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

SAFETY EVALUATION REPORT
Docket No. 71-9791
Model No. PWR-2 Lower Core Barrel Shipping and Disposal Container
Certificate of Compliance No. 9791
Revision No. 10

EVALUATION

By letter dated January 25, 2018, as supplemented on February 25, 2019, Naval Reactors submitted an application for amendment to Certificate of Compliance No. 9791, for the Model No. PWR-2 Lower Core Barrel Shipping and Disposal Container (PWR-2) transport package to include the S8G-Prototype Advanced Fleet Reactor (S8G-P) core barrel.

The U.S. Nuclear Regulatory Commission (NRC) staff performed its review of the PWR-2 transport package utilizing the guidance provided in NUREG-1609, “Standard Review Plan for Transportation Packages for Radioactive Material.” Based on the statements and representations in the application, as supplemented, the analyses performed by the applicant demonstrate that the package provides adequate protection to meet the requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 71.

1.0 GENERAL INFORMATION

The PWR-2 is designed to transport irradiated components for disposal. The package consists of an inner container designed for transport and burial and a reusable outer container.

The outer container is a 4-inch thick steel cylinder, 127 inches in outside diameter, 212 inches long, with two 6-inch thick end plates. The bottom end plate is welded to the cylinder with a full penetration weld and the top end plate is bolted with 107, 2-inch diameter fasteners.

Naval Reactors has included a new inner container to transport the S8G-P core barrel. The S8G-P core barrel disposal container (CBDC) is comprised of an HY-80 steel upper cylinder and an A737 steel lower (body) cylinder joined by a 4.5-inch thick HY-80 steel transition ring with full penetration welds. The upper cylinder has a thickness that varies from 1.35 inches to 4.5 inches thick and a maximum outside diameter of 117.7 inches. The body cylinder has a thickness of that varies from 5.25 inches to 6 inches and an outside diameter of 104 inches. Attached to the body cylinder are two additional pieces of A737 steel shielding components. The lower shielding has a thickness of 3.25 inches and the upper shielding has a thickness of 2 inches.

The A737 steel bottom plate is 7 inches thick and has an outside diameter of 108 inches. The bottom plate is welded to the lower (body) cylinder. Two, 5-inch thick HY-80 steel guide bars are welded to the outside diameter of the bottom plate with an outside diameter of 116.6 inches to create a load path for the CBDC through the PWR-2 package support rings. A 3.25-inch thick HY-80 steel closure cover is welded to the inside of the top of the upper cylinder CBDC to seal the CBDC. The closure cover is attached to the container with a 3.1-inch thick closure weld.

The outside diameters of the guide bars and upper cylinder of the CBDC establish a relatively close fit with the outer container to limit radial movement during shipment.

2.0 STRUCTURAL EVALUATION

The S8G-P contents of the PWR-2 package are held inside the CBDC which is then placed into an outer shipping container. The applicant provided analyses to demonstrate the performance of the package, stating that the performance of the outer shipping container has not been changed since it is the same as another approved package which bounds the PWR-2 with respect to weight, center of gravity and dimensions.

The staff has reviewed the package description and finds that the package satisfies the requirements of 10 CFR 71.43(a) for minimum size.

PWR-2 CBDC package screws are secured with security devices that indicate when the package has been tampered with. Staff reviewed the package closure description and determines that the package satisfies the requirements of 10 CFR 71.43(b) for a tamper-indicating feature.

The applicant states that it has ensured positive closure of the package via the bolts (with prescribed torque) in the cover. Staff has reviewed the closure description and agrees that 10 CFR 71.43(c) is satisfied.

The applicant states that the CBDB and PWR-2 shipping containers do not have any valves or relief devices that would allow any radioactive contents to escape. The staff reviewed the package description and determined that 10 CFR 71.43(e) is satisfied.

