxygen or water (in failed fuel) it becomes more rich in oxygen. This is represented as U_4O_9. Because most of the weight is in the uranium (mass about 238) and not in the oxygen (mass 16), this small increase represents an insignificant change. An average weight for the fuel type is taken into account in any calculations that require knowledge of mass of this system component.

The pinholes and hairline cracks would not absorb water, although they may be involved in the sorption of moisture and uptake of oxygen within the fuel because they could permit pool water, cask moisture, or cask oxygen to enter the fuel rod and contact the fuel pellets. Pinholes and hairline cracks are not expected to form during dry storage because the storage environment for the fuel cladding is maintained under protective and durable conditions.

The behavior of the fuel pellets is well studied and many literature references are available on this topic. Cracking in the fuel pellets generally occurs during reactor operation . The fuel pellets are fairly inert in the absence of oxygen. Therefore, the fuel is dried and then stored in a dry, helium gas (water and oxygen free) environment to preclude further oxidation.

In preparation for dry storage, the loading process ensures that moisture is removed from the fuel cladding, any fuel that may have pinholes or hairline cracks, and from the cask internals. The cask is thoroughly vacuum dried as prescribed in the technical specifications and the SAR. The vacuum drying process, which involves two, complete evacuate-fill cycles, coupled with the heat generation of the fuel, very effectively removes residual moisture that may be present in the fuel pellets and interior components of the cask system and oxygen that is inside the cask. The helium fill gas is very pure and dry, and the cask is sealed to prevent entry of water and air during storage. The effectiveness of the vacuum drying process, the sources of residual impurities, and the potential effects of impurities, are reported in PNL–6365, ''Evaluation of Cover Gas Impurities and Their Effects on the Dry Storage of LWR Spent Fuel'' November 1987. Because the storage system provides an inert environment throughout the licensed period, very little further oxidation is expected to occur under normal storage conditions.

Comment G.8: One commenter asked how the aluminum boxes filled with resin are arranged around the cask, how far apart they are, how they are held to the gamma shield wall while the outer shell is installed, and to what are they attached.

Response: As shown in TN–32 SAR drawing 1049–70–2 and described in TN–32 SAR Sections 1.2.1, 3.1.1, and 4.1, about 60 aluminum boxes are tightly fitted around the exterior of the gamma shield. A steel outer shell completely encloses the aluminum boxes and holds them in place after construction. Details, such as temporary measures to hold the boxes in place during construction will be addressed by fabrication procedures and are beyond the scope of this rule.

Comment G.9: One commenter asked if the fuel basket rails discussed on page 4–2 of the SER can come loose over time along with the basket and affect the unloading of the fuel, and why they are not welded instead of being bolted as designed.

Response: Neither the applicant nor the NRC staff has identified any mechanisms that would cause the basket rail bolts to come loose over time. The basket rails are bolted to the cask wall because they are aluminum (for heat transfer) and the container wall is steel. The only function of the basket rail attachment bolts is to attach the basket rail to the inner cavity wall of the cask body; the bolts do not support any other loads. A bolted attachment functions as well as a welded attachment. Therefore, there is no need to weld the basket rail.

Comment G.10: One commenter suggested that changes be made to the SER concerning the shield lid design for the TN–32. The commenter stated that the only drawing in the SER of the shield lid is not very clear and asked if it is accurate. Further, the commenter suggested that the drawing should add details about TN–32 designs A and B to show the differences in lid designs and why they exist. The commenter suggested that on page 5–1 of the SER that the NRC should provide a better explanation of the lid thickness calculations and that the SER should discuss the materials that are being used in the lid design and how the changes affect the analysis of the cask.

Response: The NRC disagrees with this comment. The commenter requested changes in the level of detail included in the SER to better describe the cask design. The applicant's SAR includes a level of design detail that enables the NRC to make a safety finding. However, that same level of detail does not need to be repeated in the SER because it is already available on the docket and is retrievable by the NRC staff and the public. The NRC further disagrees that additional information on thickness calculations, a discussion of lid materials, and how changes in materials affect cask analysis should be added to the SER in Chapter 5. The applicant chooses design materials, dimensions, and methods of shielding, and includes details on this and supporting analysis in its SAR. The NRC followed its review guidance in NUREG–1536, ''Standard Review Plan For Dry Cask Storage Systems'' January 1997 and provided the appropriate level of detail and information specifically in Chapter 5 to reflect areas of review and findings.

Comment G.11: One commenter noted a concern about the applicant's proposed compression of BRPA springs or using a modified lid design. The commenter suggested that this was another example of a generic design being changed to a site-specific one in effect and, therefore, this should have been requested as a site-specific cask design application for approval of storage of BPRAs. The commenter then asked why the applicant had not designed the casks to hold Westinghouse 14x14 fuel in the beginning rather than changing the design later to accommodate longer assemblies due to the BPRAs collar. The commenter also stated that the design changes lead to confusion.

Response: The NRC disagrees with this comment. A vendor can choose to include any design characteristics and must demonstrate that the design is safe and in compliance with existing regulations. Adding the capability to store BPRAs could also have been requested under a site-specific license, but the regulations do not suggest one method over the other. The question about why the applicant did not originally design the cask to hold 14x14 fuel is beyond the scope of this rule.

Comment G.12: One commenter asked for a description of the difference between the configuration of the 6 inch shield plate and the 4.88 inch shield plate of the lid, why the 4.88 inch plate is acceptable, for a description of the 1.25 inch plate incorporated in the neutron shield, how the lids are put together, how having different lid designs will affect handling procedures, if the top neutron shield (4 inch thick polypropylene) is encased by 0.25 inches of steel on the top and bottom resulting in a total thickness of 4.5 inches, what being encased means, how the neutron shield encasing is welded together, if polypropylene is flammable or if it holds water, how it reacts under accident conditions of increased pressure and temperature caused by fire or explosions, how it could effect the resins on the outside of the cask during a fire event, and if it could be repaired after being melted. The commenter also suggested that it should be assured that the design can accommodate a correct fit of the drain pipe through the lid and that vent and drain closures are appropriate for the design.

Response: ''Encased'' means that the neutron shield is enclosed in a steel shell on all sides. The casing seams are welded with full penetration or fillet welds depending on the joint configuration. The alternate lid design for the TN–32A removes 1.12 inches of steel from the under-side of the lid and adds a 1.25 inch plate on the top side of the lid. Thus, for the TN–32 and TN–32B, the neutron shield casing is 0.25 inches thick on the top and bottom giving a thickness of 0.5 inches in the casing material plus 10.5 inches (6 inches + 4.5 inches) in the lid for a total steel thickness of 11 inches at the top of the cask. For the TN–32A, the bottom of the casing is the 1.25-inch thick supplemental plate and the top of the casing is a 0.38-inch thick steel plate giving a thickness of 1.63 inches in the casing material plus 9.38 inches (4.88 inches + 4.5 inches) in the lid for a total steel thickness of 11.01 inches at the top of the cask. Thus, the effective thickness of the lid was not changed and is acceptable. The two thick steel plates in the lid are welded together and the neutron shield in its casing is bolted to the top of the lid.

