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SAFETY EVALUATION REPORT
REVISION 3, CERTIFICATE OF COMPLIANCE USA/9516/B(U)F (DOE)
MOUND 1KW PACKAGE, DOCKET 93-20-9516

SUMMARY

The Transportation and Packaging Safety Division, EH-332, of the Department of Energy (DOE) has previously approved shipment of heat-source PuO_2 in the Mound 1kW Package for two specific internal configurations involving PuO_2 powder. Revision 3 of Certificate of Compliance USA/9516/B(U)F (DOE) adds four additional specific internal configurations involving freshly pressed pellets of heat-source PuO_2 to the authorized contents of the Mound 1kW Package. The four new configurations all involve General Purpose Heat Source (GPHS) Fueled Clad Assemblies (FCAs) as described in Revision 6B of the Safety Analysis Report for Packaging (SARP)[1].

"Freshly pressed" for the purposes of Revision 3 of the Certificate is specifically defined as pellets that have been pressed from a calcinated PuO_2 powder on a date no earlier than two years prior to the date the pellets are sealed into a Mound 1kW Package primary containment vessel. The purpose of this requirement is to limit the amount of helium produced from alpha decay of ^{238}Pu that can be trapped within the PuO_2 pellets prior to being sealed in a Mound 1kW Package Primary Containment Vessel.

In all four new configurations radioisotopic power is limited to 255 Watts per PCV and 500 Watts total heat generation per Mound 1kW Package.

The staff concludes that the Mound 1kW Package with any of the four specific GPHS FCAs containing freshly pressed GPHS pellets is in compliance with Federal Regulations, 10 CFR Part 71 and 49 CFR Part 173, and International Regulations, IAEA Safety Series 6.

DISCUSSION

The staff review of the four forms containing freshly pressed GPHS pellets in FCAs is documented in the order of the chapters of the SARP[1].

Chapter 1.0, GENERAL INFORMATION

1.1 Area of Review

1.1.1 Additional Mound 1kW Package Configurations

This Safety Evaluation Report (SER) addresses a request to amend the Certificate of Compliance (CoC)[2] to include four additional specific internal configurations involving heat-source PuO_2 (which is primarily ^{238}Pu with a composition as defined in Table 1.4: Plutonium Dioxide Radioisotopic Data, page 1-31 of Reference 1) in the EG&G Mound Applied Technologies (Mound) 1kW Package[1] in the form referred to as General Purpose Heat Source (GPHS) Fueled Clad Assemblies.[3] These Fueled Clad Assemblies consist of freshly pressed PuO_2 pellets in iridium-tungsten capsules (Figure 1.13: GPHS fueled clad assembly, page 1-22 of Reference 1). Each Fueled Clad Assembly PuO_2 pellet should produce about 62.5 Watts of radioisotopic power.

The four additional specific internal Mound 1kW Package configurations[1] have the general configuration shown in Figure 1.5: Product can containment assembly, page 1-6 of Reference 1, and are defined as follows:

1) The GPHS module containing four Fueled Clad Assemblies (Figure 1.12: General purpose heat source (GPHS) Module, page 1-18 of Reference 1) per Primary Containment Vessel (PCV).

2) The GPHS Graphite Impact Shell (GIS) containing two Fueled Clad Assemblies in a threaded Product Can, with a maximum of two Product Cans mounted diametrically opposite each other within the Graphite Support Block or GSB (Figure 1.11: Graphite support block for Product Cans, page 1-15 of Reference 1) contained in each PCV.

3) A single Fueled Clad Assembly in a welded Product Can, with a Graphite Cushion and a Graphite Filler Plug (Drawing AYD820774, Sheet 2, piece numbers 5 and 7, page 1-69 of Reference 1) replacing the second Fueled Clad Assembly, with a maximum of four Product Cans per PCV.

4) Two Fueled Clad Assemblies in a welded Product Can, with a maximum of two Product Cans, mounted diametrically opposite each other within the GSB contained in each PCV.

In all four configurations radioisotopic power is limited to 255 Watts per PCV and 500 Watts total heat generation per Mound 1kW Package.

