

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6, _and/or_H-7) <i>Justification (if needed)</i>
FrontMatter						
H-7	i	Cover	–	–	“Rev. H-4, November 28, 2017”	“Rev. H-7, January 25, 2019” (Note to reviewer: Automatically applied to all footers. Due to software constraints, SAR page footers might/might not include a revision bar indicating this change. Additionally, the revision bar might span both lines of the footer.)
H-5 H-6	iii	Revision History	–	–	–	<H-5: added Revision H-5, July 20, 2018 entry> <H-6: shortened Table and Appendix entries to just their numbers> <ul style="list-style-type: none"><li>• “Chapter 1 – Revised Subsection 1.2.2 (added discussion relating to isotope mixtures); revised Table 1-2 (deleted footnote e and renumbered remaining footnotes); added Table 1-2b; updated Table 1-5 drawing revisions</li><li>• Chapter 2 – Replaced Paragraph 2.5.3.1.4; added Appendix 2.12.16</li><li>• Chapter 5 – Added Appendix 5.5.5, Appendix 5.5.6, and Appendix 5.5.7</li><li>• Chapter 7 – Added Appendix 7.5.1</li><li>• Applied miscellaneous corrections (table of changes included with cover page of the submittal)”</li></ul>
H-6	iii	Revision History	–	–	–	<added Revision H-6, December 10, 2018 entry> <ul style="list-style-type: none"><li>• Update in response to NRC RAI (10-09-2018) addressing changes and clarifications in SAR Chapters 1, 5, 7, and 8</li><li>• Applied miscellaneous corrections (table of changes included with cover page of the submittal)</li></ul>
H-7	iii	Revision History	–	–	–	<added Revision H-7, January 25, 2019 entry> <ul style="list-style-type: none"><li>• “Updated in response to NRC questions (email dated 01-15-2019) addressing changes and clarifications in SAR Chapters 1, 2, 5, and 7</li><li>• Table of changes included with the cover page of the submittal”</li></ul>

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<b>Chapter 1</b>						
H-5	1-9	1.2.1.4	1	3	"Refer to Table 1-2 and Table 1-2a for the..."	<added reference to new Table 1-2b> "Refer to Table 1-2, Table 1-2a, and Table 1-2b for the..."
H-6 H-7	1-10	1.2.2	1, 2, and a bullet set (was 1)	Multiple	"Table 1-2 and Table 1-2a provide a list of the isotopes authorized for use with the AOS Transport Packaging System. Additionally, Table 1-2 and Table 1-2a demonstrate the use of curie content to meet the radioactive and thermal maximum limits specified in Table 1-3, for each transport package model. Furthermore, the shielding requirements specified in Table 1-2 and Table 1-2a apply, where applicable. The activity limits presented in Table 1-2a should be interpreted as follows: for a shipment with a total Ir-194 impurity up to the specified activity, the corresponding Ir-192 activity limit is listed (for example, for Model AOS-050A, any shipment with a total Ir-194 activity up to 10 Ci, the Ir-192 activity limit is 1,117 Ci)."	<H-6: expanded to support isotope mixtures and exclusive use> <H-7: 2 <sup>nd</sup> paragraph, changed "1,083 Ci" to "1,009 Ci"> "Table 1-2 and Table 1-2a provide a list of the isotopes that are authorized for use with the AOS Transport Packaging System. Table 1-2a provides pre-determined mixtures of the Ir-192 and Ir-194 isotopes that are acceptable within each shipping cask model. Other isotope mixtures, including mixtures of Ir-192 and Ir-194 that do not fall directly under one the predetermined mixtures in Table 1-2a, are permitted within the shipping cask contents when external dose rate and decay heat limit compliance is demonstrated per the guidance specified in Appendix 7.5.1, "Dose Rate and Decay Heat Limit Compliance." Isotopes that emit only low-energy gammas and/or betas (that is, all emissions, including those from their progeny, are less than 0.3 MeV) are permitted for transport in the Model AOS-100A and AOS-100A-S shipping casks. To clarify, this requirement applies to the full beta spectrum, not the average beta energy (that is, $E_{\max,\beta} \leq 0.3$ ). Isotopes that meet this criteria:" <ul style="list-style-type: none"> <li>Do not need to be considered for dose rate calculations</li> <li>Need to be accounted for only when calculating the shipping cask contents' total decay heat</li> </ul> Table 1-2 and Table 1-2a demonstrate the use of curie content to meet the radioactive and thermal maximum limits specified in Table 1-3, for individual isotopes within each transport package model. Furthermore, the shielding requirements specified in Table 1-2 and Table 1-2a apply, where applicable. The activity limits presented in Table 1-2a should be interpreted as follows: for a shipment with a total Ir-194 impurity up to the specified activity, the corresponding Ir-192 activity limit is listed (for example, for Model AOS-050A, any shipment with a total Ir-194 activity up to 10 Ci, the Ir-192 activity limit is 1,009 Ci). For Models AOS-100A and AOS-100A-S, if the isotope activities exceed the values listed in Table 1-2, the activity limits for each isotope specified in Table 1-2b may be used, provided that the shipping cask is shipped as exclusive use."
H-5	1-10	1.2.2	5 (was 4)	2	"...for non-exclusive transport, except for Co-60-C quantities. (Refer to Table 1-2.)"	"...for non-exclusive transport. (Refer to Table 1-2 and Table 1-2a.)"
H-5	1-10	1.2.2	6 (was 5)	2	–	<appended period to end of sentence>
H-5	1-10	1.2.2	2 (was 1) 8 (was 7)	–	–	<appended new sentence to end of paragraph> "For Models AOS-100A and AOS-100A-S, when shipped as exclusive use, the activity limits for each isotope are specified in Table 1-2b."
H-6	1-10a (new) (was 1-10)	1.2.2	1 5	3 1	"...Table 1-2 and Table 1-2a." "...decay heat, listed in Table 1-2 and Table 1-2a, is calculated..."	<new page created for page 1-10 overflow, plus edit> "...Table 1-2, Table 1-2a, and Table 1-2b." "...decay heats, listed in Table 1-2, Table 1-2a, and Table 1-2b, are calculated..."

