ATTACHMENT - RESPONSE TO STAKEHOLDER COMMENTS

The purpose of this attachment is to list all the public comments received on Interim Staff Guidance 8 (ISG-8), "Burnup Credit in the Criticality Safety Analyses of PWR Spent Fuel in Transportation and Storage Casks," Revision 3. The NRC issued ISG-8, Revision 3 (ML12115A303) for public comment on May 2, 2012 for a 30 day period and received comments from the following three sources:

- NEI, Nuclear Energy Institute, letter from Marcus Nichol to Ms. Cindy Bladey, USNRC, dated May 30, 2012 (ML12156A265)
- NuclearConsultants.com, letter from Mr. Dale Lancaster to USNRC, dated May 30, 2012 (ML12156A266)
- Holtec International, letter from Stefan Anton to USNRC, dated June 1, 2012 (ML12158A189)

The staff's resolution and any associated changes to the ISG are listed for each comment in the following table.

Comment	Summary of Comment	Resolution	Changes to ISG
NEI 1	Recommend a more risk informed approach to burn-up verification, based primarily upon the use administrative procedures, with the misload analysis providing defense-in-depth, and eliminates burnup measurements. This approach is consistent with current industry practice in accordance with NRC approved cask licensing bases, and is supported by the technical references cited in the draft guidance. We further note that this is the most effective method of addressing the situations that could result in a misload.	The burnup measurement recommendation is maintained as an option in the draft ISG, and does not need to be performed if the applicant performs a misload analysis accompanied by additional administrative procedures. The combination of misload analysis and additional administrative procedures is intended to provide defense-in-depth against cask misloads, and staff does not see the ordering of these two elements as important (i.e., both the misload analysis and the administrative procedures are equally necessary).	None.
NEI 2	Further clarify that the purpose of burn-up verification is to prevent the three credible situations that could result in more reactive assemblies being loaded: 1) loading the wrong fuel assembly, 2) calculating a burn-up value higher than actual, and 3) assigning the wrong burn-up value to a fuel assembly. Expanding upon the concept that the purpose of burn-up verification is to	Staff believes that the way misloads are defined in the draft ISG is adequate and appropriate for consideration in the burnup credit criticality analysis. Further definition is provided in the references to Section 5 of the draft ISG and Section 7 of Appendix A, and is unnecessary in the ISG itself.	None.

	"ensure that a storage or transportation system evaluated using burn-up credit is not loaded with an assembly more reactive than those included in the loading criteria" will provide a clear basis for the guidance related to appropriate methods of burn-up verification, and ensure efficient use of industry and NRC resources in the licensing, implementation, and oversight of these activities.		
NEI 3	Recommend that the administrative procedures in draft revision 3 of ISG-8 be replaced by the following: #1. Verify the identity of the fuel assembly prior to loading it into the cask #2. Verify the identity of the fuel assemblies loaded into the cask prior to closing #3. Verify the burn-up values of each fuel assembly to be loaded into the cask from a source QA record prior to loading the first assembly #4. Reduce the verified reactor record burn-up value by uncertainty in the record value, this is the burn-up value to be used for loading acceptance #5. Verify that each fuel assembly to be loaded into the cask satisfies the loading requirements prior to loading the first assembly #6. Develop and perform procedures/ processes in accordance with the QA program #7. Verify that the soluble boron concentration in the pool and cask is greater than the minimum required prior to cask loading	Staff believes that all of the administrative procedures recommended by NEI should already be reflected in either the site or cask operating procedures, even for systems that do not credit burnup in the criticality safety analysis. The list of procedures in the draft ISG are recommended *additional* administrative procedures for the loading of a burnup credit cask, which staff believes will reduce the likelihood or consequences of a high-reactivity misload. Note that the RES report on misload probability demonstrates that misloads are credible with the procedures included in the above list. Staff will revise the ISG to clarify that the recommended administrative procedures are *in addition* to those that would normally be in place for a non-burnup credit cask system.	Revised ISG to clarify that procedures are in addition to those performed for non-burnup credit cask

NEI 4	Comment on specific loading procedure: assurance that there is no fresh fuel in the pool during system loading. This procedure would not contribute to preventing a misload of an assembly under any of the three situations identified. While it is acknowledged that this would mitigate the consequences of 1) loading the wrong fuel assembly, it is also recognized that such an occurrence would be more effectively prevented by our recommended administrative procedures. Therefore, imposing a condition that there is no fresh fuel in the pool during system loading would be unnecessary as it does not decrease the likelihood of a misload event. This condition would be more applicable to the consequences of a misload event and would be better addressed in the consideration of the assumptions for the misload analyses, as discussed in comment #1d. From a practical standpoint, we recognize that licensees typically do not load casks while fresh fuel is in the pool, however, there could be an instance when this is necessary.	Staff agrees that this procedure would not reduce the likelihood of a misload; however, the draft ISG is not recommending consideration of fresh fuel assemblies for the misload analysis. This is due in part to the results of the NUREG/CR-6955 misload consequence analysis, which demonstrate that a burnup credit cask misloaded with a single fresh, 5.0 weight % fuel assembly will not remain adequately subcritical. Fresh fuel assemblies are also not recommended for the misload analysis given their obvious physical differences from burned assemblies, which staff believes would make prevention of fresh fuel misloads amenable to simple administrative procedures. Staff recognizes that this imposes an operational restriction on cask users, and that, as discussed in Comment NEI 6, is redundant with the "qualitative" burnup verification recommendation.	Revised Section 5, *Loading Curve and Burnup Verification*, to revise recommended procedures that address the presence of fresh fuel during loading operations.
NEI 5	Comment on specific loading procedure: verification of the location of high reactivity fuel (i.e., severely underburned fuel) in the spent fuel pool both prior to and after loading. This procedure would not contribute to preventing a misload of an assembly under any of the three situations identified. The intent of this procedure appears to be to prevent 1) loading the wrong fuel assembly; however, it is	The specific procedure recommended in the draft ISG is intended to reduce the likelihood of loading spent fuel assemblies that are outside the range of parameters considered in the misload analysis. The fuel assemblies that are intended to be addressed by this recommended procedure are "severely underburned," in that they have a higher reactivity than those considered in the single misloaded fuel assembly evaluation	Revise Section 5 and associated Appendix text to clarify "severely underburned."