The radial neutron shield is a polyester that includes about 50 weight percent fire-retardant mineral fill, making it self-extinguishing. The top neutron shield is polypropylene that is ''slow burning to nonburning'' according to Table 24, Section 1 of the ''Handbook of Plastics and Elastomers.'' Furthermore, the weather protective cover isolates the top neutron shield material from sources of ignition and the radial neutron shield is completely encased by the aluminum tubes and by the outer shell.

Both neutron shielding materials are common commercial plastics that are inert with respect to water. Again, the weather cover and the outer shell protect the material from direct contact with water.

Each user of the cask will have operating procedures to address the different lid designs if more than one design is used onsite. The two different lid designs are configured to accommodate the correct fitting of the drain and vent closures and associated hardware.

Comment G.13: One commenter asked if the requirement of 10 CFR 72.236(c) for redundant sealing is only for O-rings and about the applicability of this requirement for the welds for the VSC–24, and whether the shield lid weld is verified by ultrasonic testing.

Response: The requirement of 10 CFR 72.236(c) for redundant sealing is applicable to all casks that are approved under 10 CFR 72 Subpart L. The question about VSC–24 is beyond the scope of this rule. The TN–32 cask does not have a shield lid weld.

Comment G.14: One commenter asked if hydrogen would build up above the water level if the evacuation line became iced up and blocked, how the cask remains vented, whether it uses a metal pipe that runs far from the cask rather than using a flammable plastic pipe or duct tape, whether there are any sources of ignition if hydrogen did escape from the venting, what the heat source is that the NRC discusses in the SER and how it would affect the vented hydrogen, and whether a clogged line could cause water to remain in the cask longer than expected like it did at Arkansas Nuclear One.

Response: A discussion about hydrogen generation and control is discussed in the response to Comment I.5. The TN–32 SAR, Table 8.1–1, recommends the use of heat tape as the heat source to preclude icing of the evacuation line during vacuum drying.

Clogging of the drain line due to a design or material condition in the TN–32 cask is judged by the NRC staff to be an unlikely occurrence. However, if a clogged line caused delays in a draining operation, there is not an immediate safety concern because the fuel will be adequately cooled, or a criticality or shielding concern, and any hydrogen that may form will be vented.

Comment G.15: One commenter suggested that the marking on a dry cask should carry more information than model number, identification number, and empty weight, and that the marking should be on a plate that is covered and will not rust, and should state all important information about its contents because paper records can be lost or destroyed. This labeling would be useful in an accident, sabotage, or war to identify cask contents. The commenter also asked if the NRC has carefully reviewed the labeling of casks and the storage of supporting documents.

Response: The NRC agrees in part with this comment. Each cask must be conspicuously and durably marked with model number, a unique identification number, and with its empty weight under 10 CFR 72.236. The NRC did evaluate the need for and types of labeling in the statements of consideration for 10 CFR Part 72. The applicant in Section 1.2.1 of the SAR states that each cask will be marked with the required information but did not address the durability and visibility aspect of the marker. The SAR has been modified to reflect this missing information.

However, NRC regulations do not require the identification of cask contents on permanent markings affixed to the cask. The NRC notes that 72.212(b)(8) requires that each general licensee accurately maintain a record for each cask that lists the spent fuel stored in the cask. This record must be maintained by the cask user until decommissioning of the cask is complete.

Comment G.16: One commenter suggested that this cask design requires a berm to minimize doses to the public and that all dry cask storage installations should require berms to reduce line of sight for potential sabotage, vehicle access, and dose to the public.

Response: The NRC disagrees with this comment. These are site-specific issues that will be addressed by the cask user's ALARA program and physical protection program.

Comment G.17: One commenter stated that replacement of O-rings in a cask causes unnecessary dose consequences, requires time and resources and creates schedule problems for pool use. The commenter asked if using O-rings in the design was a good idea because of the need for replacement over time, how complicated the replacement process is, and if it must be performed with the cask in the pool.

Response: The materials used for the cask seals are durable and are expected to remain functional for the lifetime of the cask. In SAR Section 2.3.2.1, the applicant included test results for seals that have been in service since 1973. These tested seals are similar to those planned for use in the TN–32. Those results demonstrate a very good record of seal integrity, performance, and endurance.

If a seal required replacement, the expected dose for the workers performing that task would be less than or equal to the dose expected for cask unloading operations. The actions to replace the seal will be similar to those required for unloading except that fuel manipulation is not required. Seal replacement for the TN–32 would require placing the cask in a suitably shielded environment such as the spent fuel pool.

Comment G.18: One commenter had several questions/concerns on the design of the TN–32 cask as follows: whether the neutron shield on the top overlaps the gamma shield enough to cover the area of streaming up the gap on the sides of the lid, why there isn't a bolt on the left of the gamma lid, whether the rim with all of the bolt holes has been evaluated for stresses and cracking around the bolts and holes, why the neutron shields don't go up higher and down lower to cover the entire area, and why the trunnions don't fit into the neutron shield rather than above and below the shield. The commenter further questioned whether the doses would be lower with a different outside neutron shield.

Response: The neutron shield on the cask lid overlaps the outer most edge of the fuel by about one inch and is sufficient to prevent vertical streaming of the neutrons. The effects of angular streaming were considered in the analysis and included in the estimated operational dose to the workers and off site. The drawing is simply showing different sections of the cask in the same view and is not a symmetrical cross section. There are 48 bolts for attaching the lid to the cask body. Closure bolts were simulated in the finite element model by the coupling of corresponding nodes at the location of the bolt. Stresses in the closure bolts and surrounding areas due to various serviced loading combinations are less than the ASME allowable values as demonstrated in Appendix 3A of the SAR. Consequently, cracking around the bolts and holes will not occur. The radial neutron shield runs the full length of the active fuel region that is the location of the neutron source. The design has been found to be acceptable after a review against the regulatory requirements. The neutron shield extends half way up the upper trunnion so the trunnion must penetrate through the shield to attach to the cask body.

The placement of the trunnions is influenced by operational and handling considerations as well as regulatory factors. As long as the cask design meets the regulatory requirements, the details of design are the applicant's prerogative.

Comment G.19: One commenter expressed concern over the issue of ice clogging drain lines and asked if some company could develop a vacuum draining system that wouldn't have ice clogging concerns.

Response: The potential for ice formation in the vacuum lines can occur from the cooling effect of water vaporization and system depressurization that occur during evacuation. Icing is not expected in the cask because of the heat generated by the fuel. Reasonable precautions such as heating the evacuation lines (using heat tape) or controlling the evacuation rates by performing the evacuation in a series of stages are adequate to preclude icing problems.

Comment G.20: One commenter suggested changes to the tolerances in SAR drawings 1049–70–1, 1049–70–3, 1049–70–4, and 1049–70–5.

Response: The NRC agrees with the comment. These changes to the tolerances specified on the SAR drawings will not affect the structural analyses and the conclusions reached in the SER. The drawings have been changed accordingly in the SAR.

Comment G.21: One commenter stated that a note should be added to drawing 1049–70–4 specifying that a test fitting may be supplied on the access port cover plate.

Response: The NRC agrees with this comment. The addition of this fitting does not affect safety. Its purpose is to facilitate leak testing of the overpressure monitoring system. The drawing has been revised to reflect this change.