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-6	1-10b (new)	“Blank”	–	–	–	<added new “blank page” due to page 1-10 overflow>
H-6	1-11 1-11a	Table 1-2 Table 1-2a	All	All	–	<replaced entire tables, which included renaming with <i>10 CFR 71.47(a)</i> in their captions>
H-7	1-11	Table 1-2	Ho-166 row Co-60-C row Footnote e			<removed Ho-166 table row> <removed footnote e and its association with Co-60-C; subsequent footnotes renumbered>
H-6	1-11b (new)	Table 1-2b (new) Table 1-3	–	–	–	<added new Table 1-2b, moved Table 1-3 from page 1-11a to previously blank page 1-11b>
H-5	1-17	Table 1-5	Assembly row Cavity Spacer Plates row		Listed Drawing Revisions, by Model# Column: Assembly: I I I I I Cavity Spacer Plates: – – A – A	<updated to new revisions, by Model# column> Assembly: J J K K K Cavity Spacer Plates: – – B – B
H-6	1-17	Table 1-5	Cask row	All	Listed Drawing Revisions, by Model# Column: Cask: H H J J J	<updated to new revisions, by Model# column> Cask: I I L L L
<b>Chapter 2</b>						
H-5	2-26	Figure 2-12	Caption	–	“Center of Gravity – Model AOS-1002”	<fixed typo, omitted “2” from Model#> “Center of Gravity – Model AOS-100”
H-6	2-44	Figure 2-13	Lower Right Callout	–	“KENSERT”	“KEENSERT”
H-5	2-55	2.5.3.1.4	All	All	–	<replaced entire section with new content>
H-5	2-79	2.6.7	–	–	–	<added Note to beginning of content> <i><b>Note:</b> The following analysis does not consider the energy that the shipping cage absorbs during a free drop. For the Free Drop Shipping Cage analysis, refer to Appendix 2.12.16.”</i>
H-5 H-7	2-155	2.12	16 <sup>th</sup> bullet (new)	–	–	<H-5: added cross-reference to new appendix> <H-7: omitted cross-reference added in H-5> <del>“• Shipping Cage LS-DYNA Impact Analysis—Model AOS-100”</del>
H-6	2-942v	Table 2-357	Footnote b	All	–	<updated to new Table 1-2 and 1-2a captions, and added reference to Table 1-2b>
H-5  H-7	<del>2-942aq</del> <del>2-942bh</del> 2-942ap	<del>2.12.16</del>  2.12.15 (last pg)	–	–	–	<H-5: added new appendix> <H-7: omitted appendix added in H-5; pg 2-942ap included to show footer update to H-7 after omission of Appendix 2.12.16; omitted now-empty pages 2-942aq – 2-942bh> <del>“2.12.16 Shipping Cage LS-DYNA Impact Analysis—Model AOS-100”.</del>

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-5 H-7	2-944 – <del>2-945</del>	<del>{2.35} –</del> <del>{2.41}</del>	–	–	–	<p>&lt;H-5: added new references in support of new Appendix 2.12.16&gt;</p> <p>&lt;H-7: omitted references in support of new Appendix 2.12.16; omitted now-empty page 2-945&gt;</p> <p><del>“{2.35} U.S. Nuclear Regulatory Commission (NRC), Title 10, Code of Federal Regulations, Part 71.71 (10 CFR 71.71), “Packaging and Transportation of Radioactive Material – Normal conditions of transport,” 2015.</del></p> <p><del>{2.36} Livermore Software Technology Corporation (LSTC), LS-PrePost, Version 4.3, 2016.</del></p> <p><del>{2.37} Autodesk, Autodesk Inventor Professional, 2016.</del></p> <p><del>{2.38} ANSYS Inc., ANSYS Workbench, Release 15.0, 2015.</del></p> <p><del>{2.39} ANSYS Inc., ANSYS Mechanical, Release 15.0, 2015.</del></p> <p><del>{2.40} LSTC, LS-DYNA Keyword User’s Manual, Volume I, Version 971, 2007.</del></p> <p><del>{2.41} LSTC, LS-DYNA Keyword User’s Manual, Volume II, Version 971, 2012.”</del></p>
H-5 H-7	<del>2-946 (new)</del>	<del>“Blank”</del>	–	–	–	<p>&lt;H-5: added “intentionally blank” page at chapter end&gt;</p> <p>&lt;H-7: omitted “intentionally blank” page at chapter end; omitted now-empty page 2-946&gt;</p>
<b>Chapter 3</b>						
H-6	3-2	3.1.2	1	All	‘Table 1-2, “Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models,” and Table 1-2a, “Ir-192 and Ir-194 Activity Limits – All Models,” provide the maximum decay heat and radioactivity for the AOS Transport Packaging System contents. This includes Decay Heat (Ci/W) values for each radioisotope listed, showing that the decay heat is consistent with the maximum quantity of radioactivity contents. A summary of the Decay Heat values is shown in Table 3-2.’	<p>&lt; updated Table 1-2 and 1-2a captions, added Table 1-2b and Appendix 5.5.5 reference, and corrected UOM&gt;</p> <p>‘Table 1-2, “10 CFR 71.47(a) Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models,” Table 1-2a, “10 CFR 71.47(a) Ir-192 and Ir-194 Activity Limits – All Models,” and Table 1-2b, “10 CFR 71.47(b) Activity Limits – Models AOS-100A and AOS-100A-S,” provide the maximum decay heat and radioactivity for the AOS Transport Packaging System contents. This includes Decay Heat (W/Ci) values for each radioisotope listed, showing that the decay heat is consistent with the maximum quantity of radioactivity contents. A summary of the Decay Heat values is shown in Table 3-2. The method that is used for calculating the decay heat for the isotope mixture in Models AOS-100A and AOS-100A-S is presented in Appendix 5.5.5, “Shipments of Multiple Isotopes under 10 CFR 71.47(a).”’</p>
<b>Chapter 4 – No changes</b>						