	insufficient to accomplish this objective since it does not verify the actual assemblies to be placed into the casks. The recommend administrative procedure #1 above would be more effective at preventing loading the wrong fuel assembly, since it verifies the assemblies to be loaded into the cask. The recommended administrative procedures would be more efficient, since many spent fuel pools contain hundreds or thousands of fuel assemblies, and therefore it requires fewer resources to verify the assemblies that will be loaded into the casks rather than the assemblies that will not be loaded into the casks.	recommended in Section 5 of the ISG. Based on the RW-859 database of discharged fuel as of 2002, staff believes that the number of such fuel assemblies in a particular spent fuel pool will be low, and may be zero in many cases. Staff will retain the recommendation to verify the presence of high reactivity fuel assemblies prior to and after loading, and will revise the ISG to clarify what is meant by "severely underburned."	
NEI 6	Comment on specific loading procedure: qualitative verification that the assembly to be loaded is burned. This procedure would not prevent a misload under any of the three situations identified. A qualitative verification may prevent a fresh fuel assembly from being selected, however this would duplicate the proposed action to ensure fresh fuel is not in the pool during loading. This condition would be more applicable to the consequences of a misload event and would be better addressed in the consideration of the assumptions for the misload analyses. Furthermore, it is unclear how this would be performed. While "visual" implies that the guidance anticipates some physical change, such as color, may be readily verified, "gross measurement" appears to imply that a burn-up measurement is	Staff agrees that this recommended procedure is redundant with ensuring that fresh fuel is not present during fuel loading. The ISG will be revised as described in response to comment NEI 4.	Revised Section 5 of the ISG and associated text in Appendix A to revise the recommended administrative procedures for preventing fresh fuel from being loaded.

	necessary.		
NEI 7	Comment on specific loading procedure: confirmation that an audit of the pool inventory has been performed no more than one year prior to the time of loading. Reliance on a licensee's QA program to ensure configuration control of the pool inventory is sufficient to ensure that storage of fuel in the pool is consistent with the records, and the performance of a misload analysis provides defense-in-depth. Also note that 10 CFR Part 74 contains requirements for material control and accounting (MC&A), for which licensees perform inventories of the pool. The condition in the draft guidance could become duplicative, or possibly impose additional conditions that were purposefully avoided in the requirements of 10 CFR Part 74 because they result in undue burdens. Guidance should not create expectations for which there is not a requirement in Part 72 regulations, when there are requirements established by other Parts of the regulations.	Staff agrees that the recommendation for pool audit is potentially duplicative of MC&A requirements in 10 CFR 74. Staff also notes that this recommendation is redundant with the recommendation to verify the presence of high-reactivity fuel both prior to and after loading. However, staff believes some degree of additional verification is necessary prior to shipment of previously loaded systems, which may have been in storage for many years. The ISG will be revised to remove the pool audit recommendation and replace it with a QA audit of already loaded canisters prior to shipment.	Revised Section 5 of the ISG and associated text in Appendix A to replace pool audit recommendation with QA audit for already loaded canisters prior to shipment.
NEI 8	Comment on specific loading procedure: quantitative measurement of any fuel assemblies without visible identification numbers. An assembly's identification number should be visible prior to loading into a cask. As a practical matter, all fuel assemblies will have visible identification numbers, and will be verified by existing administrative procedures. If there is a case where the assembly identification number is not visible, then it should not be	Since all fuel assemblies will eventually need to be transported, staff believes an administrative procedure which would provide an option for shipping fuel assemblies without visible identification numbers is necessary. This recommended procedure is burnup measurement in the draft ISG, although other procedures or analyses attempting to address lack of identification will be considered. Note that staff has had informal conversations with	None.

	permitted to be loaded, unless other means were developed and have prior NRC approval. Since this situation is not anticipated and would be a highly unlikely case, we do not believe that guidance needs to accommodate loading fuel without a visible identification number.	some applicants and licensees indicating that this situation may exist at some facilities. This recommended procedure will be maintained in the final ISG.	
NEI 9	Comment on specific loading procedure: independent, third party verification of the loading process. Commenter notes that NRC routinely credits licensee QA programs for ensuring configuration control for activities such as reactor core loading and spent fuel pool storage loadings, and does not believe that more a more rigorous NRC expectation for cask loading is warranted. As a practical matter, many licensees do include verification of the loading process by a third independent individual. It would not be appropriate for the guidance to impose conditions that exceed NRC QA requirements, and that decisions on whether or not to institute practices that go beyond the NRC's QA requirements is best determined by individual licensees.	Staff recognizes that this recommended procedure goes beyond what is typically included in system operating procedures. However, in staff's studies related to misload probability, the addition of such a verification step was determined to result in a significant reduction in misload probability, compared to other procedure steps. Additionally, staff concurs with NEI's assessment that this is already typically done by licensees using dry storage systems. This recommendation will be revised to specify that third party verification should cover the fuel selection process and generation of the fuel move instructions.	Revised Section 5 of the ISG and associated text in Appendix A to clarify that independent verification should begin with the fuel selection process and generation of the fuel move instructions.
NEI 10	The role of the misload analysis should be redefined as defense-in-depth to the administrative procedures in a risk informed manner. The draft guidance places the administrative procedures in a defense-in-depth role to the misload analyses. Commenter believes the draft guidance has reversed the role of these; i.e. it is the administrative procedures that prevent a misload and the misload analyses are	Staff believes the role of the misload analysis as identified in the ISG is appropriate. The misload analysis demonstrates that even with a severe misload, the storage or transportation system is very likely to remain subcritical in fresh water, and the administrative procedures act as a defense-in-depth measure to reduce the probability of occurrence. This order is especially	None.