These four Mound 1kW Package internal configurations (hereafter designated as GPHS Configurations 1-4) and associated maximum power levels constitute the requested amendment to the CoC and are the focus of this SER. As is noted in the above description of GPHS Configuration 3, the single Fueled Clad Assembly in the welded Product Can configuration involves a single Fueled Clad Assembly per Product Can along with piece numbers 5 and 7 of Drawing AYD820774, Sheet 2, page 1-69 of Reference 1. However, the single Fueled Clad Assembly can be located either as shown in Sheet 1 of the referenced drawing (page 1-68 of Reference 1), in the upper position of the Product Can, or in the lower position of the Product Can with the Graphite Filler Plug located above the Fueled Clad Assembly.

"Freshly pressed" for the purposes of this SER is specifically defined as pellets that have been pressed from a calcinated PuO_2 powder on a date no earlier than two years prior to the date the pellets are sealed into a Mound 1kW Package PCV.[4] This requirement is necessary to limit the amount of helium produced from alpha decay of ^{238}Pu that can be trapped within the PuO_2 pellets prior to being sealed in a Mound 1kW Package PCV. Because Paragraph 4 of Title 10, Code of Federal Regulations, Part 71 (10 CFR Part 71)[5], under "Maximum normal operating pressure," imposes a one-year period of pressure buildup in a transportation package (which, for the Mound 1kW Package PCV, begins upon weld sealing of the PCV), this requirement also limits the total period of time from the PuO_2 pellet pressing date to the end of transportation phase–the effective PuO_2 pellet lifetime limit for transportation purposes–of three years from the PuO_2 pellet pressing date.

Specifically eliminated from consideration in this SER for the requested amendment to the CoC are any PuO_2 pellets pressed from any powder or particle source where pellet pressing has occurred more than two years prior to the pellets being sealed into a Mound 1kW Package PCV.

1.1.2 Description of Previously Approved Mound 1kW Package Configurations

The Department of Energy Transportation and Packaging Safety Division (DOE/EH-332) has previously approved shipment of heat-source PuO_2 in the EG&G Mound Applied Technologies (Mound) 1kW Package[1-2] for two Mound 1kW Package configurations. These two configurations involve PuO_2 powder contained in up to four Product Cans per each of the two PCVs contained in each Mound 1kW Package. The PuO_2 powder was contained in small Powder Cans located inside of either the Mound/SRS threaded and/or welded Product Cans or the Russian welded Product Cans. The maximum permitted power levels for these two configurations, applied to the Russian design, was 255 Watts per PCV and 500 Watts total heat generation per package.

1.1.3 Design and Performance Features of GPHS Configurations 1-4 Compared to Previously Approved PuO_2 Powder Configurations

The original Technical Evaluation Report for the Mound 1kW Package (TER-1)[8] addressed the adequacy of the Mound 1kW Package for transporting PuO_2 in powder form only (PuO_2 powder internal configurations noted in Section 1.1.1) and for total package power levels at or below 500 Watts. A second Technical Evaluation Report for the Mound 1kW Package (TER-2)[9] addressed the adequacy of

use of the DOE/AL Safe Secure Transporters (SSTs) for transporting one to four Mound 1kW Packages where each package was limited to a maximum power level of 500 Watts.

The Mound 1kW Package GPHS Configurations 1-4 share many common design features with the two previously approved internal configurations containing PuO_2 in powder form only[1,2,8,9] and they have the same maximum power levels. There is no change in the basic Mound 1kW packaging configuration, containment or confinement barriers, or operational requirements compared to the previously approved internal configurations containing PuO_2 in powder form. Three of these four GPHS configurations (GPHS Configurations 2, 3, and 4) involve small Product Cans that are identical to those used in the already approved configuration using Mound/SRS threaded or welded Product Cans containing powdered PuO_2 in separate Powder Cans. These Product Cans, which do not represent containment boundaries, are mounted in a GSB that has a complex geometry (Figure 1.11: Graphite support block for Product Cans, page 1-15 of Reference 1). The GSB fills the majority of the interior volume of each of the two PCVs that are contained, along with a Graphite Filler Block (GFB), within the single Secondary Containment Vessel (SCV) which, in turn, is contained in the Mound 1kW Package heavy-walled outer Cask (Figure 1.5: Product Can containment assembly, page 1-6 of Reference 1).