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
<b>Chapter 5</b>						
H-6	5-5	Table 5-4	Footnote	a	"...surface."	"...surface, unless indicated otherwise. (Refer to Appendix 5.5.8.)"
H-6	5-5	Table 5-5	Gamma Radiation and Total	Col 2	"370.27      370.27"	"472.93      472.93"
H-6	5-6	5.2	1	All	'Table 5-6 lists the activation products to be loaded in the AOS transport package, for each transport package model. For any single shipment, only one isotope may be loaded into the cask. The exceptions to this rule are that Ir-194 impurities may be present in shipments of Ir-192, in quantities as designated in Table 1-2a, "Ir-192 and Ir-194 Activity Limits – All Models," and Nb-95 may be loaded with Zr-95, but only as outlined in Subsection 5.2.1.'	<replaced entire paragraph; included adding exception for shipping multiple isotopes> 'Table 5-6 lists the activation products to be loaded in the AOS transport package, for each transport package model. For Models AOS-100A and AOS-100A-S, in addition to the isotopes specifically listed in Table 5-6, low-energy gamma or beta emitters that emit only gammas or betas, respectively, at energies $\leq 0.3$ MeV (including emissions from progeny) are also permissible. Single isotope activity limits for all shipping cask variants are listed in Table 1-2, "Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models," when meeting 10 CFR 71.47(a) limits, and for Models AOS-100A and AOS-100A-S in Table 1-2b, "10 CFR 71.47(b) Activity Limits – Models AOS-100A and AOS-100A-S," when meeting 10 CFR 71.47(b) limits. Ir-194 impurities may be present in Ir-192 shipments, in quantities as designated in Table 1-2a, "10 CFR 71.47(a) Ir-192 and Ir-194 Activity Limits – All Models." Contents with Zr-95 are considered to always include its daughter, as specified in Subsection 5.2.1. Shipments of multiple isotopes are permitted in all shipping casks when meeting 10 CFR 71.47(a) limits, as specified in Appendix 5.5.5, and in Models AOS-100A and AOS-100A-S when meeting 10 CFR 71.47(b) limits, as specified in Appendix 5.5.7.'
H-6	5-6	5.2	2	2	"Charged particles, such as alpha and beta particles, are not..."	"The charged particles, such as beta particles, that are emitted by the isotopes listed in Table 5-6 are not..."
H-7	5-6	Table 5-6	Ho-166 row	–	–	<omitted row>
H-6	5-6	5.2.1	2	–	–	<appended new sentence> "Low-energy gamma and/or beta emitters (all emissions, including those from their progeny, are $\leq 0.3$ MeV) that are acceptable for transport in Models AOS-100A and AOS-100A-S are analyzed separately in Appendix 5.5.6."
H-6	5-7	5.2.1	1	1	"...rate analysis is performed..."	"...rate analyses for the isotopes listed in Table 5-6 are performed..."
H-6	5-7	5.2.1	2	2-3	–	<updated to new Table 1-2 caption, and added reference to new Table 1-2b>
H-6	5-12	5.3.1.4	1	–	–	<appended new content to end of paragraph> 'It can be noted from these figures that the tally locations used neglect certain transport packaging and impact limiter features. Specifically, for the transport package surface and 1-m TI locations, the gap between the upper and lower impact limiters in Models AOS-050A, AOS-100A, AOS-100A-S, and AOS-100B, and the recessed region at the axial ends of the impact limiters in every shipping cask model. Because the transport package surface is defined as "all exposed shipping cask and impact limiter surfaces," a detailed analysis of these tally locations is addressed in Appendix 5.5.8.'

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H-6	5-14	5.3.1.4	1	2	"...transport. The..."	"...transport, except as analyzed in Appendix 5.5.8. The..."
H-7	5-14	5.3.1.4	3	All	"It is assumed that the notch at the end of the impact limiter is not accessible during Normal conditions of transport. This assumption is based on the fact that the shipping cage on top and pallet on bottom will be pushed against the notch on the impact limiter in the case of an End Drop."	<omitted paragraph>
H-6	5-20	5.4.4	1 <sup>st</sup> bullet 3 <sup>rd</sup> bullet	1 1	<ul style="list-style-type: none"> <li>"...the impact limiter's external surface..."</li> <li>"...the shipping cage to..."</li> </ul>	<ul style="list-style-type: none"> <li>"...the transport package surface..."</li> <li>"...the transport package surface to..."</li> </ul>
H-6	5-21	5.4.4	1	All	'For the activity limits of all individual isotopes, refer to Table 1-2, "Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models." For the activity limits of Ir-192 sources with Ir-194 impurities, refer to Table 1-2a, "Ir-192 and Ir-194 Activity Limits – All Models.'"	'For the activity limits of all individual isotopes other than Ir-192 and Ir-194, refer to Table 1-2, "10 CFR 71.47(a) Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models." For the activity limits of Ir-192 sources with Ir-194 impurities, refer to Table 1-2a, "10 CFR 71.47(a) Ir-192 and Ir-194 Activity Limits – All Models.'"
H-6	5-21	5.4.4	2	2	"...limiter for..."	"...limiter or shipping cask surface, for..."
H-7	5-21 5-22 5-29 5-30	Table 5-13 Table 5-14 Tables 5-21, 5-22 Table 5-23	Ho-166 row	–	–	<omitted row>
H-6	5-22 – 24 5-26 – 27	Tables 5-14 – 16 Tables 5-18 – 20	All	All	–	<replaced entire tables>
H-7	5-23	Table 5-15	Co-60-C row Footnote c			<removed footnote e and its association with Co-60-C; subsequent footnotes renumbered>
H-5 H-6 H-7	5-28	5.5	–	–	–	<H-5: added introduction and list of appendix content> <H-6: 5 <sup>th</sup> and 7 <sup>th</sup> bullets: updated to revised Appendix 5.5.5 and 5.5.7 headings; added new 8 <sup>th</sup> bullet for new Appendix 5.5.8> <H-7: Appended "Study" to 4 <sup>th</sup> bullet> "This appendix presents the following information: <ul style="list-style-type: none"> <li>AOS Cask Isotopic Heat Load Calculations</li> <li>Isotope Values for Calculations</li> <li>MCNP6 Input and Output Files for Dose Calculations</li> <li>Cobalt-60-C Volume Source Calculation Study</li> <li>Shipments of Multiple Isotopes under 10 CFR 71.47(a)</li> <li>Isotopes Insignificant to External Dose Rates</li> <li>10 CFR 71.47(b) Exclusive Use Activity Limits for Models AOS-100A and AOS-100A-S</li> <li>Evaluation of Dose Rate Tally Locations"</li> </ul>