	performed as defense-in-depth to ensure the consequences of a highly unlikely human error resulting in a misload would be acceptable.	important given that dry storage misloads have been demonstrated to not be "highly unlikely," as stated in the comment.	
NEI 11	The draft guidance permits "…an appropriate administration margin that is not less than 0.02Δk" provided "An adequate justification, that includes the level of rigor in the evaluations and benchmark methods, should accompany the use of any administrative margin that is less than the normal 0.05Δk". Commenter recommends that the guidance remove the statement on "adequate justification" in favor of generically granting an administrative margin of 0.02Δk for misload analyses. It is not clear what the NRC considers to be an adequate justification, nor how the level of rigor would impact the justification.	Staff believes the appropriate justification for a reduced administrative margin is discussed in some detail in the last paragraph under "Misload Evaluation" in Section 7 of Appendix A, and in much greater detail in the referenced FCSS ISG-10. However, this section of the ISG and its associated Appendix A text will be revised to clarify this statement.	Revised Section 5 of the ISG and associated Appendix A text to clarify "adequate justification" recommendation related to misload analysis administrative margin.
NEI 12	A single misload analysis is desirable as it provides defense-in-depth to the prevention of misloads provided by administrative procedures by ensuring that a single misload would remain subcritical. The assumptions of the misloaded assembly in the draft guidance are overly complex, and the intent and definition of a "severely underburned assembly" to assume for the single misload is not clear. A simpler, more bounding assumption for the single misload would be "the most reactive fresh fuel assembly in the most reactive cask location". Since this is an extremely conservative assumption, it is also recommended that the guidance explicitly	Staff agrees that the single fresh fuel assembly in the most reactive cask location would be bounding, and would certainly be acceptable as a single misload condition. However, most existing storage or transportation systems will not be able to demonstrate adequate subcriticality under this assumption. The misload characteristics recommended in the ISG are reasonably bounding, and flexible enough to accommodate various capacity systems and fuel populations. Staff will clarify the definition of a severely underburned assembly in the ISG.	Revised Section 5 of the ISG and associated text in Appendix A to clarify the definition of severely underburned.

	state that alternative assumptions for the single misload assembly may be acceptable if justified by consideration of realistic fuel characteristics in the pool and/or administrative procedures.		
NEI 13	The assumptions of the multiple misloaded assembly analysis should be developed on a risk informed basis which considers the risk reduction of a multiple misload event through the administrative procedures. The proposed assumptions in the draft guidance are overly complex, and the intent and definition of a "moderately underburned assembly" to assume for the multiple misload is not clear. It appears that the fuel population analysis would require extensive resources to perform and would be difficult for licensees to verify compliance of fuel loaded into the casks, and difficult for the NRC to perform a review and oversight. Commenter recommends an assumption of "50% of the fuel being misloaded with assemblies that have burn-up reduced by 25%." This should be sufficiently conservative, and is more straightforward for performing analyses and verifying that implementation by licensees is consistent with the cask licensing basis. It is also recommended that guidance explicitly state that alternative assumptions may be acceptable if justified by consideration of realistic fuel characteristics in the pool and/or administrative procedures.	Staff recognizes that the alternative proposed by NEI is simpler, and would be more conservative in certain instances. However, the alternative would be less conservative in some cases, and is dependent upon the specific loading curve. The recommended multiple misload characteristics in the ISG are intended to be independent of the loading curve, while recognizing that misloaded fuel may be higher or lower than the curve. Staff considers the recommended misload conditions to be reasonably bounding. Staff will, however, revise the definition of moderately underburned fuel in the ISG to be more clear.	Revised Section 5 of the ISG and associated text in Appendix A to clarify moderately underburned fuel definition.
NEI 14	Commenter recommends that burn-up measurements be completely removed from the guidance. Solely relying on the	The burnup measurement recommendation is maintained as an option in the draft ISG, and does not need to be performed if the	None.

	reactor records is justified as they are very accurate, and have a long history of use and acceptance by NRC for reactor operations and spent fuel pool storage. Additionally, in-pool burn-up measurements are difficult to perform, result in worker dose and costs, as well as diverting resources away from activities that are more important to safety.	applicant performs a misload analysis accompanied by additional administrative procedures. The measurement recommendation will be maintained in the ISG as an alternative to misload analysis/admin procedures. This will allow flexibility to applicants if the misload analysis criteria are too restrictive for their specific design, and will allow for future measurement techniques which may make measurement option more appealing.	
NEI 15	Guidance that includes more flexibility to use alternative methods for code validation would ensure safety and regulatory compliance, while also ensuring efficient use of industry and NRC resources. The draft guidance endorses the methods for code validation for burn-up credit documented in NUREG/CR-7108 and NUREG/CR-7109; however, it is not evident from the draft guidance that the NRC would accept alternative methods if appropriately justified. Alternative methods for performing the code validation for burn-up credit may become available; in fact, an alternative method currently exists and was published by EPRI in 2011. Industry has expressed interest in using this method for code validation for burn-up credit. We recommend that the guidance be improved to be clear that alternative approaches can be proposed by applicants, and if sufficiently justified, approved by the NRC.	The validation methodology recommended by ISG-8 represents one method that has been reviewed in detail by the staff and found to be acceptable. The ISG is not intended to exclude alternative methodologies, as these would be evaluated on a case-by-case basis.	Revised Introduction to clarify that alternative methodologies will be considered on a case-by-case basis.
NEI 16	Guidance that includes more flexibility to credit additional isotopes beyond those listed in the guidance would ensure safety	Staff agrees that the ISG should address credit for isotopes beyond those recommended in the guidance. Staff will	Revised Section 1 of the ISG and associated Appendix A text to clarify

	and regulatory compliance, while also ensuring efficient use of industry and NRC resources. The draft guidance currently limits the actinides and fission products to those listed in Tables A-1 and A-2. While the nuclides permitted are those with the most impact on reactivity, this set does not represent full burn-up credit. Commenter recommends the guidance explicitly state that "Nuclides included as part of burn-up credit for criticality analyses should be included in the code validation. Nuclides that are not included in the code validation would need to be justified. Assumptions, if demonstrated to be conservative, may be considered appropriate justification."	modify the ISG to state that additional isotopes may be credited, provided the bias and bias uncertainty associated with those isotopes are quantified.	that additional isotopes may be credited, provided the bias and bias uncertainty associated with those isotopes are quantified. Additional isotopes will be considered on a case-by-case basis.
NEI 17	Commenter recommends that the guidance explicitly acknowledge the potential for an applicant to take credit for burn-up for BWR fuel, and that consideration of ISG-8 may be useful to applicants developing an approach for NRC review and approval, and that the following be explicitly stated in the guidance: "While this revision to ISG-8 does not specifically provide guidance for taking burn-up credit of BWR fuel, such an approach could be found acceptable if appropriately justified, and should consider the portions of this ISG that are also applicable to BWR fuel." While not specifically requesting the unique aspects of BWR fuel, as they relate to burn-up credit, to be included in ISG-8 at this time, such guidance may be desired in the future.	Staff notes that NRC has initiated research to support guidance on BWR burnup credit for storage and transportation, and that this research will not be completed for 2-3 years. However, the staff agrees that the guidance should acknowledge the potential for applicants to develop BWR burnup credit approaches for NRC to review.	Revised Section 1 of the ISG and associated Appendix A text to state that BWR burnup credit applications will be reviewed on a case-by-case basis.
NEI 18	Commenter recommends that the ISG's use of the main body and Appendix A be	Staff believes that the current organization of the ISG is sufficient to communicate to staff	None.