Comment G.22: One commenter stated that a note should be added to drawing 1049–70–7 allowing alternate configurations for the plumbing of the pressure monitoring system.

Response: The NRC agrees with this comment. The note should also state that the parts and equipment used are equivalent to those specified in the drawing. An adequate level of safety is obtained by the quality assurance process and leak testing and monitoring of the system as required by the technical specifications. The drawing has been revised to reflect this change.

Comment G.23: One commenter stated that the vent and drain port cover seal groove diameters on drawing 1049–70–3 should be changed as follows; 5.88 groove O.D. to 5.92, and 4.70 I.D. to 4.65.

Response: The NRC agrees with this comment. The changes to the drawing do not affect the structural design or the confinement boundary. A note has been added to the drawing to follow the manufacturer's recommendations.

Comment G.24: One commenter stated that in SAR Chapters 2 and 7 the metallic O-ring seal liners should be specified as stainless steel or nickel alloy.

Response: The NRC agrees with this comment. The use of either stainless steel or nickel alloy is acceptable to the NRC staff. The SAR has been revised.

Comment G.25: One commenter asked how the bottom plate is welded to the confinement shell, how the gamma shield bottom plate is welded to its shell, how the plates are arranged, how weld locations affect stresses, what the actual stresses are, and what mechanism could cause the plates to be detached.

Response: The weld between the bottom confinement plate and the confinement shell is a complete penetration weld. The weld has the same thickness as the plate and shell. Therefore, it makes no difference whether the weld is outside or inside the shell. The gamma shield shell rests on the bottom gamma shield plate and is welded all around the outside perimeter of the joint. Weld locations are included in the finite element model. Stress intensities for different cask components and welds for each service condition and the load combination are presented in Appendix 3A of the SAR. The bottom plate could become detached from the gamma shield shell if the weld connecting the gamma shield shell to the bottom plate were to fail completely. The mechanism for possible failure of this weld is discussed in Appendix 3E of the SAR. Special examinations are required for this weld to ensure that defects are detected and repaired before use for fuel storage. These requirements are presented in Appendix 3E of the SAR and discussed in Section 3.1.4.4 of the SER.

Comment G.26: One commenter stated that at this point in time TN should know if the bottom inner plate weld is going to be applied before or after the outer and inner shell assembly. The commenter asked if it was the shrink fit and why TN did not appear to know. The commenter stated an understanding that one shell has a seam and the carbon steel is wrapped into a cylinder and welded at the one meeting seam, while the other shell is in two halves requiring two seams and asked if that was correct. Then the commenter asked if there is a concern if one seam is located over or near the seam of the other, if the plate pushes out at the shell wall around its thickness, or if the shell of either the containment or gamma shield rests on their bottom plates, how this affects the weight distribution, how these two shells are put together, when welding is to be performed, and exactly how the welding will be inspected. The commenter noted that the use of the word ''if'' in the acceptance test section of the SER is not acceptable because the level of detail in the design and fabrication should be decided before a design is certified.

Response: The NRC disagrees with the comment. As long as the confinement barrier is welded to meet ASME code Section III, Subsection NB requirements, test standards, and acceptance standards, the barrier will be in conformance with a standard that will satisfy all of the safety requirements for this application. No adverse effects on the cask integrity is expected from either of the two fabrication alternatives; either alternative is acceptable. Therefore, the SAR can specify welding either before or after shell assembly. See the discussion for Comment G–2 about how the shells are assembled.

The steel of the seam meets the requirements of the steel used for the vessel. Location of seams in relation to one another will not affect performance. In terms of any alterations in stress (or weight distribution), it is noted that the containment vessel (and its seams) is ground to tight tolerances so that it will be exactly the right size to make the shrink fit process work. Circumferential and longitudinal confinement boundary welds are examined volumetrically by radiography and liquid penetrant or magnetic particle methods accepted by ASME NB–5000 standards. ASME Code, Section III, Division 1, Subsection NB–5231(b) requires either ultrasonic or radiographic examinations and either liquid penetrant or magnetic particle examinations be performed on the full penetration corner welded joints. Therefore, the fabricator can choose either ultrasonic or radiographic examinations to inspect the corner weld. In this case, the bottom inner plate weld is inspected using ultrasonic examination methods if the weld is applied before the outer and inner shells are assembled. If the weld is applied after assembly, this inspection is done radiographically. Both methods will be supplemented by either liquid penetrant or magnetic particle examinations. Non-confinement welds are inspected in accordance with the ASME Code, Subsection NF. Additional inspections will also be performed on the gamma shield shell to the bottom shield weld and the lid to the shield lid weld as specified in SAR Section 9.

Comment G.27: One commenter stated that using mirrors and auxiliary lighting to inspect welds that were not directly visible ''sounded tricky.'' The commenter noted that ensuring that the basket retains its form throughout its life is important and asked the NRC to clarify what a plug weld is and how they are inspected.

Response: The NRC has accepted a number of methods to visually inspect hardware to verify materials quality, including the use of mirrors and auxiliary lighting as appropriate. The basket will retain its shape over the life of the containment system because it is fabricated using acceptable methods. Also, the cask is filled with helium that precludes environmentally induced alterations. Further, the basket is designed to accommodate the thermal cycles of the application without substantial distortions. The plug weld technique is used to connect the stainless steel tubes together as part of the fuel basket using solid stainless steel connecting bars. Each plug weld penetrates the full thickness of the stainless steel tube wall. These welds are not only 100 percent visually inspected, but sample coupons made by the same welding procedures, technique, and weld machine are tested to verify quality.

H. Technical Specifications

Comment H.1: One commenter stated that the maximum uranium content should be deleted from Section 2.1 of the TSs because this information is already included in the SAR.

Response: The NRC disagrees with this comment. This design information is crucial to the conclusions reached by the NRC about the TN–32 design in its SER. The maximum uranium masses, along with other fuel parameters, include the design tolerances considered in the SAR and, therefore, are not overly restrictive. The uranium content in the TSs are set to bound all potential variations for the design. Further, the NRC considers the maximum uranium content to be a fuel parameter that is a part of the design that can not be changed without NRC review and approval. Therefore, it should remain in the TSs.

Comment H.2: One commenter stated that the parameter labeling of Table 2.1.1–1 of the TSs should be revised as Minimum Initial Enrichment and Maximum Burnup to avoid confusion.

Response: The NRC agrees with this comment. TS Table 2.1.1–1 has been revised to use the terms Minimum Initial Enrichment and Maximum Burnup. Footnotes clarifying that the actual minimum enrichment is to be rounded down and burnup is to be rounded up were also added to the table. Additionally, a discussion related to the footnotes was added to the bases for the TSs (B2.1/B2.2) located in Chapter 12 of the SAR.

Comment H.3: One commenter stated that the frequency for Surveillance Requirement (SR) 3.1.3 and 3.1.4 should use the term TRANSPORT OPERATIONS for consistency.

Response: The NRC agrees with this comment. The affected TSs have been changed to use the term TRANSPORT OPERATIONS.

Comment H.4: One commenter stated that the frequency of SR 3.1.6.1 should be revised to state ''immediately prior to lifting the cask . . .''.

