



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

SAFETY EVALUATION REPORT
Docket No. 71-9215
Model No. NPI-20WC-6 MkII Package
Certificate of Compliance No. 9215
Revision No. 10

SUMMARY

By application dated April 8, 2010, Neutron Products, Inc., requested an amendment to Certificate of Compliance (CoC) No. 9215 for the Model No. NPI-20WC-6 MkII package. The applicant specifically requested allowance to add Cesium-137 as a new content to the CoC as a sealed source which meets the requirements of a special form radioactive material.

EVALUATION

Thermal Evaluation

The staff reviewed the request for the CoC No. 9215 to transport a special form Cesium-137 source with an activity not to exceed 22.2 Tbq (600 Curies), which corresponds to 3.1 watts. The package was originally designed for special form sources with higher activity, including Cobalt-60 with an activity not to exceed 15,000 Curies, which corresponds to 231 watts. Therefore, the proposed content is bounded by the approved original heat source.

Based on staff review, the staff finds reasonable assurance that the USA/9215/B(U) package design meets the thermal performance requirements set forth in 10 CFR Part 71.

Shielding Evaluation

NRC staff reviewed the applicant's submittal, the applicant's SAR (ML092180416), the above referenced drawings, the current CoC (ML080970006), and the Rev. 0 Safety Analysis Report (SER) (ML030100087). NRC staff reviewed the configurations shown in item 5 of Drawing No. 240122, sheet 1 of 2, Rev. H (ML022800515), and item 4 of Drawing No. 240122, sheet 2 of 2, Rev. H (ML022800529). NRC staff finds that these package configurations are already approved for 15,000 and 9,500 Curies of Cobalt-60 (^{60}Co), respectively. During radioactive decay of ^{60}Co two gamma rays are emitted with energies of 1.17 and 1.33 MeV. During radioactive decay of ^{137}Cs one gamma ray is emitted with an energy of 0.6617 MeV. So ^{60}Co emits two gamma rays that each has roughly twice the energy as the single gamma ray emitted by ^{137}Cs . This strongly suggests that ^{137}Cs is bounded by ^{60}Co . To confirm this staff performed dose rate calculations for shielded and unshielded ^{137}Cs and ^{60}Co point sources. Additional calculations were performed for a 600 Ci ^{137}Cs line source to represent a pencil source. The results of these calculations confirmed the applicant's argument that ^{137}Cs is bounded by ^{60}Co ; and that a 600 Ci ^{137}Cs source does not violate the limits under normal conditions of transport or hypothetical accident conditions.

Based on a review of the representation within the application and independent calculations, staff finds reasonable assurance that a package with 600 Ci of ^{137}Cs meets the radiation limits

of Part 71, provided it is in the configurations specified in the CoC Rev. 9, Sections 5(b)(2)(i) and (ii); and provided that the applicant uses at least 2 inches of Lead or Tungsten, or 3 inches of steel as axial shielding material in the drum assembly. This is in addition to the shielding that is already part of the shipping/transfer cask (S/TC) and S/TC cover. The shielding material may be part of the plugs and spacers or part of the source drawer, but must be inserted between the source and the S/TC cover.

CONCLUSION

Condition No. 5(b) of the certificate was revised to add Cesium-137 as a new content - as sealed sources which meet the requirements of special form radioactive material, with a maximum activity not to exceed 600 curies and maximum decay heat not to exceed 3.1 watts. Condition No. 10 was added to ensure Cesium-137 and Cobalt-60 sources are not shipped together in the same package. Condition No. 12 of the certificate was revised which authorizes use of the previous revision of the certificate for a period of approximately one year.

These changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9215, Revision No. 10,
on May 13, 2010