	improved to better align with the dual uses by 1) NRC staff, and 2) applicants, licensees and CoC holders. Ease of understanding and use of the draft guidance could be improved if these two parts of the document have well defined purposes. This would also eliminate two attributes of the draft guidance that increase its complexity: 1) that some content is duplicated between these two parts of the document, and 2) that some parts of the main body cannot be fully understood without referring to the Appendix.	the concepts necessary for performing reviews of burnup credit criticality analyses for PWR storage and transportation systems. The current organization is consistent with previous revisions of the ISG, and will facilitate future revisions to incorporate new burnup credit methodologies (e.g., BWR burnup credit), as they become available. The ISG and Appendix text will be incorporated directly into the criticality chapters of the spent fuel transportation and storage SRPs.	
NEI 19	Commenter recommends the guidance include a section describing the regulatory basis. Other Interim Staff Guidance documents include this discussion, and it provides clarity and completeness to the overall guidance. The “Regulatory Basis” section, which could be included between the “Introduction” and “Applicability” sections, should cite the applicable regulations for which the guidance is establishing an NRC position. These regulations may include: 71.55(b), 71.55(d)(1), 71.55(e), 72.124(a), and 72.236(c).	Staff agrees with commenter that a Regulatory Basis section should be included in the ISG.	Revised the ISG to include a Regulatory Basis section between the Introduction and Applicability sections.
NEI 20	Commenter notes that other ISG documents include a discussion on the applicability of the ISG to the existing Standard Review Plans in the “Applicability” section. The “Applicability” section should be expanded to explain to which Standard Review Plans (and the specific sections) ISG-8 applies, and how it applies. This may	Staff agrees with the commenter that the guidance should explicitly state which SRPs this ISG is applicable to.	Revised the ISG to include SRP references in a Recommendation section.

	include the following: • SRP NUREG-1536, Section 7.5.5: replaced in its entirety by ISG-8 Revision 3 • SRP NUREG-1567, Section 8.4.5: replaced in its entirety by ISG-8 Revision 3 • SRP NUREG-1617, Section 6.5.8: replaced in its entirety by ISG-8 Revision 3		
NEI 21	Commenter recommends that the guidance include a section listing the acceptable codes and standards, if any. If the NRC intends to accept the standards referenced in the draft guidance, then an "Acceptable Codes and Standards" section, which could be included between the "Introduction" and "Applicability" sections, should cite the applicable codes and standards that the draft guidance is endorsing.	ISG-8 is not intended to endorse any specific codes or standards.	None.
NEI 22	Commenter recommends that the guidance be revised to state that the applicability is also to "undamaged" fuel, and not only "intact" fuel. This is needed to be consistent with the NRC recommendation in ISG-1 Revision 2, page 9. It would also be helpful to include a discussion on the basis why the applicability is not readily extended to "Damaged" fuel, so that applicants will be able to understand the concern, or unique aspects, that must be addressed in a proposed approach for burn-up credit for these conditions of fuel.	Staff agrees that the ISG guidance should also be applicable for undamaged and damaged fuel, per the definitions in ISG-1.	Revised Applicability section of ISG, and associated Appendix A text, to clarify that the guidance is also applicable to undamaged and damaged fuel, provided any additional uncertainties associated with such fuel are addressed in the evaluation.
NEI 23	This ISG will be applicable to any Part 72 Site Specific Storage license that will incorporate burnup credit into their criticality analyses. Site Specific Licenses typically do not have a Certificate of Compliance associated with them. Please change this	Agree.	Revised Section 1 of the ISG, and associated Appendix A text, to state "certificate or license conditions."

	to “certificate or license conditions”.		
NEI 24	Provide clarification regarding which inputs may be “representative” and which should be bounding. Some of the input items listed here have a 2nd or 3rd order affect on the analysis and thus representative values should be acceptable while others should bound the actual contents of the package.	The last paragraph of Section 2 partially addresses this comment. In general, realistic assumptions and input parameters which only produce small positive increases in k-eff should not be disregarded simply because they are small. Those that are not bounding should be justified in the criticality analysis or tied to specific limits in the certificate or license.	None.
NEI 25	While inputs listed here should be accounted for in the analysis, not all can be verified for each assembly loaded into the cask. In addition, these parameters are not constant over the life of the fuel assembly or over the axial height of the assembly. Verification of input parameters should be limited to those that are readily available, such as power level.	Staff agrees that not all analysis input parameters should be verified for each assembly. Parameters used in the criticality analysis should be selected to bound the population of spent fuel intended to be stored or shipped to the extent practicable. Those that are not bounding should be justified in the criticality analysis. The ISG states that those not selected to be bounding may need to be included in the certificate or license conditions as a loading limitation.	None.
NEI 26	Commenter recommends that guidance on performing adjustments with regards to control parameters be modified as follows: “The burnup credit results should be adjusted using the bias and bias uncertainty determined for the fuel depletion code, *as adjusted for any trends of significance with respect to any* ~~with regards to different~~ control parameters ~~such as~~ *(these might include* enrichment, burnup, and*/or* cooling time).” NUREG/CR-6811 shows a trend on burnup but does not discuss trends on enrichment	Staff agrees that enrichment, burnup, and cooling time are not the most appropriate for burnup credit depletion code bias trending analysis.	Revised Section 3 of the ISG to recommend burnup/ enrichment and $^{235}U/^{239}Pu$ ratios as trending parameters for depletion bias.