Revision	Page	Heading/Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-6 H-7	5-28	5.5.1	4	All	‘Table 5-22 summarizes the final heat load values applicable to the isotopes analyzed in this chapter. These values, along with the respective cask decay heat limits reported in Table 1-2, “Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models,” and Table 1-2a, “Ir-192 and Ir-194 Activity Limits – All Models,” are used to calculate activity limits based on heat loads. The heat load presented in Table 5-22 for each isotope is calculated as shown in Equation 5-8.’	<H-6: revised paragraph> <H-7: added Table 1-2b cross-reference> ‘Table 5-22 summarizes the final heat load values applicable to the isotopes analyzed in this chapter. These values, along with the respective cask decay heat limits reported in Table 1-2, “10 CFR 71.47(a) Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models,” Table 1-2a, “10 CFR 71.47(a) Ir-192 and Ir-194 Activity Limits – All Models,” and Table 1-2b, “10 CFR 71.47(b) Activity Limits – Model AOS-100A and AOS-100A-S,” are used to calculate activity limits based on heat loads. The heat load presented in Table 5-22 for each isotope is calculated as shown in Equation 5-8. Refer to Appendix 5.5.5 for the heat load calculations that are to be used for shipping multiple isotopes in Models AOS-100A and AOS-100A-S.’
H-7	5-37	Table 5-30	Ho-166	All	–	<omitted table contents, replaced with “THIS TABLE INTENTIONALLY LEFT BLANK”>
H-7	5-41	5.5.4	Heading	1	“Cobalt-60-C Volume Source Calculation”	“Cobalt-60-C Volume Source Calculation Study”
H-7	5-41	5.5.4	1	1-2	“For the Model AOS-100A/AOS-100A-S casks, the Co-60-C configuration considers a volume source for the dose rate calculations. The...”	“This appendix provides a study that considers a volume source for Co-60-C in the Model AOS-100A/AOS-100A-S shipping casks for a minimum activity of 19,000 Ci. The results of this study are used as the basis for the volume source geometry for the Co-60-C dose rate calculations in Appendix 5.5.7. The...”
H-7	5-42	5.5.4	1	3-4	“...activity limit, the dose rate results from this case are used for the Co-60-C isotope for the Model AOS-100A/AOS-100A-S shipping casks.”	“...activity limit, this is considered to be the bounding geometry for the Co-60-C isotope for the Model AOS-100A/AOS-100A-S shipping casks.”
H-5 H-6	5-44a – 5-44n	Apx 5.5.5 Apx 5.5.6 Apx 5.5.7	–	–	–	<H-5: added three new appendices and blank page at end, 5-44a – 5-44n> <H-6: all pages except 5-44n were updated (as indicated in subsequent entries below); thus, pp 5-44a – 5-44n will be printed as H-6> “5.5.5 Shipments of Multiple Isotopes – Models AOS-100A and AOS-100A-S 5.5.6 Isotopes Insignificant to External Dose Rates 5.5.7 Exclusive Use Activity Limits – Models AOS-100A and AOS-100A-S”
H-6	5-44a	5.5.5	Heading	1-2	“Shipments of Multiple Isotopes – Models AOS-100A and AOS-100A-S”	“Shipments of Multiple Isotopes under 10 CFR 71.47(a)”
H-6	5-44a	5.5.5	1	5	“...the Model AOS-100 400-W decay heat limit.”	“...the decay heat limit of the respective shipping cask model (for example, 400W for the Model AOS-100).”
H-6	5-44a	Table 5-34	Caption	–	“Dose Rate Acceptance Criteria – Models AOS-100A and AOS-100A-S”	<renamed table and added new footnote a > “10 CFR 71.47(a) <sup>a</sup> Dose Rate Acceptance Criteria for Multiple Isotopes” “a. Reference [5.1].”

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H-6 H-7	5-44b	5.5.5	1	All	“For Models AOS-100A and AOS-100A-S, the total external dose rates at each regulatory location and total decay heat are calculated using each isotope’s activity within the shipping cask contents and their respective reference values in Table 5-35. Note that this method for mixing isotopes within a single content is applicable to all AOS shipping cask variants, using the dose rate information provided in Subsection 5.4.4 and decay heat values in Table 5-22. For Models AOS-100A and AOS-100A-S, an isotope that does not appear in Table 5-35 or fall within one of the categories addressed in Appendix 5.5.6 (that is, low-energy gamma and/or beta emitters) is not acceptable for shipment. For any mixture of isotopes in which the Co-60-B or Co-60-C dose rate/curie values are used, the required axial shielding and cavity spacer plate components shall be used. For isotopes other than Co-60 (that is, those for which the axial shielding and cavity spacer plates were not analyzed), the added use of these components will decrease external dose rates, thereby providing additional margin to the values listed in Table 5-35.”	<H-6: revised paragraph> <H-7: added “and their progeny” to line 8> “For each of the AOS shipping cask models, the total external dose rates at each regulatory location and total decay heat are calculated using each isotope’s activity within the shipping cask contents and their respective reference values. These reference values for each of the AOS shipping casks are listed Table 5-35 through Table 5-35c. For Models AOS-100A and AOS-100A-S, an isotope that does not appear in Table 5-35 or fall within one of the categories addressed in Appendix 5.5.6 (that is, low-energy gamma and/or beta emitters) is not acceptable for shipment. For isotopes that fall within the criteria specified in Appendix 5.5.6, that are insignificant to external dose rates but must be accounted for in decay heat calculations, the decay heat for each of those isotopes and their progeny shall be calculated using Equation 5-8 and the isotope Q-value from the SCALE 6.1 ORIGEN (Reference [5.2]) decay library origen.rev03.decay.data. The radioactive contents of the other AOS shipping cask models are limited to the isotopes listed in their respective tables – Table 5-35a, Table 5-35b, and Table 5-35c for Models AOS-025A, AOS-050A, and AOS-100B, respectively. For any mixture of isotopes in which the Co-60-B or Co-60-C dose rate/curie values are used, the required axial shielding and cavity spacer plate components shall be used. For isotopes other than Co-60 (that is, those for which the axial shielding and cavity spacer plates were not analyzed), the added use of these components will decrease external dose rates, thereby providing additional margin to the values listed in Table 5-35. For any mixtures within the Model AOS-050A in which the Ir-192 or Ir-194 dose rate/curie values are used, the required axial shielding plates shall be used.”
H-6	5-44b	Table 5-35	–	–	–	<replaced entire table>
H-6 H-7	5-44b1 – 5-44b2	Table 5-35a, 5-35b, and 5-35c (new)	–	–	–	<H-6: added new Tables 5-35a, 5-35b, and 5-35c> <H-7: omitted Ho-166 row from Tables 5-35a and 5-35b>