The fourth configuration (GPHS Configuration 1) involves this same general arrangement from the GSB outward. However, a box-shaped assembly called the GPHS Module (Figure 1.12, page 1-18 of Reference 1), which integrally contains four of the Fueled Clad Assemblies, replaces the small Product Cans, fitting into a large rectangular hole in a much simpler GSB design. This general arrangement is shown in Figure 1.3: GPHS containment assembly, page 1-4 of Reference 1.

1.2 Acceptance Criteria

The acceptability of the four additional internal configurations for the Mound 1kW Package[1], GPHS Configurations 1-4, was reviewed in comparison to the two previously approved internal configurations containing PuO_2 powder to assure that shipment of these configurations in the Mound 1kW Package would be in compliance with the applicable performance requirements of 10 CFR Part 71,[5] paragraphs 71.4, 71.31, 71.33, 71.35, 71.37, 71.41, and 71.43, for shipment under Normal Condition of Transport (NCT) and Hypothetical Accident Conditions (HAC); 49 CFR Part 173,[6] paragraph 173.403 (ff) for stowage conditions during transport; and IAEA Safety Series 6[7] requirements.

Package general information is deemed acceptable if it can be shown that the information provided is of sufficient detail to satisfy the requirements set forth above.

1.3 Review Procedure

The Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, have the general physical characteristics and structural, thermal, containment, shielding, and criticality characteristics as the two previously approved internal configurations containing PuO_2 powder. However,

the use of PuO_2 pellets in place of PuO_2 powder does affect the local geometries within the GSB for GPHS Configuration 1 and within the Product Cans for GPHS Configurations 2-4. Both the structural limits, in the form of the maximum allowable temperatures of and pressures within a Mound 1kW Package PCV, and acceptable maximum power levels (500 Watts per package) have been previously reviewed and found acceptable.[2,8]

The review focused on assuring that Section 1 provides sufficient information to be able to independently verify that these four additional configurations (GPHS Configurations 1-4) can be shown to demonstrate compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6[7] requirements

1.4 Findings and Conclusions

The packaging and its contents have been described in sufficient detail to identify the package accurately and provide a sufficient basis for evaluation of the package with internal configurations involving GPHS Fueled Clad Assemblies (GPHS Configurations 1-4).

The SARP contains all information required to demonstrate compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6[7] requirements.

Chapter 2.0, STRUCTURAL EVALUATION

2.1 Findings and Conclusions

The Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, have the equivalent general distributions of mass but less total mass than the two previously approved internal configurations containing PuO_2 powder. Consequently, the Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, also will be in compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6 requirements.

Chapter 3.0, THERMAL EVALUATION

3.1 Area of Review

Four additional internal configurations for the Mound 1kW Package[1], GPHS Configurations 1-4, were evaluated by comparing to the two previously approved internal configurations containing PuO_2 powder[2]. The comparative evaluations were directed at determining if the Mound 1kW package containing any of the four additional internal configurations, GPHS Configurations 1-4, was in compliance with 10 CFR Part 71[5] and 49 CFR Part 173[6] requirements and IAEA Safety Series 6[7] requirements.

All six internal configurations, the GPHS Configurations 1-4 and the two previously approved PuO_2 powder[2] configurations, have maximum power levels of 255 Watts or less per PCV and 500 Watts or less per Mound 1kW Package. Although local temperatures in and near the PuO_2 power source are quite dependent on each of the six actual configurations, the mass and high thermal

dependent on each of the six actual configurations, the mass and high thermal conductivity of the GSB tend to reduce configuration-dependent temperature differences. As a result, from the GSB outward, in particular for the PCV walls, temperatures for all configurations are similar; for five of the six internal configurations, the resulting volume-weighted average gas temperatures for free volumes within each PCV (PCV average gas temperature), which is used in calculating PCV internal pressures, are likewise similar.

One notable difference among the configurations: GPHS Configuration 1, the GPHS module containing four Fueled Clad Assemblies per PCV, has both substantially less free volume within the PCV compared to the other five configurations and relatively high (compared to the other five configurations) PCV average gas temperatures. Since the internal pressure of the PCV is a primary concern in evaluating the suitability of GPHS Configurations 1-4 for use in the Mound 1kW Package, GPHS Configuration 1, with its relatively small PCV free volume and relatively high PCV average gas temperatures, is the controlling design regarding both PuO_2 pellet lifetime limits and peak pressures within the PCV caused by both the initial argon cover gas plus the progressive production of helium from the alpha decay of ^{238}Pu.