	or cooling time. Since the two cooling time changes that are important are the Pu-241/Am-241 and Eu-155/Gd-155 decays then a seeking a trend on these ratios may be illuminating.		
NEI 27	Clarify whether the "burnup range" corresponds to assembly average burnup or the burnup of a given axial node. The tables should be clarified to state that that these values are the bias uncertainty, and the bias to be used is zero.	ISG will clarify that burnup ranges are assembly average. Also, will revise the tables to report bias and bias uncertainty separately, as appropriate.	Revised Tables 1 and 2 to state that burnup ranges are assembly average values. Also revised Table 1 to state that corresponding bias value is zero, and Table 2 to show separate bias and bias uncertainty values.
NEI 28	Consider relaxing the restriction on the use of the pre-determined depletion bias and bias uncertainty to "the same depletion code and cross section library.", or providing this possibility if appropriately justified. This will allow the use of MCNP, which for the same isotopic content agrees very well with KENO.	Agree with commenter that the restriction here should be for the same depletion code.	Revised Section 3 of the ISG and associated text of Appendix A to clarify that this restriction applies to the depletion code only.
NEI 29	It is unclear what the "similar initial assumptions" means, as these will depend on the limiting conditions expected for the fuel to be loaded in the cask. These assumptions are different than using the actual conditions for a chemical assay. If the applicant is using the values in Table 1, then initial assumptions of the chemical assays would not be relevant. It is unclear what the "code modeling options" means, as NUREG/CR-7108 does not provide input decks from which the code modeling options used could be	Staff agrees that the initial assumptions and code modeling options used in NUREG/CR-7108 and -7109 are not readily available to applicants and licensees. ORNL modeled a large number of depletion and criticality cases, including a number of sensitivity studies, which envelop a relatively large range of initial assumptions and modeling options. Staff believes that while there are several modeling options that could have an effect on the applicability of the given bias and bias uncertainty values, it is more important that they are correct for the situation being modeled than that they are	Revised Sections 3 and 4 of the ISG, and associated text in Appendix A, to revise the applicability clauses regarding initial assumptions and code modeling options to refer instead to "appropriate initial assumptions and input parameters, as described in Appendix A."

	determined. Is this intended to apply to ENDF/B-V where it is possible to use NITAWL rather than CENTRM and this will produce different results?	the same as what was used in the NUREG/CRs.	
NEI 30	Biases and uncertainties should not be directly combined in determining the final k-eff. Biases are added directly to the calculated k-eff, while uncertainties are statistically combined with each other before being added to the calculated k-eff. Correct the references to combining biases and uncertainties, and clarify the values by separating them into their constituent parts.	Staff agrees that biases and bias uncertainties should typically be reported and treated separately. This has been done with the depletion bias and bias uncertainty as described in the response to NEI 27. However, the uncertainty in k-eff due to uncertainty in the cross section data reported in NUREG/CR-7109 is intended to be used as a bias. This is because there is no critical experiment information to determine a traditional k-eff bias, and the uncertainty determined by ORNL is an indication of how large the bias could be, based on cross section uncertainties.	Revised Section 6 of Appendix A to clarify the use of the combined bias and bias uncertainty for k-eff determination.
NEI 31	Commenter requests that the referenced standard not be quoted since the use of the word “shall” in guidance conveys a requirement, and would not be appropriate. In cases where references use words such as “shall”, it is recommended that the guidance summarize the reference or cite it without direct quotation. In this particular use, we recommend the following citation of the standard “ANSI/ANS 8.1 provides an acceptable method for establishing the bias by correlating the results of critical and exponential experiments with results obtained for these same systems by the calculational method being verified. Other methods may be used if appropriately justified.”	The use of “shall” in this instance is intended to imply that the action is necessary to be incompliance with ANSI/ANS 8.1, not that it is necessary to be in compliance with the ISG. Also note that this explanatory text appears in the guidance, and does not convey a recommendation to the staff.	None.
NEI 32	The use of “must” conveys that no	Staff has evaluated the use of “must” in the	Revised Section 5 of

	alternative can be proposed, and in certain context could effectively establish a requirement. Many of these uses of “must” in the draft guidance are in conditional statements; however, there may be valid alternatives to the absolute condition being imposed by these statements. In these cases, the use of “must” eliminates the applicant’s ability to propose such an alternative. For conditional statements where “must” is used, either replace “must” with a softer conditional statement, such as “should”; or follow such conditions with a statement that alternative approaches may be acceptable if appropriately justified.	instances noted by the commenter. In most cases, staff believes the use of “must” to be appropriate. For instance, on page A-3, the use of “must” is associated with the conditions for directly using the bias and bias uncertainty numbers developed in the ORNL NUREG/CRs. There are alternative validation methodologies, but in order to use the numbers directly, the conditions cited in this section must be done.	Appendix A (page A-19) to change several instances of “must” to “should.”
Lancaster 1	The restriction to "Intact fuel" originated in the "Topical Report on Actinide-Only Bumup Credit for PWR Spent Nuclear Fuel Packages.” The intent of this restriction was to exclude significant fuel movement. ISG-1 calls fuel with pinhole and hairline defects in the clad as not intact. From a criticality point of view these defects are insignificant. If ISG-1 definitions are to be used then "intact fuel" should be changed to "fuel that is not grossly breached."	See response to NEI 22.	None.
Lancaster 2	NUREG/CR-6811 shows a trend on burnup but does not discuss trends on enrichment or cooling time. Since the two cooling time changes that are important are the Pu-241/Am-241 and Eu-155/Gd-155 decays then a seeking a trend on these ratios may be illuminating. Commenter recommends that the	See response to NEI 26.	None.

	enrichment and cooling time be eliminated from the referenced sentence. The remaining sentence would still say "with regards to different control parameters such as burnup." This sentence then suggests that the applicant carefully review the data and underscores the important parameter, bumup.		
Lancaster 3	The tables need to be clear that the values are the uncertainty in the bias and the bias to be used is zero. The uncertainty can be statistically combined with other uncertainties. No statement on statistical combination is necessary unless the NRC is not allowing combination of this uncertainty with other uncertainties.	See response to NEI 27.	None.
Lancaster 4	The depletion bias results depend on the cross section library. They depend on the depletion code to a lesser extent. They should not depend much on the final criticality code (KENO vs MCNP). Consider relaxing the restriction to "the same *depletion* code and cross section library." This will allow the use of MCNP which for the same isotopic content agrees very well with KENO. Alternatively, allow for some sample cross checking between KENO and MCNP to prove acceptability.	See response to NEI 28.	None.
Lancaster 5	It is unclear what “similar initial assumptions” means. The depletion assumptions for cask analysis will depend on the limiting conditions expected for the fuel to be loaded in the cask. These assumptions are different than using the actual conditions for a chemical assay. Remove "initial assumptions and."	See response to NEI 29.	None.