The applicant states that the only lifting lugs that exist on the package are used to upright the loaded package but never to lift the loaded package, and, thus, no analysis is necessary. Staff has reviewed the closure description and concludes that 10 CFR 71.45(a) is satisfied.

In terms of length, width, shape, and center of gravity, the loaded PWR-2 CBDC package is very nearly identical in dimension (and weighs less) to another previously approved package. The applicant states that lifting lugs are removed or rendered inoperable during transportation. Given the geometry and weight of the package as previously described, the PWR-2 package is bound by the previously approved package, and therefore, 10 CFR 71.45(b) is satisfied.

In terms of length, width, shape, weight, and center of gravity, the loaded CBDC package is bounded or very nearly identical to another previously approved package.

2.1 Normal Conditions of Transport

The applicant states that, with respect to the reduced external pressure of 3.5 psia, the package was evaluated at a maximum internal pressure which resulted in all components having stresses below yield strength of the material. The evaluation satisfies 10 CFR 71.71(c)(3) for reduced external pressure.

The applicant states that, with respect to increased external pressure of 20 psia, and the minimum internal pressure of the package, all package components have stresses below yield strength of the material. Thus 10 CFR 71.71(c)(4) is satisfied.

The applicant states that, with respect to vibrational effects, the fundamental frequency of the package (and its components) is sufficiently large enough to not be affected by the resonance frequency of the conveyance. Thus 10 CFR 71.71(c)(5) is satisfied.

The applicant states that the PWR-2 CBDC is not susceptible to damage from water spray based on its construction. Thus 10 CFR 71.71(c)(6) is satisfied.

The applicant states that the CBDC inside the PWR-2 package is bounded by another previously approved package (nearly identical length, width, shape, and center of gravity while weighing less than the previously approved package) with respect to free drop. Therefore, the containment boundary of the PWR-2 package is expected to perform just as well if not better than the previously approved package, which maintained containment for the normal conditions of transport 1 foot drop. Thus 10 CFR 71.71(c)(7) is satisfied.

The staff reviewed the application and finds that the package was evaluated in part by analysis which was found to be acceptable to the Commission and therefore satisfies the requirements of 10 CFR 71.41(a).

Based on the package's weight, the package is not subject to the corner drop requirements stated in thus 10 CFR 71.71(c)(8).

Based on the weight of the package, the compression requirements for the package per 10 CFR 71.71(c)(9) are not applicable.

The applicant states that the package is not susceptible to penetration, based on an analysis of the shipping container used in the previously approved PWR-2 Lower Core Barrel (PWR-2 LCB) package. Thus 10 CFR 71.71(c)(10) is satisfied.

The staff reviewed the structural performance of the packaging under the normal conditions of transport prescribed in 10 CFR 71.71 and concludes that there will be no substantial reduction in the effectiveness of the packaging that would prevent it from satisfying the requirements of 10 CFR 71.51(a)(1) for a type B package.

2.2 Hypothetical Accident Conditions

The applicant states that the CBDC inside the PWR-2 shipping container is bounded by another previously approved package since it has nearly identical length, width, shape, and center of gravity while weighing less than the previously approved package. The applicant did not explicitly evaluate the "slap down" scenario for the CBDC inside the PWR-2 shipping container because of the large amount of reserve plastic strain capacity in the outer container, and because even if the weakest component in the CBDC were to fail, the CBDC would be well confined by the outer container itself. The applicant also noted that the package contains less than an A_2 quantity of releasable activity, thus satisfying containment requirements of 10 CFR 71. Therefore, with respect to free drop and puncture, requirements 10 CFR 71.73(c)(1) and 10 CFR 71.73(c)(3) are satisfied.

Based on review of the statements and representations in the application, the NRC staff concludes that the structural design has been adequately described and evaluated and that the package has adequate structural integrity to meet the requirements of 10 CFR Part 71.