Revision	Page	Heading/Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-6	5-44d	5.5.6	4	All	“For all AOS shipping cask variants, beta particles and their secondary radiation (that is, bremsstrahlung photons) cannot sufficiently penetrate an AOS shipping cask’s shielding to contribute to external dose rates. Note that although the term “beta particles” specifically refers to electrons that are emitted through beta decay, in this context, beta particles refers to any electron that is emitted from an isotope regardless of decay mode (that is, including electrons emitted by way of other decay modes, such as internal conversion of the auger effect). Thus, isotopes that emit only beta particles can be transported within any of the AOS shipping casks, in any configuration, without accounting for any contribution to external dose rates. Some common examples of pure beta emitters are H-3, C-14, P-32, and Ni-63.”	“For all AOS shipping cask variants, beta particles cannot sufficiently penetrate an AOS shipping cask’s shielding to contribute to external dose rates. The only concern for external dose rates is from the secondary radiation of the beta particles (i.e., bremsstrahlung). However, the bremsstrahlung gamma energy cannot exceed the source electron energy. Thus, for the Model AOS-100A and AOS-100A-S variants, all beta emissions for these “low-energy beta emitters” and their progeny must be less than 0.3 MeV because it has already been determined that 0.3-MeV gammas will not significantly contribute to external dose rates. For the Model AOS-025A, AOS-050A, and AOS-100B variants, low-energy beta emitters are currently not acceptable for shipment because they remain unanalyzed. Note that although the term “beta particles” specifically refers to electrons that are emitted through beta decay, in this context, beta particles refers to any electron that is emitted from an isotope regardless of decay mode (that is, including electrons emitted by way of other decay modes, such as internal conversion of the auger effect). Some common examples of low-energy beta emitters are H-3, C-14, and Ni-63.”
H-6 H-7	5-44e	5.5.6	1	1-3	“As determined earlier in this appendix, low-energy gamma emitters (that is, all gammas that are less than 0.3 MeV) and pure beta emitters do not need to be accounted for in dose rate calculations. However, the decay heat from these isotopes must...”	<H-6: revised paragraph> <H-7: added “and their progeny” to line 4> “As determined earlier in this appendix, low-energy gamma and beta emitters (that is, all emitted gammas and betas that are less than 0.3 MeV) do not need to be accounted for in the Model AOS-100A and AOS-100A-S dose rate calculations. To clarify, this requirement applies to the full beta spectrum not the average beta energy (i.e. $E_{max,\beta} \leq 0.3$ MeV). However, the decay heat from these isotopes and their progeny must...”
H-7	5-44e	5.5.6	1	15	“...defined in Appendix 5.5.5.”	“...defined in Appendix 5.5.5 and Appendix 5.5.7.”
H-6	5-44e	Table 5-37	–	–	–	<replaced entire table>
H-6	5-44f	5.5.7	Heading	1	“Exclusive Use Activity Limits – Models AOS-100A and AOS-100A-S”	“10 CFR 71.47(b) Exclusive Use Activity Limits for Models AOS-100A and AOS-100A-S”
H-6	5-44f	5.5.7	1	7-8	“...exclusive use. 10 CFR 71.47(a) requirements are applicable to both exclusive and non-exclusive use shipments. For simplicity...”	“...exclusive use. For simplicity...”
H-7	5-44f	Table 5-38	2	NCT row, Dose Rate Location column	“External Surface”	“Transport Package Surface”
H-6	5-44g	5.5.7	3 <sup>rd</sup> bullet 5 <sup>th</sup> bullet	1-2 2	“...(side-to-side) and...” “...321.92 cm”	“...(side-to-side), at least 4 ft. forward from the back of the trailer, and...” “...609.6 cm”
H-6	5-44g	5.5.7	3	12	“...direction. The...”	“...direction. For reference, the arrangement of the tally cells is illustrated in Figure 5-9. The...”

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-7	5-44h	5.5.7	1	6	"...accurate."	"...accurate. It should be noted in Table 5-39 that for the Co-60-C isotope, the "External Surface" location is considered to be that of the enclosure surface for a closed transport vehicle, with the shipping cage being the enclosure. As such, use of the dose rate at the radial distance of the deformed impact limiter surface for the enclosure surface location is bounding. Based on the transport package surface dose rate from Table 5-46 (1.868E-02 mrem/hr/Ci) and the activity limit from Table 5-39 (25,806.4 Ci), the maximum transport package surface dose rate is 428 mrem/hr, which is well below the closed transport limit of 1,000 mrem/hr. However, this also means that the 10 CFR 71.47(b)(1)(i) through (iii) (Reference [5.1]) requirements apply to Co-60-C Exclusive Use shipments as well."
H-6	5-44h	Table 5-39	Co-60-C row Hf-181 row Footnotes	Cols 2 and 7 Col 7 c	"3.947E-03      25,806.5" "92,378.8" "...only) and..."	"5.452E-03      25,806.4" "92,378.7" "...only), Table 5-44 (Co-60-C), and..."
H-7	5-44h	Table 5-39	Co-60-B row Co-60-C row Footnotes	Col 1 Col 1 d, e, f (new)	"Co-60-B" "Co-60-C" –	<added footnotes d, e, and f, and cross-references to them> "Co-60-B" <sup>d</sup> "Co-60-C" <sup>e f</sup> "d. Use of tungsten alloy axial shielding plates 183C8491 is required. e. Use of tungsten alloy axial shielding plates 183C8491 and stainless steel –or– aluminum cavity spacer plates 183C8518 is required. f. For Co-60-C quantities, the maximum allowable specific activity is 350 Ci/g (that is, no more than 350 Ci of Co-60 in a gram of Cobalt)."
H-6	5-44j	Table 5-40	Caption Co-60-B, C rows Footnotes	1 Footnotes c, d (new)	"...Heat – Model AOS-100A" "Co-60-B      Co-60-C" –	"...Heat – Models AOS-100A and AOS-100A-S" "Co-60-B" <sup>c</sup> Co-60-C" <sup>d</sup> "c. Use of tungsten alloy axial shielding plates 183C8491 is required. d. Use of tungsten alloy axial shielding plates 183C8491 and stainless steel –or– aluminum cavity spacer plates 183C8518 is required."
H-6	5-44k	5.5.7	1	1-5	"...use by following the method defined in Appendix 5.5.5. Using the dose rate equations for the NCT external surface location, HAC 1-m from shipping cask surface location, and total decay heat defined in Appendix 5.5.5, and the equations for the NCT 2m from trailer surface and driver cab dose rate locations provided below, the..."	"...use with the following method. Using the dose rate equations for the NCT external transport surface, NCT 2m from trailer surface, NCT driver cab, and HAC 1-m locations provided in Table 5-40a, the..."
H-7	5-44k	5.5.7	1	8	"...Appendix 5.5.6. For..."	"...Appendix 5.5.6. Note that for low-energy gamma and beta emitters, the decay heat from these isotopes and their progeny must be accounted for when calculating the shipping cask content's total decay heat output. For..."
H-6	5-44k	5.5.7	1 <sup>st</sup> bullet – R <sub>2Cabi</sub>	–	–	<replaced chunk of content, includes new Table 5-40a>
H-7	5-44k	Table 5-40a	Column 1 Footnote	Body Row 1 b (new)	"Transport Package Surface (Cage Surface)"	<revised text and added footnote> "External Surface (Transport Package or Enclosure Surface) <sup>b</sup> " "b. Enclosure surface for Co-60-C. Transport package surface for all others."
H-7	5-44k	Table 5-40a	Column 1	Body Row 2	"...Side of Rear)"	"...Side or Rear)"