Specific attention in the review was directed at verifying both the calculated free volumes within the PCV and the mixed mean temperature of these free volumes for the specific PVC internal design features and thermal conditions involved in GPHS Configurations 1-4. These PCV characteristics were verified as the physical basis for realistic prediction of internal gas pressures within each PCV for the specific NCT and HAC environments involving GPHS Configurations 1-4.

The staff also evaluated the potential effect of helium production from the alpha decay of ^{238}Pu on the internal gas pressures within each PCV for GPHS Configurations 1-4 as a function of time from the actual pressing date of the PuO_2 powder into the GPHS pellets until the end-of-transport date. This evaluation provided a method of confirming that the Mound 1kW Package SARP[1] predicted effective PuO_2 pellet lifetime limits (based on PCV internal pressure buildup from helium produced from alpha decay of ^{238}Pu) realistically resulted in PCV internal gas pressures less than NCT and/or HAC maximum allowable pressures for the accepted[4] effective PuO_2 pellet lifetime limit for transportation purposes of three years from the PuO_2 pellet pressing date.

3.2 Acceptance Criteria

The thermal characteristics of the four additional internal configurations for the Mound 1kW Package[1], GPHS Configurations 1-4, were reviewed to assure that shipment within the U.S. of these configurations in the Mound 1kW Package would be in compliance with the applicable performance requirements of 10 CFR Part 71,[5] paragraphs 71.33, 71.35, 71.51, 71.71, 71.73, and 71.87 for shipment under NCT and HAC; 49 CFR Part 173,[6] paragraph 173.403 (ff) for stowage conditions during transport; and IAEA Safety Series 6[7] requirements.

These performance requirements have been successfully fulfilled for the Mound 1kW Package PuO_2 powder configurations.[2,8] The most stringent of these requirements directly affecting the acceptability of the GPHS Configurations

1-4 are the need to successfully withstand both exposure to NCT environments of an ambient temperature of 38°C (100°F) in still air and insolation according to tabulated requirements in 10 CFR Part 71,[5] paragraph 71.71(c); and HAC environments of exposure of the whole specimen for not less than 30 minutes to a heat flux not less than that of a radiation environment of 800°C (1475°F) with an emissivity coefficient of at least 0.9 as defined in 10 CFR Part 71,[5] paragraph 71.73(b).

3.3 Review Procedure

The Mound 1kW Package SARP[1] includes predictions of the effective PuO_2 pellet lifetime limit from the fabrication date of the PuO_2 powder into the GPHS pellets until the end-of-transport date for GPHS Configurations 1-4. These time limits are presented in the last column (titled "Time to Reach Max. Allowable Pressure (Months)") of Table 3.17: Maximum internal pressure of the primary containment vessel (PCV) under NCT thermal conditions and Table 3.20: Maximum internal pressure of the primary containment vessel (PCV) under HAC thermal conditions (pages 3-34 and 3-49 of Reference 1, respectively).

As noted in Section 3.1, GPHS Configuration 1, the GPHS module containing four Fueled Clad Assemblies per PCV has substantially less free volume within the PCV and relatively high PCV average gas temperatures compared to the other configurations. As a result, GPHS Configuration 1 is the controlling design regarding peak pressures within the PCV and, as a result, effective PuO_2 pellet lifetime limits. The time limit for GPHS Configuration 1 presented in the last column of Table 3.17 is 42 months or 3.5 years. This value is shorter than any other time limit presented in either Table 3.17 or Table 3.20, thereby setting the Mound 1kW Package SARP[1]-proposed minimum age of a GPHS Fueled Clad Assembly that could be shipped in a Mound 1kW Package.

The staff review of the Mound 1kW Package SARP[1] involved independent verification of:

1) the input used to generate the calculated PCV internal pressures, also reported in Table 3.17 and Table 3.20;

2) the resulting effective time limits from the actual pressing date of the PuO_2 powder into the GPHS pellets until the end-of-transport date.