2.3 Materials Evaluation

2.3.1 Material Properties:

The inner disposal container is an all-welded steel assembly that provides structural support, containment, and shielding of the activated core barrel metal and surface crud. The staff reviewed the safety analysis report and its drawings and verified that the materials of construction, welding processes, and materials examination and testing requirements support effective materials performance under normal conditions of transport and hypothetical accident conditions.

2.3.2 Chemical or Galvanic Reactions:

The applicant stated that there will be no significant corrosion, chemical reactions, or radiation effects that could impair the effectiveness of the packaging. The staff reviewed the materials of construction of the package, including the CBDC and the S8G-P core barrel, and verified that the materials are compatible with their service environments, such that there will be no adverse corrosive or other reactions that could impact safe transport.

2.4 Conclusion

Based on review of the statements and representations in the application, as supplemented, the staff concludes that the structural design and package materials have been adequately described and evaluated and that the package has adequate structural integrity to meet the requirements of 10 CFR Part 71.

3.0 THERMAL

The applicant proposed the amendment to transport CBDC containing the S8G-P core barrel assembly as authorized contents in PWR-2 shipping container.

The objective of this review is to verify that the PWR-2 shipping container, loaded with CBDC and S8G-P core barrel assembly, satisfies the thermal requirements of 10 CFR Part 71 under normal conditions of transport and hypothetical accident conditions.

3.1 Thermal Design and Decay Heat

The applicant stated in Chapter 3.0 of the application that the S8G-P core barrel is placed inside the CBDC which consists of the upper cylinder, the body cylinder and the bottom plate to form a closed body cylinder. The body cylinder is attached with two pieces of steel shielding components. The core barrel assembly has a low decay heat.

The staff has reviewed the package description and the associated request of contents for shipment and concludes that description of thermal design and heat load are adequate for normal conditions of transport and hypothetical accident condition thermal evaluations.

<u>Computer Model</u>

The applicant performed thermal finite element analyses with the ABAQUS code as described in SAR Chapter 3.0. The applicant performed mesh sensitivity analyses including refinement of the grid size to ensure that the grid size used in the thermal analyses is appropriate for the temperature calculations. The applicant verified the analysis model by performing hand calculations for steady state heat transfer through PWR-2 container, comparing results with existing analyses, and checking the thermal model view factors for accurate cavity radiation.

The staff reviewed the ABAQUS thermal finite element analyses described in SAR Chapter 3.0 and confirmed that the code verification was acceptable for the thermal analysis in this amendment.

3.2 Material Properties and Component Specifications

The applicant presented the packaging components and the material properties (e.g., emissivity, conductivity, density, and diffusivity) in Chapter 3.0 safety analysis report for packaging (SARP). The staff reviewed the thermal properties of the materials used in the fabrication of the packaging components and the CBDC and agrees that the thermal properties used in normal conditions of transport and hypothetical accident condition thermal evaluations are appropriate.

3.3 Thermal Evaluation under Normal Conditions of Transport

The applicant stated in Chapter 3.0 of the SARP that two configurations (Configuration A and Configuration B) were analyzed for normal conditions of transport and Configuration B (without the upper cylinder) was found to be more limiting than Configuration A (with the upper cylinder) for the normal conditions of transport thermal analysis.

The staff reviewed Chapter 3.0 of the application and agrees that use of Configuration B is bounding for the normal conditions of transport thermal analysis because of its increased thermal resistance for transferring heat from the package to the ambient.

The applicant described the thermal model in Chapter 3.0 of the SARP. The model includes solar insolation, heat flux to the vertical surface of the S8G-P core barrel, and absorptivity/emissivity. The applicant stated, in Chapter 3.0 of the SARP, that (1) the maximum temperature of each component will not exceed its corresponding limit, (2) the package surface temperature remains below 122°F in the shade, as required by 10 CFR 71.43(g) for a non-exclusive use shipment, and (3) for the cold test, the minimum temperature of the package is assumed to be the minimum ambient temperature specified as -40°F in still air and in shade, and with no heat load.