Response: The NRC agrees with this comment. The FREQUENCY requirement of SR 3.1.6.1 has been changed to state ''Once, immediately prior to lifting the cask and prior to cask transfer to or from ISFSI.''

Comment H.5: One commenter stated that the applicability of SR 3.2.1 should be revised to ''during TRANSPORT OPERATIONS'.

Response: The NRC disagrees with this comment because it is not necessary to include this information in the body of the TS. However, it is appropriate for clarity to insert a comment in the basis for the TS (B3.2.1) located in Chapter 12 of the SAR. The SAR has been revised accordingly.

Comment H.6: One commenter stated that the cell opening and boron loading should be removed from Section 4.1.1 of the TSs.

Response: The NRC disagrees with this comment. This design information is crucial to the conclusions reached by the NRC in its SER. The minimum boron loading and the minimum cell opening for the basket include any design tolerances included in the SAR. Design features that may affect safety if altered or modified are included in the TSs.

Comment H.7: One commenter stated that the Codes and Standards Section, 4.1.3, of the TSs should be removed.

Response: The NRC disagrees with the comment. This information is required under 10 CFR 72.24(c)(4).

Comment H.8: One commenter stated that in the storage location for Casks, 4.2.1 of the TSs, the 16-foot dimension should be listed as a minimum value or a tolerance should be added.

Response: The NRC does not agree with this comment to add a tolerance. As written, the TSs state that ''the casks shall be spaced a minimum of 16 feet apart, center-to-center.'' This specification assures that the minimum cask spacing assumed in the analysis is achieved to allow proper dissipation of radiant heat energy.

Comment H.9: One commenter stated that references to consideration as important to safety [for a berm] be removed from Section 4.3.6 of the TSs.

Response: The NRC disagrees with this comment. As defined in 10 CFR 72.3, structures, systems, and components important to safety are those features of the ISFSI or monitored retrievable storage (MRS) whose function is to maintain the conditions required to store spent fuel safely. Thus, when a berm or other system, structure, or component is installed to meet the normal condition dose limits of 10 CFR 72.104 (i.e., to provide safe storage), it is considered important to safety. However, under 10 CFR 72.122, the quality standards for the feature's design, fabrication, erection, and testing may be at a level commensurate with the safety importance of the function to be performed. See NUREG/CR 6407, ''Classification of Transportation Packaging and Dry Spent Fuel Storage Components According to Importance to Safety'' February 1996. Generally, features that are not needed to meet the accident conditions will not have to meet as high a standard as those that need to function in an accident.

Comment H.10: One commenter stated that the proposed TN–32 TSs are confusing, more complicated than those of the VSC–24, and are not written in plain English. For example, the commenter noted that 1.3 ''completion times'' on page 1.3–2 is confusing with too many words.

Response: The NRC disagrees with the comment. The TN–32 TSs are modeled on the improved Standard Technical Specifications (ISTS) for power reactors. The ISTS were developed as the result of extensive technical meetings and discussions between the NRC staff and the nuclear power industry in the early 1990s in an effort to improve clarity and consistency of the power reactor TSs and to make them easier for operators to use. The most likely users of the TN–32 spent fuel storage cask technical specifications are power reactor licensees familiar with the format of the ISTS. Although different in form than the VSC–24 TSs, the NRC staff believes that the format of the proposed TN–32 TSs will make them easier for operators to use and will help to achieve consistency between power reactor TSs and spent fuel dry cask storage TSs. The NRC staff also believes that the specific wording of Section 1.3, ''Completion Times'' helps to clarify the TSs by walking the user through each step in detail and by explaining the conditions, the required action, and the allowable time to complete the required action.

Comment H.11: One commenter requested an explanation of SR 3.0.2. The commenter stated that the use of 1.25 times the interval specified was confusing and that workers should have definite clear directions. One commenter questioned the 25 percent extension of time allowed by SR 3.0.2. The commenter stated that the surveillance should not be missed and should be completed on time.

Response: The basis for SR 3.0.2 is discussed in the TN–32 Technical Specification Bases Section B 3.0, ''Surveillance Requirement Applicability.'' This section explains the NRC staff's rationale for allowing a 25-percent extension in the completion of periodic surveillances. The NRC staff finds the 25-percent extension does not significantly degrade the reliability that results from performing the surveillance at its specified frequency. For those cases where it is necessary to adhere to a strict time frame for completing a surveillance, the specific SR will state that the 25-percent extension of SR 3.0.2 is not applicable. The 25-percent extension is also not applicable in cases when a surveillance frequency is specified by a regulation because the requirements of the regulations take precedence over TSs. The NRC staff believes that the provisions of SR 3.0.2 are clear to users of the TSs and will ensure that all required surveillances will be performed within an acceptable time period, consistent with the NRC staff's safety analyses.

Comment H.12: One commenter asked the frequency of alarm checks and calibration for accuracy. The commenter stated that automatic testing and alarms at the plant should be developed. The commenter also stated that the testing interval of every 36 months for the channel operational test (COT) in SR 3.1.5.2 was inadequate due to the importance of the pressure switch.

Response: The NRC agrees that the instrumentation for monitoring the seals is important and that is why the NRC required TSs for surveillance of this instrumentation. The surveillance requirements for the cask interseal pressure monitoring (e.g. alarm checks and calibration frequency) are given in SR 3.1.5.1 and SR 3.1.5.2.

SR 3.1.5.1 requires monitoring of the interseal pressure at a frequency of once per 7 days. This check ensures that the condition of the alarm is verified at an acceptable frequency. The surveillance frequency is acceptable to the NRC staff based on the measures to verify the integrity of the cask seals and the pressure monitoring system during cask preparations, the static and passive nature of the seals, and the low likelihood that the seal or the monitoring system will develop a leak after placing them into service.

SR 3.1.5.2 requires a channel operational test (COT) of the pressure monitoring instrumentation at a frequency of once every 36 months. According to the TS definition, the COT tests the pressure sensing instrumentation and low pressure indication feature by injecting an actual or simulated signal as close to the sensor as possible to verify the operability of the alarm functions. The COT also includes adjustments, as necessary, of the required alarm setpoint so that the setpoint is within the required range and accuracy. Section 8.3 of the SAR that was reviewed and accepted by the NRC further describes the COT for the TN–32.

By establishment of requirements in the TSs, the NRC imposed minimum performance requirements of the equipment used for the overpressure monitoring system. It is incumbent on the general licensee to procure and install pressure monitoring equipment on the TN–32 cask that has acceptable reliability. This would include having provisions for instrument drift to ensure that the requirements for continuous monitoring of the cask seal are met. Based on considerable industry experience with instrumentation, suitable instrumentation that meets the performance requirements for the TN–32 is available. Further, the monitoring frequency is also acceptable to the NRC staff based on the measures to verify the integrity of the cask seals, the pressure monitoring system during cask preparations, and the low likelihood that the seal or the system will develop a leak after placing them into service.

Regarding the commenter's suggestion of creating an automated or computerized method for testing the instrumentation, details on site-specific design of this equipment is beyond the scope of this rule.

Comment H.13: One commenter stated that the measurement location for the cask temperature in SR 3.1.6.1 should be outside the auxiliary loading area in ambient conditions before the cask starts the transfer to the ISFSI. The commenter further stated that additional criteria is needed to specify the location because the cask temperature should not be taken next to a heater inside the building.