Additionally, the staff performed a review and analysis of helium gas diffusion in PuO_2 to verify that the process of producing GPHS pellets from PuO_2 powder would result in an initial near-zero inventory of helium produced from alpha decay of ^{238}Pu in the newly made pellets .

3.4 Findings and Conclusions

The acceptance criteria defined in Section 3.2 focused on the ability of GPHS Configurations 1-4 to contain the heat-source PuO_2 throughout the required NCT and HAC environments. As has been discussed above, the Mound 1kW Package[1] has already been shown to meet these performance requirements for the Mound 1kW Package PuO_2 powder configurations.[2,8]

As a primary comparative indication that the four additional internal configurations for the Mound 1kW Package[1], GPHS Configurations 1-4, behave in a similar manner to the two previously approved internal configurations containing PuO_2 powder, peak PCV metal temperatures reported for NCT and HAC environments and the highest temperature GPHS Configuration are only 8°C (14°F) and 15°C (27°F) higher than the highest temperature PuO_2 powder configuration (388°C versus 380°C and 575°C versus 560°C, respectively) (Table 3.15: Maximum temperatures of cask numerical models for NCT with insolation and Table 3.19: Maximum HAC package temperatures from numerical cask models, pages 3-30 and 3-39 of Reference 1, respectively). Such small temperature differences have no notable impact on either thermal or structural behavior of the Mound 1kW Package[1] from the PCV outward.

The Mound 1kW Package SARP[1] includes Appendix 3.6.9, titled "Determination of Average PCV Temperature via Partitioning of Volumes" (pages 3-191 to 3-224). This appendix presents both detailed information on and calculations related to PCV void volumes and PCV void volume average gas temperatures. The appendix was adequate to permit independent calculations by separate staff analysis. As a result, it was possible for the staff to verify that:

1) the values for PCV gas (PCV void volume average gas) temperatures reported in Table 3.15 and Table 3.19 (pages 3-30 and 3-39 of Reference 1, respectively), when combined with

2) the values for PCV void volumes reported in Table 3.17 "Maximum internal pressure of the primary containment vessel (PCV) under NCT thermal conditions" and repeated in Table 3.20 "Maximum internal pressure of the primary containment vessel (PCV) under HAC thermal conditions" (pages 3-34 and 3-49 of Reference 1, respectively) do represent a conservative basis for predicting internal gas pressures within each PCV for the specific NCT and HAC environments involving GPHS Configurations 1-4.

As noted in Section 3.2, also included in Tables 3.17 and 3.20 are predictions of the effective time limits starting from the actual precipitation or calcination date of the PuO_2 powder used for pressing into the GPHS pellets until the end-of-transport date. These time limits appear in the last column in each table titled "Time to Reach Max. Allowable Pressure (Months)." The time limits are calculated using the PCV average gas temperatures and the free volumes reported in Tables 3-15, 3-17, 3-19, and 3-20 and the PCV internal pressure contributions from both the initial argon cover gas plus the progressive production of helium from the alpha decay of ^{238}Pu (always assumed at an instantaneous 100% release fraction).

A staff review and analysis of helium gas diffusion in PuO_2, using reference material noted in Appendix 4.5.1 (pages 4-15 to 4-18) of the SARP[1] and References 10 to 12, concluded that it was reasonable and conservative to assume that the date of PuO_2 pellet pressing, which occurs both after the actual precipitation or calcination date and shortly before the pellet sintering process, could be taken as time equal to zero for the effective time limit for GPHS Fueled Clad Assemblies. This conclusion results from consideration of the combined effects of the high-temperature sintering

operation (at about 1600°C) followed by a vacuum outgassing process.[11] These two sequential processes effectively result in a near-zero inventory in the pellet of the helium produced from prior ^{238}Pu decay (or any other non-condensable gas for that matter).

An additional staff analysis produced an independent calculation of the time limits for each of the GPHS Configurations 1-4 and involving the PCV free volumes and corresponding average gas temperatures reported in Tables 3-15, 3-17, 3-19, and 3-20 (pages 3-30, 3-34, 3-39, and 3-49 of Reference 1, respectively) and the internal pressure contributions from both the initial argon cover gas plus the staff calculations of progressive production (alpha decay of ^{238}Pu) and instantaneous release of helium. This staff analysis also demonstrated that the time limits reported in Tables 3-17 and 3-20 of Reference 1 for the Mound 1kW Package PCV undergoing the specific NCT and HAC environments involving GPHS Configurations 1-4 do result in a conservative prediction of the time span to be permitted between the actual PuO_2 pellet pressing date and the end-of-transport date.