The staff reviewed the thermal model and evaluation presented in Chapter 3.0 of the SARP and confirmed that (a) the maximum component temperatures remain below their corresponding limits under normal conditions of transport hot conditions and (b) there is no adverse operational effect under normal conditions of transport cold conditions of -40° in still and shade.

The applicant stated in Chapter 3.0 of the SARP that (a) the maximum normal operating pressure was calculated with contribution from the air pressure due to the condensable gases (water vapor) and the non-condensable gas pressure due to the thermal expansion in the core barrel assembly and CBDC; and (b) the increase in pressure due to hydrogen generation is excluded because the increase in volume due to hydrogen generation is negligible.

The staff reviewed Chapter 3.0 of the SARP and verified the calculation of maximum normal operating pressure. The staff confirmed that increase of the pressures as described above is adequately evaluated and shipment of the core barrel assembly and CBDC under normal conditions of transport meets the thermal requirements in 10 CFR 71.71.

3.4 Thermal Evaluation under Hypothetical Accident Conditions

The applicant stated in Chapter 3.0 of the SARP that the thermal model analysis used for the hypothetical accident conditions evaluation is the same model used in the previous application which was reviewed by the NRC. For the 30-minute fire transient, the temperatures from the normal conditions of transport thermal evaluation with no solar insolation were used as the initial temperatures for the hypothetical accident conditions fire test and then the heat absorbed by the PWR-2 package was calculated at a 1475°F fire source with an emissivity of 0.9 and with no convection for 30 minutes. For the post-fire cooldown, the heat emitted by the PWR-2 was calculated at 100°F ambient, minimum emissivity of PWR-2 surface and solar insolation.

However, as stated in the response dated February 25, 2019, to NRC's request for additional information, to account for (a) convection during the hypothetical accident conditions fire and (b) initial temperatures resulting from normal conditions of transport with solar insolation, the applicant performed the additional scoping thermal evaluation with the initial temperatures from the normal conditions of transport analysis (with solar insolation) and with the natural convection before, forced convection during, and natural convection after the 30-minute fire.

The staff reviewed the results of both the thermal model analysis and scoping thermal evaluation (which is the bounding thermal evaluation) and finds that the resulting internal pressures and the maximum temperatures of the S8G-P core barrel, CBDC and PWR-2 from the scoping thermal evaluation are still below their corresponding design temperature limits. The staff agrees that the applicant's hypothetical accident condition thermal evaluation based on the scoping thermal evaluation and confirms that shipment of the core barrel under hypothetical accident conditions meets the thermal requirements, in compliance with 10 CFR 71.73(c)(4).

3.5 Evaluation Findings

Based on review of statements and thermal evaluations in this proposed amendment, the staff determined that (a) the thermal design features of the PWR-2 loaded with an S8G-P core barrel in a CBDC remain appropriate for the conditions reviewed by the NRC and (b) the thermal evaluations of the PWR-2 package, conducted by the applicant, are discussed in sufficient detail for verification of package performance under normal conditions of transport and hypothetical accident conditions. The staff concludes that the PWR-2 containing an S8G-P core barrel in a CBDC meets the thermal requirements in 10 CFR Part 71.

4.0 CONTAINMENT EVALUATION

The applicant requested an amendment to the certificate for the PWR-2 for the inclusion of the S8G-P core barrel.

4.1 Description of the Containment System

Chapter 4 of the SARP describes that the CBDC, which is the containment boundary, employs an all welded containment system. The contents requiring containment include the irradiated S8G-P core barrel, Chalk River Unidentified Deposits (CRUD) that adhere to the core barrel surfaces, and CRUD that is deposited in the CBDC during shipment that in total is greater than a Type A quantity as shown in Table 4.2-2 of the SARP. The CBDC containment boundary is shown in Figure 4.1-1 of the SARP and includes the body cylinder, bottom plate, transition ring, upper cylinder, and closure cover.