Response: The NRC disagrees with this comment. The cask body temperatures are not going to undergo rapid change induced by ambient conditions. This is because the mass of the cask is so large. It is the cask user's responsibility to ensure that the temperature measurement represents the actual temperature of the outer surface of the cask rather than some other heat source that might be located in the vicinity of the cask. This level of detail is beyond the scope of this rule.

Comment H.14: One commenter asked for clarification of the limitations on changes discussion in LCO 3.0.4. The commenter felt that the way the LCO was worded is ambiguous because it allows actions to be taken that are not endorsed.

Response: The ultimate purpose of LCO 3.0.4 is to allow the cask to be placed in a safe condition in accordance with the Required Action(s) of the governing TS. LCO 3.0.4 precludes placing the cask in an unacceptable condition; specifically one in which the governing LCO would not be met in the Applicability desired to be entered, or if that Applicability would have to be exited at a certain time to comply with the Required Actions. LCO 3.0.4 does not allow actions to be taken that are not approved by the NRC staff.

Comment H.15: One commenter stated that a clarification to the code should be made in Table 4.1–1 of the TSs that the weld of the lid shield plate to the lid is not impact tested.

Response: The NRC agrees with the comment and the TSs have been changed accordingly.

Comment H.16: One commenter stated that in Section 4.1.3, and Table 4.1–1 of the TSs, all references to NB should be changed to NF for the basket.

Response: The NRC agrees with the comment because the TN–32 is a storage only cask, and have changed the TSs accordingly.

I. Miscellaneous

Comment I.1: One commenter pointed out that an NRC letter and technical report calculation numbers are not the same.

Response: The NRC agrees with this comment. The SAR has been revised to correct the discrepancy.

Comment I.2: One commenter stated that the SAR Rev. 11A references an old technical report revision date.

Response: The NRC agrees in part with this comment and has determined that the technical report referenced by the applicant in the SAR was the one used in the supporting analysis and is not the most recent version. The NRC has determined that the information used in the supporting analysis is consistent with that included in the more recent revision. Therefore, using the more recent revision would not impact the applicant's analysis and the NRC requires no update to the reference in the SAR.

Comment I.3: One commenter asked if a vacuum pump fails while a cask is filled with air and some water, how long could workers take to fix the pump before heat up took place in the cask?

Response: The time and rate of heatup of a cask partially filled with water would depend on the type of fuel, its burnup, and enrichment. According to SR 3.1.1.1, vacuum drying must be complete within 24 hours of the completion of cask draining. Therefore, if vacuum drying is not complete for whatever reason by the 24-hour period, specific actions are required by TS 3.1.1 to place the fuel in the desired safe condition.

Comment I.4: One commenter asked for information about Interim Staff Guidance (ISG) 7 referred to in the SER. Further, the commenter asked what different cask is referred to, if partial helium injection is effective, and if it has been tested. Also, the commenter recommends that testing be conducted for the TN–32.

Response: The purpose of the helium injection is to improve the thermal conductivity of the fill gas as a temporary measure to provide an opportunity to troubleshoot and repair breakdowns during the drying or helium fill process. ISG 7, ''Potential Generic Issue Concerning Heat Transfer in a Transportation Accident'' dated October 2, 1998, provides NRC staff guidance for mixtures of gases within the VSC–24, a spent fuel storage cask. In support of ISG–7, a sensitivity study was performed to evaluate the relative change in cladding temperatures as a result of significant reductions in the thermal conductivity of the fill gas (e.g., 30 percent that of helium). This evaluation found that the cladding temperature was relatively insensitive to gas thermal conductivity as evidenced by an increase in the fuel cladding and bulk gas temperatures of about 3 percent. The NRC staff did not review nor require any testing of the helium injection process based on the analysis and the restrictions imposed by the TSs on operations without a full helium environment.

Comment I.5: One commenter suggested that an unloading test should be done to see what would happen. The commenter asked how the check valve is put into the documents [procedures], how workers can validate this, what water level is in the cask with how much space above, can hydrogen accumulate in that space, and if the draining and venting is performed through connected hoses. The commenter also suggested that the procedure is dangerous, could be confusing for a new worker, and that figure 8.2–1 of the SAR should be added to the SER for clarity. Further, the commenter asked a number of questions about the reflooding evolution: what happens to steam and if hydrogen can form and mix and could exit the cask; what other chemical reactions could occur, if paint, crud or BPRAs pieces, or bits of aluminum could fall and clog equipment; what would occur if cooling water were put in at the top hole instead of in the drain pipe at the bottom of the cask; and if the SER and SAR provide sufficient and correct guidance on the fill, vent, and drain opening for loading and unloading.

Response: The NRC disagrees with this comment about testing. Testing is normally required when the analytic methods have not been validated or assured to be appropriate and/or conservative. In lieu of testing, the NRC finds analytic conclusions that are based on sound engineering methods and practices to be acceptable. The TN–32 Dry Storage Cask design including the unloading process has been reviewed by the NRC. The basis of the safety review and findings are clearly identified in the SER and CoC. In addition, as a condition of the CoC, each cask user must demonstrate the ability to unload a cask as a part of its pre-operational testing and training exercise. The demonstration of the ability to unload a cask, in combination with NRC staff review and acceptance of the analyses performed by TN, provides reasonable assurance that the TN–32 cask can be safely unloaded.

The unloading process including the check valve is described in TN–32 SAR Section 8.2. Detailed site-specific procedures for performing unloading operations are required to be developed and demonstrated at each facility that uses the TN–32. Cask users are required to provide adequate procedures, training, and quality oversight to ensure that the procedure actions are performed as required. The vent and drain ports have different size pipe threads in order to aid in precluding any confusion for the worker. A note has been added to the SAR drawing and Chapter 8 for clarification.

For hydrogen generation to occur, there must be either a chemical interaction between the water in the cask and cask materials or radiolysis of the water. Hydrogen generation itself is not a safety problem because there must also be conditions that allow for accumulation of hydrogen and air (or oxygen) to an ignitable mixture and an ignition source. For the materials present in the TN–32 cask, the rate of hydrogen generation is low when compared to other materials such as zinc based coatings. The applicant provided an evaluation of hydrogen in the TN–32 SAR, Section 3.4.1.4, that addressed hydrogen generation, measures to preclude hydrogen accumulation, and that the TN–32 does not have any ignition sources because the cask closure is bolted.

During loading, the cask is completely filled with water and continuously vented which precludes the accumulation of hydrogen. For the cask draining operation, the cask remains vented. The applicant concluded that the hydrogen buildup in a 2-hour period (the expected time for draining) would be well below the ignitable limit of 4 percent. Vacuum drying is performed after draining. In this condition there is no longer a source of hydrogen generation.

During cask reflood, the cask is continuously vented, precluding the accumulation of hydrogen. The cask fill gas and possibly steam will be forced out of the cask through the vent until the cask is full and the reflood is complete. After the reflood is complete, the cask remains vented as it is placed in the pool and the lid removed. The procedure descriptions in the TN–32 SAR, Section 8, include specific provisions for venting of the cask during times when the cask is filled with water such as during draining and reflood operations.