Lancaster 6	The restriction on code modeling options is also not clear. NUREG/CR-7108 does not provide input decks. However, for ENDF/B-V it is possible to use NITWAL rather than CENTRM and this will produce different results. Commenter recommends that Table 2 specify CENTRM so this issue is removed. Also, recommend removing this restriction or providing more details about what it means.	See response to NEI 29.	None.
Lancaster 7	The appendix is clearer on what similarity to the GBC-32 means but does not actually give an acceptable range for the H/X or EALF. Commenter recommends that the specific range for these parameters be determined and that the range be included in the Appendix where this is discussed.	Acceptable ranges for these example system parameters, and others, would be determined by the applicant's model of the GBC-32, in comparison with the same fuel in their application system. This would be similar to the manner in which critical experiments are compared to an application system to determine their applicability. Alternatively, the applicant may use sensitivity and uncertainty analysis tools to compare the systems, as is described in Section 2 of Appendix A to the ISG.	None.
Lancaster 8	Use of "combined bias and bias uncertainty" should be avoided. Uncertainties are statistically combined but biases are added. Recommend changing text in Section 4 to: "1.5% of the worth of the minor actinides and fission products conservatively covers the bias due to these isotopes. Due to the conservatism in this value no additional uncertainty in the bias needs to be applied."	See response to NEI 30. Also, staff agrees with the proposed text.	Revised Section 4 of the ISG, and associated text in Appendix A, to incorporate suggested language.
Lancaster 9	The combined minor actinide and fission product worth for high bumups is close to 0.1 in k-eff. For example in one case it was calculated as 0.11 in k-eff. The range of	The 0.1 credited minor actinide and fission product worth restriction is based on the fact that none of the sensitivity studies performed to determine the applicable k-eff bias	None.

	data used in NUREG/CR-7109 can justify a higher limit for the range of applicability. Recommend raising this to 0.13 to give more margin for various designs.	showed worths greater than that value (with few above 0.08). Note that this restriction is given to one significant figure, such that a calculated worth of 0.11 would still be acceptable.	
Lancaster 10	The recommended bias of 1.5% of the worth of minor actinides and fission products depends mainly on the cross section library and should be the same for codes other than SCALE. Proof of this for other codes is not possible yet but the factor of 2 increase in the bias should not be needed. Comparison of fission product and minor actinide worth between SCALE and code of choice could be used to confirm applicability to other codes. For this comparison a benchmark should be set up showing the isotopic worths in SCALE and then other codes could be compared to this benchmark. Recommend removing the requirement to use the SCALE system.	Staff agrees that the 1.5% recommendation should be applicable to other industry standard codes, provided the same cross section data is used and there is some demonstration of applicability – possibly via a minor actinide and fission product worth comparison. However, the recommendation for a benchmark where the worths are provided for the GBC-32 system requires more work, and will not be available for this revision of the ISG. Staff will consider performing this work to be included in follow-on guidance.	Revised Section 4 of the ISG, and associated text in Appendix A, to allow for applicants to demonstrate applicability of the 1.5% criterion for other code systems.
Lancaster 11	Page A-2 discusses "intact" fuel. Here, the discussion seems to follow the original intent on "intact" fuel but is inconsistent with the ISG1 definition. The concern is over Reconstituted, disassembled or grossly damaged fuel. The term "intact" needs to be replaced.	See response to NEI 22.	None.
Lancaster 12	Page A-3 middle paragraph provides the limits discussed in Comments 4-7. Please update to be consistent with responses to Comments 4-7.	Agree.	Revised Page A-3 of Appendix A of the ISG to be consistent with responses to earlier comments.
Lancaster 13	Top of Page A-12. It seems to suggest that the applicant calculate end effects. The applicant should not be required to	Agree.	Revised Section 4 (Page A-12) of Appendix A of the ISG to remove the phrase

	calculate the uniform burnup k at burnups where the end effect is a positive contribution to reactivity. The applicant will have to assure the more limiting burnup profile is used in the burnup range of transition but calculation with the non-limiting profile should not be required. "demonstrate that the Δk value(s)" should be removed.		"demonstrate that the Δk value(s)"
Lancaster 14	It is conservative to assume fuel is not blanketed and use the limiting axial profiles. The current writing of the 2nd paragraph on page A-13 may lead one to believe there is not a solution for blanketed fuel. The rest of the paragraph starting with: "While the database included some assemblies with axial blankets" should be deleted or rewritten.	Agree.	Revised Section 4 (Page A-13) of Appendix A of the ISG to rewrite the paragraph to indicate that it is non-conservative to model blanketed fuel with non-blanketed axial distributions.
Lancaster 15	The statement on Page A-14 regarding "over 1000 nuclides" is not supported. From a spectrum point of view, SCALE does not support more than 388 isotopes. Precursors to the 28 nuclides credited do not require 1000 isotopes. There is no documentation that indicates using fewer isotopes produce poorer results. This paragraph is on a non-issue and should be deleted unless there is a real issue with a code system that could be used.	Agree in part. This paragraph conveys important information to a reviewer regarding the operation of depletion codes.	Revised Section 4 (Page A-14) to replace “1000” isotopes with “a large number of” isotopes.
Lancaster 16	On Page A-14, the X-Y plane at each segment is used for power reactors but since for PWR cask analysis axial variation of enrichment is rarely credited this discussion is not relevant to cask criticality. Most cask criticality calculations use a uniform axial temperature assumption.	This statement in Appendix A is intended only to address axial profile modeling, not axial variation of fuel design or irradiation parameters.	Revised Section 4 (Page A-15) to clarify the statement regarding axial profile modeling.

	More complicated assumptions would be hard to justify for a cask. This paragraph has no value and should be deleted.		
Lancaster 17	The suggestion on page A-15 that CASMO or HELIOS would not be adequate for analysis of depletion for a cask is dismaying. The presence of some lumped fission products does not disqualify a depletion code. Decomposing a lumped fission product to some of the 28 allowed isotopes would be surprising. If that were attempted the regulator would of course have to be very careful. This paragraph should be deleted.	This paragraph was not intended to imply that these codes cannot be used for burnup credit depletion analyses.	Revised Section 4 (Page A-15) of Appendix A of the ISG to remove the implication that these specific codes are not adequate for depletion analyses.
Lancaster 18	The paragraph on Page A-15 regarding 1D approaches seems to show little acceptance that the supercell approach had been worked out. It is doubtful that anyone will use a 1D approach in the future but it is disrespectful to not recognize that our elders had worked out these issues. This paragraph should be deleted.	The intent of this paragraph was not to disparage 1D depletion codes, but to point out to reviewers that there are additional approximations related to their use, when compared to 2D codes.	Revised Section 4 (Page A-15) of Appendix A of the ISG to remove the implication that 1D codes are unacceptable.
Lancaster 19	The final paragraph on Page A-15 seems to be making an issue out of reactor operating history. The previous sections have dealt with these issues. Both the time and space meshing used in the analysis should be converged. This is tested by decreasing the time and space mesh until the changes in the results are consistent with the desired accuracy. This paragraph can be deleted without loss.	This paragraph is not intended to make an issue out of reactor operating history, but merely to point out that this history is important to appropriately model in the depletion analysis. Also, this paragraph is pointing out that the number of time steps in which the burnup-dependent cross sections are updated is an important parameter to review.	None.
Lancaster 20	Page A-16: "A uniform loading of SNF at a specified assembly average burnup..." There is no reason a uniform loading is required. The NRC has already approved a	Agree.	Revised Section 4 (Page A-16) of Appendix A of the ISG to remove the recommendation for