The containment boundary penetrations include the top bore that is closed by a welded closure cover, and the CBDC bottom plate includes a legacy penetration that is sealed with a plug weld. Therefore the CBDC containment system is securely closed with a positive fastening device that cannot be opened unintentionally or by a pressure that may arise within the package.

The containment boundary welds are shown in Figure 4.1-1 of the SARP and summarized in Table 4.1-1 of the SARP that describes the weld locations, materials joints, weld thickness, weld type, drawing reference, and weld inspection requirements. There are no seals associated with the CBDC containment boundary.

4.2 General Considerations

Section 2.2.3 of the SARP provides an analysis and concludes that the hydrogen gas generation is negligible and therefore less than 5% by volume for a 1-year shipment time. In addition, the analysis in Section 2.2.3 of the SARP does not take credit for the catalyst.

4.3 Containment under Normal Conditions of Transport

The internal pressure during normal conditions of transportation was calculated and considers the partial pressure of non-condensable gases, potential generation of gases, vapor pressure, and temperature increase due to decay heat and solar load.

The radioactive source term that requires containment by the CBDC containment boundary is the particulate CRUD on the irradiated core barrel. First and foremost, Table 4.2-2 of the SARP shows that the CRUD is less than an A_2 quantity, even though the total package activity is greater than an A_2 quantity. The containment evaluation demonstrates that no radioactive material release will occur during normal conditions of transport based on the use of multiple pass welds for the CBDC, which undergo nondestructive examinations as summarized in Table 4.1-1 of the application. In addition, the quality control practices relative to material and welding specifications and qualifications are described in the application. There is also no reduction of the containment system effectiveness based on the structural performance for normal conditions of transport which is summarized in Table 4.2-1 of the SARP. Therefore, 10 CFR Part 71.51(a)(1) is met.

4.4 Containment under Hypothetical Accident Conditions

The internal pressure during hypothetical accident conditions was calculated and considers the partial pressure of non-condensable gases, potential generation of gases, vapor pressure, and temperature increase due to decay heat. The inclusion of the solar load as an initial condition, as well as external convection during hypothetical accident conditions increases the internal pressure and temperature; however, it does not affect the structural conclusions of the SARP.

The radioactive source term that requires containment by the CBDC containment boundary is the particulate CRUD on the irradiated core barrel. First and foremost, Table 4.2-2 of the SARP shows that the CRUD is less than an A_2 quantity, the SARP goes on to show that the potentially releasable quantity of CRUD during hypothetical accident conditions is even lower, and there is no releasable krypton-85 present in the package. The containment evaluation demonstrates that there is no degradation of the sealing capability of the containment system and no reduction of the containment system effectiveness as a result of hypothetical accident conditions tests which is supported by the results of the structural evaluation, summarized in Table 4.3-1 of the application. Therefore, 10 CFR Part 71.51(a)(2) is met.

4.5 Releasable Activity

While the contents are greater than a Type A quantity, the releasable activity is less than a Type A quantity, and is therefore the foremost and necessary reason the staff finds that 10 CFR Part 71.51(a)(1) and (2) are met for the S8G-P contents.

4.6 Conclusion

Based on its review of the statements and representations in the application, the staff concludes that the containment design has been adequately described and evaluated and that the package design meets the containment requirements of 10 CFR Part 71 for the S8G Prototype Advanced Fleet Reactor Core Barrel.

5.0 SHIELDING EVALUATION

The applicant requested an amendment to the certificate for the PWR-2 package. The change proposed related to the shielding evaluation is the inclusion of an S8G-P core barrel irradiated components within a new CBDC as authorized contents. The objective of this review is to verify that the PWR-2 package continues to meet the external radiation requirements of 10 CFR Part 71 under normal conditions of transport and hypothetical accident conditions with the new contents.