The staff concludes that the four additional Mound 1kW Package[1] internal configurations, GPHS Configurations 1-4, containing Fueled Clad Assemblies with freshly pressed GPHS PuO_2 pellets are in compliance with 10 CFR Part 71[5] and 49 CFR Part 173[6] requirements and IAEA Safety Series 6[7] requirements and can be shipped in the Mound 1kW Package[1] subject to an effective PuO_2 pellet lifetime limit for transportation purposes of three years from the PuO_2 pellet pressing date through completion of the transportation phase.

The definition of freshly pressed PuO_2 pellets consistent with this compliance is specifically limited to PuO_2 pellets that have been pressed from a calcinated PuO_2 powder on a date no earlier than two years prior to the date the Fueled Clad Assemblies containing these PuO_2 pellets are sealed into a Mound 1kW Package Primary Containment Vessel.

Chapter 4.0, CONTAINMENT EVALUATION

4.1 Findings and Conclusions

The Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, have the identical design of and design limits for containment as do the two previously approved internal configurations containing PuO_2 powder.

From Tables 3-17 and 3-20 (pages 3-34 and 3-49 of Reference 1, respectively), it can be seen that the expected peak PCV pressures for the GPHS Configurations 1-4 are similar to those for the two powder configurations and are well below the 10 CFR Part 71[5] definition of maximum normal operating pressure for NCT and are below both those for the two powder configurations and the 10 CFR Part 71[5] definition of maximum normal operating pressure for HAC. Consequently, the Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, also will be in compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6[7] requirements.

Chapter 5.0, SHIELDING EVALUATION

5.1 Findings and Conclusions

The Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, has better shielding characteristics than the previously approved worst-case configuration containing PuO_2 powder (the configuration involving the PuO_2 powder in the Mound/SRS threaded and/or welded Product Can). Consequently, the Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, also will be in compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6[7] requirements.

Chapter 6.0, CRITICALITY EVALUATION

6.1 Findings and Conclusions

The Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, has equivalent or less severe criticality characteristics as do the two previously approved internal configurations containing PuO_2 powder. Consequently, the Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, also will be in compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6[7] requirements.

Chapter 7.0, OPERATING PROCEDURES EVALUATION

7.1 Findings and Conclusions

The Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, has the equivalent general operating procedural requirements as do the two previously approved internal configurations containing PuO_2 powder, with the exception of the need for PCV loading procedures to require use of Fueled Clad Assemblies containing only freshly pressed PuO_2 pellets as per the definition in Section 3.3.2. Consequently, the Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4 and this added freshly pressed PuO_2 pellet requirement, also will be in compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6[7] requirements.

Chapter 8.0, ACCEPTANCE TESTS AND MAINTENANCE PROGRAM EVALUATION

8.1 Findings and Conclusions

The Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, has the equivalent general acceptance tests and maintenance program requirements as do the two previously approved internal configurations containing PuO_2 powder, with the exception of the need for acceptance tests to assure use of Fueled Clad Assemblies containing only freshly pressed PuO_2 pellets as per the definition in Section 3.3.2. Consequently, the Mound 1kW Package with the four additional internal

configurations, GPHS Configurations 1-4 and this added freshly pressed PuO_2 pellet requirement, also will be in compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6[7] requirements.

Chapter 9.0, QUALITY ASSURANCE EVALUATION

9.1 Findings and Conclusions

The Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4, has the equivalent general quality assurance program requirements as do the two previously approved internal configurations containing PuO_2 powder, with the exception of the need for quality assurance procedures to assure use of FCAs containing only freshly pressed PuO_2 pellets as per the definition in Section 3.3.2. Consequently, the Mound 1kW Package with the four additional internal configurations, GPHS Configurations 1-4 and this added freshly pressed PuO_2 pellet requirement, also will be in compliance with 10 CFR Part 71[5], 49 CFR Part 173[6], and IAEA Safety Series 6[7] requirements.

Approved by

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Date OCT 18 1994

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