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-6	5-44m	Table 5-41	Caption Footnotes c, d	1 All	“...Values – Model AOS-100A” “c. Use of these dose rate/curie values requires the use of axial shielding plates. d. Use of these dose rate/curie values requires the use of axial shielding plates and cavity spacer plates.”	“...Values – Models AOS-100A and AOS-100A-S” “c. Use of tungsten alloy axial shielding plates 183C8491 is required. d. Use of tungsten alloy axial shielding plates 183C8491 and stainless steel –or– aluminum cavity spacer plates 183C8518 is required.”
H-7	5-44m	Table 5-41	Co-60-C row Footnotes	Col 1 e, f	“Co-60-C <sup>d</sup> ” –	<added footnotes e and f, and cross-references to them> “Co-60-C <sup>d e f</sup> ” “e. For shipments including Co-60-C, 10 CFR 71.47(b)(1)(i) through (iii) (Reference [5.1]) requirements apply. f. For Co-60-C quantities, the maximum allowable specific activity is 350 Ci/g (that is, no more than 350 Ci of Co-60 in a gram of Cobalt).”
H-6	5-44m	Figure 5-9 (new)	–	–	–	<added new figure>
H-6	5-44p – 5-44ap (new)	5.5.8 (new)	–	–	–	<added new appendix>
H-7	5-44q	5.5.8	2	3-10	“...Model AOS-050A, AOS-100A and AOS-100A-S, and AOS-100B side dose rate/curie values, respectively, in the gap between the upper and lower impact limiters. For each, the 1-m TI dose rates listed are based on the HAC dose rates calculated as described in Paragraph 5.3.1.4. Because the HAC and NCT dose rates are calculated with the same MCNP model and all HAC 1-m dose rates are from the shipping cask surface (neglecting the impact limiters), the side 1-m TI location from the exposed shipping cask surface is the same as the side 1-m HAC location. Table 5-43, Table 5-44, and Table 5-45 also list the total dose rate for both locations (1-m TI and transport package surface) based on the dose rate/curie value listed and the maximum allowable activity for each isotope as calculated in Subsection 5.4.4. Because the 1-m TI dose rate/curie values are based on the calculated dose rates at 1-m from the transport package surface, as long as...”	“...Model AOS-050A, AOS-100A and AOS-100A-S, and AOS-100B side dose rate/curie values, respectively, in the gap between the upper and lower impact limiters for the transport package surface and 1-m TI locations, with both a point source in the top corner of the shipping cask cavity and a source on the side wall. (Refer to Figure 5-11 and Figure 5-12.) For each case, the 1-m TI dose rates listed are based on the HAC dose rates that are calculated as described in Paragraph 5.3.1.4 (that is, 1m from the shipping cask surface). Because the HAC 1-m dose rates are from the shipping cask surface (neglecting the impact limiters), this tally is representative of the side 1-m TI location at the exposed shipping cask surface. Thus, for this location, as long as...”
H-7	5-44r	5.5.8	4	6	“...values can be used...”	“...values are used...”
H-7	5-44t 5-44u 5-44v	Table 5-43 Table 5-44 Table 5-45	Cols 3-4	1-2	“Corner Dose Rate/Ci...” “Side Dose Rate/Ci...”	“Corner Source Dose Rate/Ci...” “Side Source Dose Rate/Ci...”
H-7	5-44t	Table 5-43	Ho-166 row	–	–	<omitted row>
H-7	5-44y	5.5.8	2	13	“...would result in a larger predicted dose rate...”	“...would result in a smaller predicted dose rate...”
H-7	5-44ab 5-44ab 5-44ad 5-44ae	Table 5-49 Table 5-50 Table 5-51 Table 5-52	Ho-166 column	–	–	<omitted column>

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-7	5-44ag	5.5.8	1	5	“The Co-60, Ho-166, and Ir-194 activity limits...”	“The Co-60 and Ir-194 activity limits...”
H-7	5-44ag	Table 5-53	Ho-166 row	–	–	<omitted row>
H-6	5-45	5.6	5.7 (new)	–	–	<added new reference> ‘[5.7] International Commission on Radiological Protection, “Nuclear Decay Data for Dosimetric Calculations,” ICRP Publication 107, 2008.’
Chapter 6 – No changes						

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
<b>Chapter 7</b>						
H-6	7-5	7.1.1.1	Steps c, d	All	<p>“c. Verify that the radiation and contamination levels are in compliance with regulatory requirements – IAEA TS-R-1, Paragraphs 508 and 530 through 532, 10 CFR 71.47 and 71.87(i), 49 CFR 173.441 and 173.443, and 10 CFR 20.1906 (References [7.1], [7.2], [7.3], and [7.4], respectively).</p> <p>d. Record any finding(s), and notify the Job Supervisor for disposition of the finding(s). Findings must be evaluated against 10 CFR 71.95 [7.2], to determine whether they require regulatory notification, so proper action can be taken. The Job Supervisor is the person responsible for direct oversight of the personnel that are performing the work.”</p>	<omitted>
H-6 H-7	7-6	7.1.1.2	Steps d, e Step d Note	<new> <new>	–	<p>&lt;H-6: inserted new steps d and e, existing step and subsequent steps renumbered&gt;</p> <p>&lt;H-7: added note for step d&gt;</p> <p>“d. Verify that the radiation and external contamination levels are in compliance with regulatory requirements IAEA TS-R-1, Paragraph 508, 10 CFR 71.87(i), 49 CFR 173.428, and 10 CFR 20.1906 (References [7.1], [7.2], [7.3], and [7.4], respectively).</p> <p><b>Note:</b> <i>The transport package’s bottom surface is not accessible until the transport package is removed from the pallet. As a result, when measurements are required, the radiation and external contamination levels on the transport package’s bottom surface are assessed after the shipping cask is removed in step g.</i></p> <p>e. Record any finding(s), and notify the Job Supervisor for disposition of the finding(s). Findings must be evaluated against 10 CFR 71.95 [7.2], to determine whether they require regulatory notification, so that proper action can be taken. The Job Supervisor is responsible for direct oversight of the personnel that are performing the work.”</p>
H-6	7-6	7.1.1.2	Step f	3 <sup>rd</sup> bullet, 2-3	“...the cask, and place them into temporary storage.”	“...the shipping cask, then place the impact limiters in temporary storage.”
H-5	7-6	7.1.2.1	Step a	2 – 3	“...in Section 7.1.”	<p>&lt;FYI, content moved to page 7-6a as part of H-6&gt;</p> <p>“...in Section 7.1 and guidance provided in Appendix 7.5.1.”</p>
H-6	7-6a (new)	7.1.2 7.1.2.1	Step f	2	“Repair or replace damage noted, as required, then re-inspect.”	<p>&lt;moved to new page 7-6a and updated step f&gt;</p> <p>“The presence of foreign material or deep radial scratches that may result in a failed Pre-Shipment Leakage Rate test should be repaired or replaced, as required, and AOS is to be notified for written disposition.”</p>
H-6	7-6b (new)	“Blank”	–	–	–	<new blank page, inserted for page 7-6 pagination>
H-6	7-7	7.1.2.2	Step a	All	“...cavity spacer plates listed in Table 7-1 are used during the shipment of radioisotope capsules, either in Normal or Special Form, when identified in the Pre-Shipment Engineering Evaluation (refer to Section 7.1), as required for shipment to meet regulatory requirements.”	“...cavity spacer plates are used as necessary, per the requirements listed in Table 7-1.”