The NRC staff reviewed and accepted the analysis of hydrogen generation and procedure descriptions to load and unload the TN–32 cask in Preliminary SER Sections 3.1.4.1 and 8. A discussion of crud development is included in the response to Comment I.13.

Comment I.6: One commenter stated that based on the information in the documents that pressurized water reactor (PWR) fuel burned to 45,000 MWD/MTU with a 6-year cooling time can not be loaded in the cask because it increases the neutron source by 12%.

Response: The NRC agrees with the comment. As specified in Table 2.1.1–1 of the TSs, fuel must be cooled at least 7 years before it can be stored in the TN–32 cask.

Comment I.7: One commenter asked how pinhole leaks and hairline cracks can be detected or seen in rods in the middle of an assembly, how many of these defects are permitted in one rod, (as many as 100?), what is the acceptable defect size, if blisters and crud can be present, if a rod or BPRAs can be depressurized, and if utilities or the NRC are clear on what is acceptable.

Response: An example of pinhole leaks and hairline cracks is given in SAR Section 6A.3. Only assemblies that are intact are allowed in the TN–32. The TN–32 meets the criticality safety requirements of 10 CFR Part 72 without any additional fuel condition requirements. The criteria for an intact assembly are defined in TS Section 1.1 as fuel assemblies without known or suspected cladding defects other than pinhole leaks or hairline cracks and can be handled by normal means. Partial fuel assemblies (fuel assemblies with missing fuel rods) must not be classified as intact fuel assemblies unless dummy fuel rods are used to displace an amount of water greater than or equal to that displaced by the original fuel rods. As proof that the fuel to be loaded is undamaged, the NRC will accept, as a minimum, a review of the records to verify that the fuel is undamaged, followed by an external visual examination of the fuel assembly before loading to identify any obvious damage. For fuel assemblies where reactor records are not available, the level of proof will be evaluated on a case-by-case basis. The purpose is to provide reasonable assurance that the fuel is undamaged. Depressurized rods and BPRAs do not impact the safe operation of the cask as discussed in the response to F.3 above.

Comment I.8: One commenter asked how helium purity is tested, if it will be done and if it will be in the documents [procedures].

Response: Testing or sampling for helium purity is performed by the helium supplier and certified to the cask user upon delivery. TS 4.1.4 requires that the cask be filled with helium with a purity of at least 99.99 per cent and documented accordingly. The purity of the helium will be controlled under the licensee's quality assurance program. Only pure helium will be used to backfill the cask; no other gasses will be added during backfill. Acceptable helium purity for dry spent fuel storage casks was defined by R. W. Knoll et al. At Pacific Northwest Laboratory in, ''Evaluation of Cover Gas Impurities and Their Effects on the Dry Storage of LWR Spent Fuel'' PNL–6365, November 1987.

Comment I.9: One commenter asked if the 0.10 fraction for release of full fines is valid, if there has been any more testing after the 1992 Sandia report, and if anything new has been conducted after the 1980 rod burst tests.

Response: The NRC staff has accepted the 0.10 fraction for releasability of fuel fines for the TN–32. The basis for this acceptance is provided in the TN–32 SER Section 7.3. The NRC staff does not have information on experiments or testing more recent than that referenced in the SER.

Comment I.10: One commenter asked why there is a progression to backfill twice with helium.

Response: This process ensures a high confidence that residual moisture and oxidizing impurities are removed from the cask cavity. It is a recommendation of PNL–6365, ''Evaluation of Cover Gas Impurities and Their Effects on the Dry Storage of LWR Spent Fuel'' November 1987.

Comment I.11: One commenter asked what would happen if a gas sample found that helium had been lost , if a water sample reflected crud particulates, paint flakes, or parts of a deteriorated BPRA or TPA. The commenter noted a concern that the above materials in the water could clog equipment and require filter changes in the pool if mixed with spent fuel pool water. The commenter suggested that some equipment to filter the cask water before to mixing with pool water is needed along with a filtration system to control gas releases from the cask.

Response: There is not a requirement to sample the cask cavity for the presence of helium. The cask is designed and analyzed to maintain a helium environment for the duration of the authorized storage period. However, if helium is hypothetically assumed to not be present in a cask during storage, there is a possibility that the fuel may be degraded. Any leakage from these postulated degraded fuel rods would be retained by the cask confinement system that acts as a barrier to releases of radioactive materials to the environment. Specific actions are outlined in the unloading procedure descriptions in SAR Table 8.2–1 regarding analyzing a gas sample for radioactive material (to detect degraded fuel). If degraded fuel is detected, appropriate actions are required for the cask user to develop procedures to minimize exposures to workers and releases to the environment. A requirement to sample the water discharged from the cask during reflood operations is beyond the scope of this rule.

The NRC disagrees with the recommendation to add a filtration system to cask water because the spent fuel pool already has a filtration and purification system in place. Further, the design of the cask precludes the need for a gas filtration system. A discussion of crud development is included in the response to Comment I.13.

Comment I.12: One commenter discussed the use of poured resin material, the importance of procedures for mixing and pouring, the need for detailed procedures for workers who may never have worked on nuclear application material, the need for management supported work ethics, the need to report and correct mistakes, and the need for production workers making the boron aluminum sheets to be aware of the effects of flaw removal. The commenter asked if there are clear criteria for inspection and testing of resin material by the fabricator, and what the measures are to ensure the absence of voids in resin material and if they are clear.

Response: The fabrication of the resin neutron shield will be performed under specific controls and procedures to provide a uniform and effective material. Radiation surveys performed around the cask after loading are designed to detect flaws or mistakes that will adversely affect the ability of the cask to meet the offsite dose limits. Fabrication, testing, and repair of the components in the cask important to safety are covered by an NRC approved quality assurance program either directly or as a supplier or subcontractor to a holder of a QA program. The applicable QA requirements are contained in 10 CFR Part 72 Subpart G.

Comment I.13: One commenter asked a number of questions on the cask filling and venting process and how the procedures will preclude ignition of hydrogen. The commenter asked how the cask filling process works and if the fill and drain lines vent gases during cask filling and if hydrogen can form during the process; if steam, hydrogen, paint flakes, or crud (debris) will fall into the fuel basket and between rods and clog the drain lines, and what happens to these materials during the fill process; if effluent flows from the cask to the fuel pool and affects pool water quality or reacts chemically with materials ; and if casks can be safely unloaded based on the above.

Response: The filling and venting process are discussed in the response to Comment I.5. Except for crud, the NRC staff does not expect paint flakes, particles or debris in the TN–32 cask because the coating on the cask interior is flame sprayed aluminum that is a tightly adherent and stable coating in the spent fuel storage environment and the other cask materials do not create debris during any of the expected conditions in the cask. Some crud may be dislodged from the fuel cladding during spent fuel dry storage, but the crud particles for PWR fuel are very small with diameters ranging from 1 to 3 micro-meters as reported in SAND88–1358, ''Estimate of CRUD Contribution to Shipping Cask Containment

Requirements.'' Particles of this size do not pose a clogging concern in vent/drain lines for this cask. Apart from the crud, no materials other than water and steam are discharged to the pool, where crud from wet fuel storage is already present. The amount of crud from the spent fuel cask is expected to be very small and would be captured in the spent fuel pool filtration system. Crud is generally made up of metal oxides that are not chemically reactive.

