

**Enclosure 3 to E-41337**

**List and Description of Changes  
(Safety Report Number ANFG-11.105 (05E)  
ANF-50 Revision 11)**

## List and Description of Changes (Safety Report Number ANFG-11.105 (05E), ANF-50, Revision 11)

Register 00, Safety Report for the Shipping Container ANF-50 as type A-package, ANFG-11.105 (05E), was revised from Revision 9 to Revision 10, and then to Revision 11 for revisions to the various registers. A copy of Revision 11 is provided in Enclosure 4, and the revisions are indicated by a vertical bar in the right hand margin.

Register 01, Safety Analysis for the ANF-50 shipping container, ANFG-11.106 (04E), was revised from Revision 5 to Revision 6 to include references to International Atomic Energy Agency (IAEA), Specific Safety Requirements No. SSR-6, Regulations for the Safe Transport of Radioactive Material, 2012 Edition. A copy of Revision 6 is provided in Enclosure 4, and the revisions are indicated by a vertical bar in the right hand margin.

Register 01, Safety Analysis for the ANF-50 shipping container, ANFG-11.106 (04E), was revised from Revision 6 to Revision 7 for editorial enhancements and other minor changes. A copy of Revision 7 is provided in Enclosure 4, and the revisions are shown by a vertical bar in the right hand margin.

Register 05, Handling and Maintenance of Shipping Container ANF-50, ANFG-11.101 (30E), was revised from Revision 1 to Revision 2 to replace "TRV 006" with BAM-GGR-011. This register was subsequently revised to Revision 3 for various editorial enhancements. A copy of Revision 3 is provided in Enclosure 4, and the revisions are indicated by a vertical bar in the right hand margin.

Register 07, Criticality Safety Analysis, ANFG-5.061 (11) was revised from Revision 3 up to Revision 6. A copy of Revision 4, Revision 5, and Revision 6 is provided in Enclosure 4, and the revisions are indicated by a vertical bar in the right hand margin. Below is a summary of each of the revisions.

1. From Revision 3 to Revision 4: The collective terms "undamaged" for the routine and normal transport conditions and "damaged" for the accident transport conditions are deleted. A precise allocation of calculations to routine, normal, and accident transport conditions is made and shown in the text and in the tables. The assumed clearances between the single ANF-50 shipping containers are adjusted in accordance with the specifications by the design department, and thus enlarged. The accident dimensions up to Revision 3 are: 44.1 cm x 31.7 cm x 47.7 cm. The accident dimensions beginning from Revision 4 are: 53.8 cm x 39.6 cm x 57.4 cm. These dimensions in question were taken from the drop test report. Up to Revision 3 of the criticality report no credit was taken from the lid overhang dimensions. Because of the request from various competent authorities, pellet chips were considered to penetrate into the upper clamp device. In order to keep the criticality safety index (CSI) unchanged, the missing overhang of the lid (conservative assumption up to Revision 3) was removed beginning with Revision 4. Therefore, there were not any revisions to any of the other registers (SAR chapters) resulting from the change in the criticality register (the revised accident dimensions). The model of pellet trays was simplified. In lieu of the corrugated shape, a flat shape was modeled. All calculations were converted from discrete to cell-weighted. In addition, calculations were also made with axial gaps in the pellet columns. The range of pellet diameters considered was restricted from 7 mm - 10 mm to 7.6 mm - 10 mm. The texts, tables and figures were revised. All calculations were made in SCALE-6.0.

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2. From Revision 4 to Revision 5: Appendix 3 was added; it includes comparative calculations for the hexagonal, in three directions infinite arrangement of pellets on stainless steel carriers of the continuous cross-section library compared with the cell-weighted 44-group cross-section library. The calculations show the difference in the multiplication factor between cell-weighted model approach and discrete model approach. The multiplication factors in Table 12 were revised because the intermediate moderation in the free volume of the pellet box had not been varied.
3. From Revision 5 to Revision 6: The American authorities have required additional proof of the criticality safety in the case of accidents. It is assumed in this case that 10 wt.-% of the uranium oxide leak into the clamping space as the result of an accident. Chapter 7 and Table 17 were supplemented by this proof. The numbering of all subsequent tables has, therefore, been modified. Spelling errors have been corrected.

Register 08, Container Instructions, ANFG-11.101 (25E) was revised from Revision 4 to Revision 5 for editorial enhancements and clarifications. A copy of Revision 5 is provided in Enclosure 4, and the revisions are shown by a vertical bar in the right hand margin.

Register 10, Work-report, ANFG-11.118 (01E) was revised from Revision 2 to Revision 3. The purpose of this report was enhanced to summarize the four calculations detailed in said report. A statement was added before Chapter 5 regarding the ambient temperature used in the stress calculations. The net weight of the pellet box was added in Chapter 5, and the stress calculations at ambient and room temperature were removed. Chapter 6 was revised to address handling of the ANF-50 with a forklift truck and the resulting static stresses. Chapter 7 was revised to address the handling of the ANF-50 with a crane and the resulting static stresses. Chapter 8 was revised to address load securing of the ANF-50 in the 20 foot ISO standard container and the resulting static stresses. Chapter 9, now titled "Removing the pellet box from the shipping frame," was revised to three subchapters. Chapter 9.1, previously in Chapter 7, is the shackle M8/pellet box stress calculation. There were no changes to this calculation. Chapter 9.2, previously Chapter 8, is the cover bolts M8/pellet box stress calculation. There were no changes to this calculation. Chapter 9.3, previously Chapter 9, is the tightening torques for the bolts used and comparison with minimum breaking torques. There were no changes to this comparison. A copy of Revision 3 is provided in Enclosure 4, and the revisions are shown by a horizontal line below the words.

Register 10, Work-report, ANFG-11.118 (01E) was revised from Revision 3 to Revision 4. A paragraph regarding a safety factor of 3 was added at the end of Chapter 7.1. Chapter 7.2 was removed. Chapter 8 was revised to enhance the description of the parameters associated with respect to load securing of the ANF-50 in the 20 foot ISO standard container. Chapter 10, "Stacking Test according to IAEA Regulations," was added. A copy of Revision 4 is provided in Enclosure 4, and the revisions are indicated by a vertical bar in the right hand margin.

Register 19, Pellet-shipping container ANF-50 Drawing List, 5-3 27 40004-02, was revised from Revision 1 to Revision 2 to incorporate the revision to drawing number AD-003759-001. See below for details on this drawing). A copy of Revision 2 is provided in Enclosure 4.

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Drawing number AD-003759-001-008-000, "Pellet Box ANF-50," was revised to AD-003759-001-009-000 to allow for an alternate location for placement of the manufacturer name and serial number. A copy of Revision 9 of this drawing is provided in Enclosure 4. Note that this drawing is proprietary.