Revision	Page	Heading/Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-6	7-7	Table 7-1	Comments	All	<ul style="list-style-type: none"> <li>‘Shielding liner is mandatory for all contents. (Refer to Table 1-2, “Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models.”</li> <li>Use when additional shielding is required. (Refer to Table 1-2a, “Ir-192 and Ir-194 Activity Limits – All Models.”)</li> <li>Use when additional shielding is required. (Refer to Table 1-2, “Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models.”)’</li> </ul>	<ul style="list-style-type: none"> <li>‘Shielding liner is mandatory for all contents. (Refer to the current revision of the NRC Certificate of Compliance 9316.)</li> <li>Used when shipping Ir-192 and Ir-194 isotopes. (Refer to the current revision of the NRC Certificate of Compliance 9316.)</li> <li>Used when additional shielding is required for Co-60. (Refer to the current revision of the NRC Certificate of Compliance 9316.)’</li> </ul>
H-6	7-7	7.1.2.3	Note	3	“If the cask lid seal (elastomeric or metallic) is...”	“If the metallic cask lid seal is...”
H-6	7-7	7.1.2.3	Note	5	–	<append new sentence to <b>Note</b> > “The elastomeric seal option is acceptable for use only with Special Form contents, in which the cask contents provide containment for the radioactive contents.”
H-6	7-10 7-10a	7.1.3.3	Tests A1, A2 heading	1-2	“...Seals (Tests...”	“...Seals for <i>Special Form</i> Contents (Tests...”
H-6	7-10 7-10a	7.1.3.3	Tests A1, A2 text	1	“To leak test the containment system:”	“To perform a pre-shipment verification of the elastomeric lid seal:”
H-6	7-10 7-10a	7.1.3.3	Tests A1, A2 Note (1 <sup>st</sup> )	1	“...port must only be leak tested if they have...”	“...port need to be leak tested only if the ports have...”
H-6	7-10	7.1.3.3	Test A1 Note (2 <sup>nd</sup> )	2-3	“The internal volume of the test apparatus upstream of the isolation valve must be known and considered to achieve the required test sensitivity for the test hold time.”	<omitted>
H-6	7-10 7-10a	7.1.3.3	Test A1, A2 Note (3 <sup>rd</sup> )	1	“Note: Leak Test criteria for leak rates must meet the requirement of Reference [7.8].”	<omitted>
H-6	7-10 7-10a	7.1.3.3	Tests A1, A2 Step c	2	“...corresponding to $1 \times 10^{-3}$ ref-cm <sup>3</sup> .”	“...that is less than or equal to 0.1 psig.”
H-6	7-10a	7.1.3.3	Test A2 Note (2 <sup>nd</sup> )	2-3	“The internal volume of the test apparatus downstream of the isolation valve must be known and considered to achieve the required test sensitivity for the test hold time.”	<omitted>
H-6	7-10a	7.1.3.3	Test B heading	1-2	“...Seal or Optionally for Elastomeric Cask Lid Seal (Tests...”	“...Seal for <i>Normal</i> or <i>Special Form</i> Contents (Tests...”
H-6 H-7	7-11	7.1.3.4	Step b	All	“Perform a radiological survey of all cask surfaces (refer to Table 7-3), to demonstrate compliance with applicable shipping regulations.”	<H-6: revised step text> <H-7: changed 10 CFR 71.87 reference> “Perform radiological surveys to demonstrate compliance with transport package surface dose rate requirements (refer to Table 7-3), consistent with IAEA TS-R-1, Paragraph 531, 10 CFR 71.47 and 71.87(j), and 49 CFR 173.441 (References [7.1], [7.2], and [7.3], respectively).”
H-6	7-11	Table 7-3	All	All	–	<replaced entire table>

Revision	Page	Heading/Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-6 H-7	7-11	7.1.3.4	Step d (new)	–	–	< H-6: new step; subsequent steps renumbered> <H-7: clarified where to check the contamination levels> “Verify that the contamination levels on the outer shipping cask surfaces and impact limiters(both inner and outer surfaces) are in compliance with regulatory requirements IAEA TS-R-1, Paragraph 508, 10 CFR 71.87(i), and 49 CFR 173.443 (References [7.1], [7.2], and [7.3], respectively).”
H-6	7-11	7.1.3.4	Step h (now i)	2	–	<append new sentence> “(Alternatively, refer to step k.)”
H-6	7-11	7.1.3.4	Step i (moved ~ to Step k)	All	“Install the shipping cage. If the shipping cage includes the optional lifting bar, install the lifting bar guards so that the lifting bar cannot be used for lifting of the entire package or for tie down.”	<omitted/moved to new step k, subsequent steps renumbered>
H-6	7-11	7.1.3.4	Step j	2-3	“...Paragraphs 508 and 530 through 532, 10 CFR 71.47 and 71.87(i), 49 CFR 173.441 and 173.433, and 10 CFR 20.1906 (References [7.1], [7.2], [7.3], and [7.4], respectively).”	“...Paragraphs 530 through 532, 10 CFR 71.47 and 71.87(j), and 49 CFR 173.441 (References [7.1], [7.2], and [7.3], respectively).”
H-6 H-7	7-12	7.1.3.4	Note (new)	–	–	<H-6: added note> <H-7: corrected typo> <b>Note:</b> For the 1-m TI dose rate, the 1-m distance is from the transport package surface (that is, the <del>shipping cage</del> shipping cask or impact limiter surface), not the shipping cage surface.”
H-6	7-12	7.1.3.4	Step k (new) Step l (omitted)	–	–	<new step k; omitted step l; subsequent steps renumbered> “k. Install the shipping cage. If the shipping cage includes the optional lifting bar, install the lifting bar guards so that the lifting bar cannot be used for lifting of the entire package or for tie down. If the security seals were not applied in step i, apply two (2) security seals between the shipping cage and pallet, on opposing sides.”
H-6	7-15	7.2	1	3	“...activities, as required by 10 CFR 71.89 [7.2].”	“...activities. As required by 10 CFR 71.89 [7.2], the consignor shall send to the consignee, in advance of the shipment, instructions for safely opening the transport package.”
H-6	7-15	7.2	Item e	All	‘Review the Activity Limits listed in Table 1-2, “Activity Limits (All Isotopes Except Ir-192 and Ir-194) – All Models,” and Table 1-2a, “Ir-192 and Ir-194 Activity Limits – All Models.” These values represent maximum conditions.’	“Review the Activity Limits listed in the current revision of the NRC Certificate of Compliance 9316. These values represent maximum conditions. For shipping multiple isotopes, or isotopes that emit only low-energy gamma/beta emitters (that is, all emissions, including those from their progeny, are ≤ 0.3 MeV), refer to the guidance provided in Appendix 7.5.1.”
H-6	7-15	7.2	Item f	1	“...listed in Table 1-5...”	“...listed in the current revision of the NRC Certificate of Compliance 9316 and Table 1-5...”
H-6	7-15a (new)	7.2.1	—	—	—	<moved to new page 7-15a>
H-6	7-15a (new)	7.2.1	Step a	3-4	“Otherwise, remove the security seal, by cutting the wires, then properly dispose of them.”	“Otherwise, if the security seals are on the shipping cage, remove the security seals by cutting the wires, then properly dispose of the security seals. If the security seals are connected to the impact limiters, remove the seals after the shipping cage is detached.”

Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-6	7-15a (new)	7.2.1	Step b	All	"b. Repeat steps a through d in Paragraph 7.1.1.1, and steps b through g in Paragraph 7.1.1.2, to remove the package from the carrier."	<p>&lt;replaced step b with new steps&gt;</p> <p>"b. Position the transport vehicle in the Receiving Inspection area.</p> <p>c. Visually inspect the transport package for damage and proper labeling and marking. Refer to the shipping paper for shipment category and compare the marking and labels on the package to the requirement of Reference [7.3].</p> <p>d. Position the transport vehicle in the job staging area, for transport package removal. This operation can be aided by the use of an overhead crane or forklift truck.</p> <p>e. Position the spreader bar or forks, then connect the appropriate slings and shackles to remove the shipping cage.</p> <p>f. Remove the shipping cage and tie-down hardware.</p> <p>g. Verify that the radiation and external contamination levels are in compliance with regulatory requirements IAEA TS-R-1, Paragraphs 508 and 530 through 532, 10 CFR 71.47 and 71.87(i), 49 CFR 173.441 and 173.443, and 10 CFR 20.1906 (References [7.1], [7.2], [7.3], and [7.4], respectively).</p> <p>h. Record any finding(s), and notify the Job Supervisor for disposition of the finding(s). Findings must be evaluated against 10 CFR 71.95 [7.2], to determine whether they require regulatory notification, so that proper action can be taken. The Job Supervisor is responsible for direct oversight of the personnel that are performing the work.</p> <p>i. Depending upon site-specific constraints, do one of the following:</p> <ul style="list-style-type: none"> <li>Remove the upper impact limiter from the cask, then place the impact limiter into temporary storage.</li> <li>Install trunnions. Prior to the installation, apply an anti-vibration compound on the trunnion bolt threads.</li> <li>Lift and remove the entire transport package from the transport vehicle, then set down the package in an appropriate location. Next, remove the impact limiters from the shipping cask, then place the impact limiters in temporary storage.</li> </ul> <p>j. Remove the cask, using the appropriate rigging equipment."</p>
H-7	7-15a	7.2.1	Step g Note (new)	–	–	<b>Note:</b> <i>The transport package's bottom surface is not accessible until the transport package is removed from the pallet. As a result, when measurements are required, the radiation and external contamination levels on the transport package's bottom surface are assessed after the shipping cask is removed in step j.</i>
H-6	7-15b (new)	"Blank"	–	–	–	<new blank page, inserted for page 7-15 pagination>
H-7	7-17	7.3.4	1	2	"...Paragraph 520, and 49 CFR 173.428..."	"...Paragraph 508, and 49 CFR 173.443..."
H-6	7-17	7.3.4	1	–	–	<p>&lt;append new sentence&gt;</p> <p>"Perform a dose rate survey to demonstrate compliance with regulatory requirements IAEA TS-R-1, Paragraph 516, and 49 CFR 173.428 (References [7.1] and [7.3], respectively)."</p>



Revision	Page	Heading/ Step	Para #/Step	Line #/Step	What it was (Rev H-4)	What it is (Rev H-5, H-6,_and/or_H-7) <i>Justification (if needed)</i>
H-5 H-6	7-19 7-19a (new)	7.5 7.5.1 (new) Figure 7-8 (new)	–	–	“7.5 APPENDIX (NONE)”	<H-5: added new appendix content, which also created need for new page 7-19a > <H-6: both pages were updated (as indicated in subsequent entries below); thus, pp 7-19 and 7-19a will be printed as H-6> “7.5 APPENDIX 7.5.1 Dose Rate and Decay Heat Limit Compliance Figure 7-8. Example Dose Rate/Decay Heat Calculation Sheet (Model AOS-100A Non-Exclusive Shipment Version Shown)”
H-7	7-19	7.5.1	B, 2 <sup>nd</sup> bullet	1	“External dose rate limits...”	“Compliance with external dose rate limits...”
H-7	7-19	7.5.1	2 <sup>nd</sup> bullet, last paragraph	4	“...≤ 0.3).”	“...≤ 0.3 MeV).”
H-7	7-19	7.5.1	2 <sup>nd</sup> bullet, last paragraph	6-7	“...decay heat from these isotopes shall...”	“...decay heat from these isotopes and their progeny shall...”
H-5	7-19b (new)	7.6	–	–	–	<moved “7.6 REFERENCES” to new page 7-19b>
H-6	7-19b	7.6	[7.9] (new)	–	–	<added new reference> “[7.9] Oak Ridge National Laboratory, ORNL/TM-2005/39 Version 6.1. “SCALE: A Comprehensive Modeling and Simulation Suite for Nuclear Safety Analysis and Design,” June, 2011.”
<b>Chapter 8</b>						
H-6	8-14	8.1.6	1	2-3	“Conducting a 100% UT examination of the shielding material surface provides the necessary inspection process for verifying the shielding attribute of these materials. As an alternate method, prior...”	“Conducting a 100% UT examination, as well as dimensional and density checks of the shielding material, provide the necessary inspection processes for verifying the shielding attribute of these materials. As an optional additional test, prior...”
H-6	8-14	8.1.6	1	9-11	“The criterion used to evaluate the effect of material defects (such as voids and cracks) is that the dose rate cannot exceed 1.5 times (1.5x) the mean measurable dose rate.”	“To verify the cask shielding material integrity, the measured dose rates should closely match the anticipated values from shielding/dose rate calculations, and large, unanticipated deviations should not exist between measurements.”
<b>Chapter 9 – No changes</b>						