	burnup credit design with zoned loading. This sentence should be removed.		uniform loading.
Lancaster 21	Page A-16: "18-20 uniform axial regions." Modeling fuel with 24 nodes is very common. Increase 20 to 24.	Agree.	Revised Section 4 (Page A-16) of Appendix A of the ISG to increase 20 to 24.
Lancaster 22	For the first paragraph on Page A-17 regarding source convergence, provide a reference so the reader will know what type of source assumption can cause troubles.	Agree.	Revised Section 4 (Page A-17) of Appendix A of the ISG to clarify that starting particles in the more reactive ends of the fuel may improve convergence to the correct k-eff.
Lancaster 23	On the first paragraph on Page A-18 regarding number of RCA samples: Only two samples contain all 28 isotopes. This would seem to be a problem with regards to the second sentence. Cs-133 is based on only 7 samples. Ag-109 has only 14 samples, Ru-101 and Mo-95 have only 15 samples, and Rh-103 has only 16 samples. The comment that the sample size should be 30 is clearly not the case for the basis for the recommended biases. Recommend deleting this paragraph.	Although at least 30 samples are desirable, there are appropriate methods for dealing with smaller sample sizes. The use of smaller sample sizes should be accompanied by additional statistical analyses and methods to support their use, as was done with the samples used in NUREG/CR-7108.	Revised Section 5 (Page A-18) of Appendix A of the ISG to include a statement indicating that smaller sample sizes should be accompanied by additional statistical analyses and methods to support their use.
Lancaster 24	The second paragraph on page A-25 points out that there could be compensating errors that are not able to be found by the integral approach. This is true but misses the fact that there may be compensating errors in our standard approach. We do critical experiments that use cross sections for a large number of isotopes. We have errors in our U-235 cross sections which are compensated for by errors in our U-238 cross sections. We look for these errors by our trend analysis but we certainty do not	This section of the Appendix is intended mainly to point out to the reviewer the many issues associated with the use of CRCs for integral depletion and criticality benchmarking. The ISG represents one way to approach depletion and criticality benchmarking. Other approaches will be considered on a case-by-case basis, as indicated by the last sentence in this section.	None.

	get rid of the compensating errors. In the integral approach we may indeed have errors in the isotopic content. We try to understand these errors through chemical assays. Unfortunately, the chemical assay data is much more uncertain than our measurement of core reactivity so all we can do with the chemical assays is see gross errors. We feel good about our criticality validation if it is representative of the critical condition of concern. The CRCs have a high c_k values. The c_k values for the CRCs are higher than the c_k values for the critical experiments that will be used for our validation. Should we not worry more about compensating errors in critical experiments than the compensating error between our depletion and criticality codes? The third paragraph raises concerns that were addressed in the TSUNAMI analysis. The one valid complaint is the complexity of the modeling. Missing is the main reason the EPRI work was done: the maximum core average bumup is 33 GWd/MTU. This core average burnup is a volume weighted value and the importance weighted burnup would be less. It is recommended that this section be reduced to: "'ANSI/ANS 8.27-2008, Burnup Credit for LWR Fuel,' provides a burnup credit criticality validation option consisting of analysis of applicable critical systems consisting of irradiated fuel with a known irradiation history. This is known as integral,		

	or 'combined,' validation, since the bias and bias uncertainty associated with the depletion calculation method is inseparable from…"		
Anton 1	The ISG does not specifically address how the maximum k-eff is to be calculated. The referenced recently published NUREGs list the following equation (based on ANSI/ANS-8.27): $k_p + \Delta k_p + \beta_i + \Delta k_i + \beta + \Delta k_\beta + \Delta k_x + \Delta k_m < k_{limit}$ This equation adds uncertainties arithmetically. The ANSI standard clarifies that independent uncertainties may be combined statistically, but the NUREG is silent on this issue. The ISG should clarify that a statistical combination of independent uncertainties is acceptable.	Agree. See response to NEI 27. Staff will also revise the ISG to give a separate β_i, Δk_i, and Δk_x, and to indicate that Δk_i may be statistically combined with other independent uncertainties.	Revised Sections 3 and 4 of the ISG, and associated text in Appendix A, to clarify the use of β_i, Δk_i, and Δk_x.
Anton 2	Page 1, "This ISG revision also includes an increase in the assembly average burnup recommended for burnup credit." This sentence should be revised to clarify that the upper burnup limit is increased. As written, the sentence could be interpreted to state that there is a recommended burnup value for burnup credit, which is now higher than before.	Agree.	Revised the Introduction to the ISG, and associated Appendix A text, to clarify that the recommended assembly average burnup is a maximum.
Anton 3	Page 2: ISG-1 Rev. 2 distinguishes between intact and undamaged fuel, where undamaged fuel may have certain defects as long as the important performance functions of the fuel is not impaired. If it is in fact the intent to limit burnup credit to intact fuel, then this should be discussed and justified. Otherwise, "intact" should be changed to "undamaged".	See response to NEI 22.	None.
Anton 4	Page 2, "accurate representation of the	The bulleted list and paragraphs which	Revised Section 2 of the