The unloading process is outlined in section 8.2 of the TN–32 SAR along with supporting analysis in sections 3 and 4. The NRC staff reviewed and accepted the operating descriptions and analysis, and concluded in the SER that there was reasonable assurance that the casks could be safely unloaded by qualified personnel using detailed procedures developed by the cask user at an ISFSI site.

Comment I.14: One commenter asked the basis for the 24 hour timeframe for conducting the dryness test; the basis for stating that a high vacuum is an indication that the cavity is dry; what analysis provides the basis for the height of the vacuum and whether the analysis is for the specific materials in the cask; the definition of a dry cavity and whether it includes the aluminum paint, drain pipe, bottom plate, zircaloy, pellets, etc.; how do you really know that the contents of the cavity are dry.

Response: The basis for the 24-hour time limit to achieve the required vacuum and cask dryness is discussed in detail in TS bases B.3.1.1. The purpose of the time limit is to prevent the temperature of the basket components from exceeding their analyzed temperature range. A high vacuum ensures that most of the moisture will be removed from all components in the cavity including coatings. The vacuum drying process is further discussed in the response to Comment G.7.

Comment I.15: One commenter asked if an analysis has ever been completed to see what happens when the fuel and other cavity contents are dried out and then placed back in the pool. The commenter asked how the materials react with the pool water and whether it affects the pool.

Response: The information provided in SAR Section 3.4.1 discusses material interactions and would apply to when the fuel and cavity were dried out and placed in the pool with the introduction of water to the materials. The NRC staff has determined that this information is complete and acceptable.

Comment I.16: One commenter asked if it is appropriate to use the same procedures to dry the cask out after being in the pool for seven days and if the process is still accurate.

Response: The procedures used for drying the cask and the expected materials and fuel interactions are discussed in the response to Comment G.7. The procedures are applicable to an exposure of the cask to pool water of any duration.

Comment I.17: One commenter asked if there was a weld problem in Precision Components Fabrication and how the problem was resolved. The commenter believed there was a concern with the shims and asked where the shims are located and how they are removed at unloading.

Response: Shims are not used in the TN–32 cask closure design; the lid is bolted on and not welded. Questions related to the fabrication activities at Precision Components Fabrication are beyond the scope of this rule.

Comment I.18: One commenter asked if the TN–RAM shipping problems had been resolved and if this was a concern for the TN–32 design.

Response: This comment is beyond the scope of this rule that deals with a storage cask design.

Comment I.19: One commenter stated that the gaps (in welds) was one of the real concerns for the TN–32 and asked what are the gaps.

Response: Gap welds are not a concern with the TN–32 cask design because the lid is bolted not welded in place. Therefore, this comment is not applicable to this rule.

Comment I.20: One commenter asked if the documents at Transnuclear and the subcontractors were controlled according to their Quality Assurance (QA) program. The commenter stated that there had been some problems with the Transnuclear QA manual and asked if the problem was now resolved. The commenter further asked if workers understand what a defect is and if the QA program clearly defines a defect. The commenter stated that there should be a requirement to store documents in process in fireproof boxes at the end of each work day.

Response: The NRC recognizes the relationship of the comment with the inspection findings noted in NRC Inspection reports 71–0250/97 and 72–1021/97–206. The inspection findings were addressed and the resolution was reviewed by the NRC. TN was notified that their response was acceptable and that no further information was required in NRC letters to Transnuclear dated July 28, 1997, and August 8, 1997. There is no regulatory requirement or applicant procedure to store design documents in fireproof boxes.

Comment I.21: One commenter asked if the SAR has been updated and if it will have another update with the CoC approval.

Response: The applicant has revised the SAR in response to rulemaking comments and questions before CoC issuance. The final version issued with this rule is available in the NRC Public Document Room.

Comment I.22: One commenter asked if soil liquefaction has been adequately addressed in the TN–32 pad design.

Response: Soil liquefaction is a site-specific issue and is beyond the scope of this rule that adds a generic cask design to the listing.

Comment I.23: One commenter asked if the Surry cask design has been amended to use increased burnup and enrichment.

Response: Virginia Power has submitted a request to the NRC to amend their cask design to permit storage of fuel with higher enrichment and with higher burnup. This request will be reviewed by the NRC staff.

Comment I.24: One commenter asked if ''assembly line methods'' of fabrication are causing problems and multiple non-conformance for the TN–32 design, and if there are problems that should be resolved.

Response: The NRC is not aware of any fabrication methods that have caused problems or non-conformance with the TN–32 design.

Summary of Final Revisions

As a result of the staff's response to public comments, or to rectify issues identified during the comment period, the following items in the TSs have been modified: TS 1.1 (staff initiative), TS 2.1 (staff initiative), Table 2.1.1–1 (see comment H.2), TS 3.1.3 (see comment H.3), TS 3.1.4 (see comment H.3), TS 3.1.6.1 (see comment H.4), TS 4.1.3 (see comment H.16), Table 4.1–1 (see comment H.15 and H.16), and TS 5.2.3 (staff initiative).

The proposed CoC has been revised to clarify the requirements for making changes to the CoC by specifying that the CoC holder must submit an application for an amendment to the certificate if a change to the CoC, including its appendices, is desired. The CoC has also been revised to delete the proposed exemption from the requirements of 10 CFR 72.124(b) because a recent amendment of this regulation makes the exemption unnecessary (64 FR 33178; June 22, 1999). The staff has also updated the CoC, including the addition of explicit conditions governing acceptance tests and maintenance program, approved contents, design features, and authorization, and has removed the bases section from the TSs attached to the CoC to ensure consistency with NRC's format and content. In addition, other minor, nontechnical changes have been made to CoC 1021 to ensure consistency with NRC's new standard format and content for CoCs. The NRC staff has also modified its SER. The NRC staff has also modified the rule language by changing the word ''Certification'' to ''Certificate'' to clarify that it is the Certificate that expires.

Agreement State Compatibility

Under the ''Policy Statement on Adequacy and Compatibility of Agreement State Programs'' approved by the Commission on June 30, 1997, and published in the **Federal Register** on September 3, 1997 (62 FR 46517), this rule is classified as compatibility Category ''NRC.'' Compatibility is not required for Category ''NRC'' regulations. The NRC program elements in this category are those that relate directly to areas of regulation reserved to the NRC by the Atomic Energy Act of 1954, as amended (AEA), or the provisions of Title 10 of the Code of Federal Regulations. Although an Agreement State may not adopt program elements reserved to NRC, it may wish to inform its licensees of certain requirements via a mechanism that is consistent with the particular State's administrative procedure laws, but does not confer regulatory authority on the State.

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 NRC 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 from the Commission. The environmental assessment and finding of no significant impact on which this determination is based are available for inspection at the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC. Single copies of the environmental assessment and finding of no significant impact are available from Merri Horn, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 415–8126, e-mail mlh1@nrc.gov.

Paperwork Reduction Act Statement

This final rule does not contain a new or amended information collection requirement subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). Existing requirements were approved by the Office of Management and Budget, approval number 3150–0132.