	physics in the system." It should be clarified that if models, assumptions and inputs appropriately consider all phenomena discussed in the ISG, then the accuracy requirement is satisfied. Without such a clarification, an applicant would be unable to demonstrate that this accuracy requirement is fulfilled.	immediately follow this sentence describe what the reviewers should evaluate regarding representation of the "physics in the system," with more detail provided in Appendix A.	ISG to point to parameters given in the ISG and Appendix A regarding accurate physics representation.
Anton 5	Page 3, Paragraph starting "YAEC-1937 ..." Recommend removing "for each burnup range" after "proposed contents". It implies that axial profiles are established for more than one burnup range, which may or may not be the case.	Axial profiles are routinely generated for different burnup ranges on the same loading curve.	None.
Anton 6	Page 4, Section starting "In lieu of an explicit benchmarking ..." Traditionally, one additional purpose of benchmarking was to qualify the individual or organization performing the calculations. How is this achieved now? Note that this aspect may be specifically important for depletion codes, which are more specialized and not as widely used as Monte Carlo criticality codes.	For k-eff determination, the applicant still must perform a validation of the code for the major actinides, which represent the majority of the decrease in k-eff with burnup. Staff believes that this is sufficient to qualify the individual performing k-eff calculations. For depletion analyses, staff agrees with the commenter. For applicants that choose the route of using the same code and cross section libraries with the ORNL-determined depletion bias and bias uncertainty, reviewers will have to ensure that the applicant has used the code properly, with appropriate initial assumptions and code modeling options.	Revised Section 3 of the ISG, and associated text in Appendix A, to reinforce that the reviewer needs to ensure that appropriate initial assumptions and code modeling options are used for the depletion and criticality analyses.
Anton 7	Regarding Page 6 on criticality bias: since this bias is for a cross section uncertainty, and the relative reactivity effect should be the same for all high quality criticality codes using those cross sections, it is not clear why an increase is necessary. Further, the increase by factor 2 does not appear to	See response to Lancaster 10.	None.

	have a solid basis, making its justification, other than referencing the ISG, difficult or impossible. Finally, given industries request for a code-independent solution, and the considerable effort that went into developing the NUREGs, it is not clear why this approach was taken. The ISG should therefore either endorse the 1.5% for all high quality codes using ENDF/B-V, VI, or VII cross sections; or provide for an easy verification method that other codes results are equivalent to SCALE so they can use the 1.5%.		
Anton 8	Regarding model assumptions, experience has shown that the attempt to bound large fuel populations can result in extremely conservative assumptions and results. More site specific evaluations, using site specific axial profiles, core operating conditions, burnable poison usage, fuel inventories for misloading evaluations, etc., may result in more favorable loading curves. The ISG does not specifically exclude such site specific evaluations. However, the discussions on axial burnup profiles and misload evaluations seem to focus on large fuel populations. The ISG should clarify that site specific calculations and loading curves are permissible.	Agree.	Revised Sections 2 and 5 of the ISG, and associated text in Appendix A, to clarify that site-specific calculations and loading curves are acceptable.
Anton 9	The bulleted list on Page 7 regarding misload analyses should be expanded to include the misload analyses expected on poison rods, burnable absorber and control rods discussed later in that section. It should also be clarified if single or multiple misloads are to be considered for those	Staff does not have a position on non-fuel absorber misloads at this time; as such systems have not yet been submitted or reviewed. Applicants that wish to credit non-fuel absorbers in a burnup credit criticality analysis should justify their misload analysis assumptions, and such analyses will be	None.

	conditions.	considered on a case-by-case basis.	
Anton 10	Regarding Page 8, "assurance that there is no fresh fuel in the pool during system loading": given the fact that fresh assemblies can be easily identified, the requirement seems unnecessary, and also operationally impractical.	See response to NEI 4.	None.
Anton 11	Regarding Page 8, "minimum required soluble boron concentration in pool water during loading and unloading:" it is unclear what the basis for the determination of the minimum soluble boron requirement is.	Agree.	Revised Section 5 of the ISG, and associated text in Appendix A, to clarify that the soluble boron recommendation for loading and unloading is a defense-in-depth measure intended to offset the reactivity insertion caused by a potential misload.
Anton 12	Regarding Page A-12, Horizontal Burnup Profiles: the discussion seems contradictory. It states "In large rail casks, the probability that underburned quadrants of multiple fuel assemblies will be oriented in such a way as to have a substantial impact of k-eff is not expected to be significant," but then requests a bias for the effect to be applied.	Although not expected to be significant, the possibility of an increase in system reactivity due to orientation of underburned fuel assembly quadrants should still be evaluated and considered as part of the final calculated k-eff. This statement in Appendix A is intended to inform reviewers that they should not expect a large increase in k-eff due to horizontal burnup profile.	None.
Anton 13	Regarding the first paragraph of the Appendix A section titled, “Depletion Analysis Computational Model:” the depletion code needs to be validated using the approach documented in NUREG/CR-7108, and isotopic correction factors or bias and bias uncertainty are derived from this. The number of isotopes that are tracked in the code appears irrelevant, since any possible shortcomings of the code would be	See response to Lancaster 15.	None.

	captured by the benchmarking, and only isotopes qualified through the benchmarking are used. Further, even without benchmarking, it is not clear how the number of isotopes can be an objective indication of the quality of the code.		
Anton 14	Regarding the third paragraph of the Appendix A section titled, “Depletion Analysis Computational Model:” after determination of isotopic correction factors or bias and bias uncertainty, the question whether or not a code uses lumped fission products appears irrelevant, since again any shortcomings introduced by those lumped fission products would be captured in the isotopic correction factors or bias and bias uncertainty.	See response to Lancaster 17. Also, the text of this section is not meant to imply that all depletion codes using lumped fission products are not suitable for burnup credit, only that the use of such codes should be accompanied by additional explanation of the lumping methodology and the methodology for determining specific nuclide concentrations.	Revised Section 4 of Appendix A to modify discussion of lumped fission products.
Anton 15	The first sentence in Paragraph 4 of the Appendix A section titled, “Depletion Analysis Computational Model,” appears questionable, and seems to be based on a very narrow definition of "accurate". Two-dimensional depletion codes have been used successfully in the industry for a long time.	The intent of this paragraph is not to imply that 2-D codes are inaccurate, but to indicate that, if they were available, 3-D codes would be preferable for their ability to model axial variation in depletion parameters.	Revised Section 4 of Appendix A to clarify discussion of 2-D vs. 3-D depletion codes.
Anton 16	Overall, the section on Depletion Analysis Computational Model seems to present preferences of one code over others based on qualitative and subjective judgment. However, instead, the qualification of a depletion code should be based on the proposed benchmarking outlined in NUREG/CR-7108. This section should therefore be removed, or at a minimum reduced to the essential content.	This section of Appendix A is not intended to present preferences of one code versus another, but merely to point out to a reviewer what types of codes he or she might expect to see, and the relative advantages/ disadvantages of each.	Revised Section 4 of Appendix A to clarify intent of the paragraphs discussing dimensional aspects of depletion codes.
Anton 17	Regarding Page A-16, "A uniform loading of	See response to Lancaster 20.	None.

	SNF at a specified assembly-average burnup, initial enrichment, and cooling time should be used for each cask analysis:" it is not clear why only uniform loading should be used. It may be beneficial to qualify certain locations for assemblies of different burnups or cooling times, to increase the overall population of fuel that can be loaded.		