Public Protection Notification

If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

Voluntary Consensus Standards

The National Technology Transfer Act of 1995 (Pub. L. 104–113), requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless the use of such a standard is inconsistent with applicable law or otherwise impractical. In this final rule, the NRC is adding the Transnuclear TN–32 cask system to the list of NRC-approved cask systems for spent fuel storage in 10 CFR 72.214. This action does not constitute the establishment of a standard that establishes generally-applicable requirements.

Regulatory Analysis

On July 18, 1990 (55 FR 29181), the Commission issued an amendment to 10 CFR Part 72. The amendment provided for the storage of spent nuclear fuel in cask systems with designs approved by the NRC under a general license. Any nuclear power reactor licensee can use cask systems with designs approved by the NRC to store spent nuclear fuel if it notifies the NRC in advance, the spent fuel is stored under the conditions specified in the cask's CoC, and the conditions of the general license are met. In that rule, four spent fuel storage casks were approved for use at reactor sites and were listed in 10 CFR 72.214. That rule envisioned that storage casks certified in the future could be routinely added to the listing in 10 CFR 72.214 through the rulemaking process. Procedures and criteria for obtaining NRC approval of new spent fuel storage cask designs were provided in 10 CFR Part 72, Subpart L.

The alternative to this action is to withhold approval of this new design and issue a site-specific license to each utility that proposes to use the casks. This alternative would cost both the NRC and utilities more time and money for each site-specific license. Conducting site-specific reviews would ignore the procedures and criteria currently in place for the addition of new cask designs that can be used under a general license, and would be in conflict with NWPA direction to the Commission to approve technologies for the use of spent fuel storage at the sites of civilian nuclear power reactors without, to the maximum extent practicable, the need for additional site reviews. This alternative also would tend to exclude new vendors from the business market without cause and would arbitrarily limit the choice of cask designs available to power reactor licensees. This final rule will eliminate the above problems and is consistent with previous Commission actions. Further, the rule will have no adverse effect on public health and safety.

The benefit of this rule to nuclear power reactor licensees is to make available a greater choice of spent fuel storage cask designs that can be used under a general license. The new cask vendors with casks to be listed in 10 CFR 72.214 benefit by having to obtain NRC certificates only once for a design that can then be used by more than one power reactor licensee. The NRC also benefits because it will need to certify a cask design only once for use by multiple licensees. Casks approved through rulemaking are to be suitable for use under a range of environmental conditions sufficiently broad to encompass multiple nuclear power plants in the United States without the need for further site-specific approval by NRC. Vendors with cask designs already listed may be adversely impacted because power reactor licensees may choose a newly listed design over an existing one. However, the NRC is required by its regulations and NWPA direction to certify and list approved casks. This rule 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 public health and safety and the common defense and security. No other available alternative is believed to be as satisfactory, and thus, this action is recommended.

Small Business Regulatory Enforcement Fairness Act

In accordance with the Small Business Regulatory Enforcement Fairness Act of 1996, the NRC has determined that this action is not a major rule and has verified this determination with the Office of Information and Regulatory Affairs, Office of Management and Budget.

Regulatory Flexibility Certification

In accordance with the Regulatory Flexibility Act of 1980 (5 U.S.C. 605(b)), the Commission certifies that this rule will not, if promulgated, have a significant economic impact on a substantial number of small entities. This rule affects only the licensing and operation of nuclear power plants, independent spent fuel storage facilities, and Transnuclear. The companies that own these plants do not fall within the scope of the definition of ''small entities'' set forth in the Regulatory Flexibility Act 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 or 10 CFR 72.62) does not apply to this rule because this amendment does not involve any provisions that would impose backfits as defined in the backfit rule. Therefore, a backfit analysis is not required.

List of Subjects in 10 CFR Part 72

Criminal penalties, 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 as amended by Pub. L. 10d–48b, sec. 7902, 10b Stat. 31b3 (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 1021 is added to read as follows:

§ 72.214 List of approved spent fuel storage casks.

* * * * *

Certificate Number: 1021.
SAR Submitted by: Transnuclear, Inc.
SAR Title: Final Safety Analysis Report for the TN–32 Dry Storage Cask.
Docket Number: 72–1021.
Certificate Expiration Date: April 19, 2020.
Model Number: TN–32, TN–32A, TN–32B.

Dated at Rockville, Maryland, this 6th day of March, 2000.

For the Nuclear Regulatory Commission.

William D. Travers,

Executive Director for Operations.

[FR Doc. 00–6630 Filed 3–17–00; 8:45 am]

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FEDERAL RESERVE SYSTEM

12 CFR Part 208

[Regulation H; Docket No. R–1064]

Membership of State Banking Institutions in the Federal Reserve System

AGENCY: Board of Governors of the Federal Reserve System.

ACTION: Interim rule with request for public comments.

SUMMARY: The Board is amending Regulation H to implement provisions of the Gramm-Leach-Bliley Act for state member banks. The Gramm-Leach-Bliley Act authorizes state member banks to control, or hold an interest in, financial subsidiaries which may conduct certain activities that are financial in nature or incidental to a financial activity. The Board has promulgated this rule on an interim basis, effective on March 11, 2000, in order to allow state member banks that meet applicable criteria to acquire control of, or an interest in, a financial subsidiary as soon as possible following the effective date of the relevant provisions of the Gramm-Leach-Bliley Act.

The Board solicits comments on all aspects of the interim rule and will amend the rule as appropriate in response to comments received.

DATES: This interim rule is effective on March 11, 2000. Comments must be submitted on or before May 12, 2000.

ADDRESSES: Comments, which should refer to Docket No. R–1064, may be mailed to Ms. Jennifer J. Johnson, Secretary, Board of Governors of the Federal Reserve System, 20th Street and Constitution Avenue, N.W., Washington, DC 20551 or mailed electronically to regs.comments@federalreserve.gov. Comments addressed to Ms. Johnson also may be delivered to Room B–2222 of the Eccles Building between 8:45 a.m. and 5:15 p.m., weekdays or delivered to the guard station in the Eccles Building Courtyard on 20th Street, N.W. (between Constitution Avenue and C Street, N.W.) at any time. Comments will be available for inspection and copying by any member of the public in the Freedom of Information Office, Room MP–500 of the Martin Building, between 9:00 a.m. and 5:00 p.m. weekdays, except as provided in § 261.8 of the Board's Rules Regarding Availability of Information (12 CFR 261.8).

FOR FURTHER INFORMATION CONTACT: Oliver Ireland, Associate General Counsel (202/452–3625), Kieran J. Fallon, Senior Counsel (202/452–5270), Michael J. O'Rourke, Counsel (202/452–3288), Legal Division, Board of Governors of the Federal Reserve System. For the hearing impaired only, Telecommunications Device for the Deaf (TDD), contact Janice Simms (202/872–4984).

SUPPLEMENTARY INFORMATION:

Background

The Board is amending Regulation H (Membership of State Banking Institutions in the Federal Reserve System) to implement section 121 of the Gramm-Leach-Bliley Act (GLB Act) (Pub. L. 106–102; 113 Stat. 1373–82) as it applies to state member banks. The Comptroller of the Currency has recently issued a rule to implement those parts of section 121 applicable to national banks (65 FR 12905, March 10, 2000). The Board's rule for state member