5.1 Description of Shielding Design

5.1.1 Design Features

The package consists of a cylindrical PWR-2 package. The contents are placed inside a CBDC which is placed within the PWR-2 package. The PWR-2 package is reused while the CBDC is buried with the contents for disposal. Items to be shipped in the package include large, irradiated reactor components (e.g., pressure vessels, core baskets, and core barrels).

5.1.2 Summary Tables of Maximum Radiation Levels

Maximum radiation levels allowed under 10 CFR Part 71 on contact with the package surface and at 2 m under normal conditions of transport are 200 mrem/hr and 10 mrem/hr, respectively. The maximum radiation level allowed in 10 CFR Part 71 for hypothetical accident conditions is 1000 mrem/hr at a distance of 1 meter from the package surface. The applicant summarized calculated radiation levels in Tables 5.1-2 and 5.1-3 in the SARP for normal conditions of transport and hypothetical accident conditions, respectively, and are below the limits listed above.

5.2 Radiation Source

5.2.1 Gamma Source

The contents of this package consist of activation sources and crud; therefore, the irradiation history will determine the magnitude of the source term. For activation sources, the applicant derived the three-dimensional source distribution from the lifetime average full power neutron flux distribution. The applicant used actual core power history, shown in Table 5.1-1 of the SARP, to accurately account for the neutron flux variation from axial power shifting during core life. The applicant's method accounts for the spatial variations in the neutron flux and the materials that become activated. Since the applicant applied an additional factor to the flux above and below the fuel region, staff finds the method acceptable as it over-predicts the activation of source materials. For the CRUD sources, the applicant based activity on: an empirical correlation between radiation level measurements on reactor coolant piping and CRUD deposition level; a conservative projected operating history from the time the applicant took measurements through the end of core life; an uncertainty factor; and an adjustment for decay time after shutdown. Staff finds the combination of actual measurements coupled with conservative assumptions for further activation and the uncertainty factor will conservatively over-predict the magnitude of the CRUD source.

5.2.2 Neutron Source

There is no significant neutron source from the new contents of this package.

5.3 Shielding Model

5.3.1 Configuration of Source and Shielding

The applicant modeled a stronger radiation source than would be loaded due to the conservative activation assumptions discussed in Section 5.2 of this SER. The applicant ignores the presence of material other than source material within the CBDC, which staff finds acceptable since removing material in the model will under-estimate shielding and over-predict dose rates. Under normal conditions of transport, the applicant models the source material configured as it is expected to be loaded in the package, which the staff finds acceptable. Under hypothetical accident conditions, the applicant modeled the source material shifted to the fullest extent possible within the CBDC cavity to maximize external dose rate. For the top and bottom drop for hypothetical accident conditions, the applicant reduces the thickness of the entire PWR-2 package to the depth of the puncture test. Staff finds this acceptable as it conservatively removes shielding material from the model over a larger area than would be affected by the puncture drop. For the side drop for hypothetical accident conditions, the applicant modeled two punctures at the axial peak source region and centered azimuthally in line with the core barrel nozzle opening. Staff finds this acceptable as both punctures are modeled simultaneously at locations of maximum source and major streaming paths.

5.3.2 Material Properties

Staff reviewed the material properties specified in the model and found them to be appropriate for the actual construction and contents of the package. A summary of mass and number densities used in the analysis is presented in Table 5.3-2 of the SARP.

The staff found the applicant described and/or provided drawings of sufficient detail for NRC staff to confirm the applicant's analysis for both normal conditions of transport and hypothetical accident conditions.

5.4 Shielding Evaluation

5.4.1 Methods

The applicant calculated the external radiation from the source using a point-kernel code and iron dose build-up factors. The staff determined these methods and the cross-section libraries used have been previously determined to be acceptable.

5.4.2 Input and Output Data

Due to the sensitive nature of the software, the staff did not perform a confirmatory analysis using the applicant's input data. However, the staff found the information in the SARP sufficient for assessing the expected dose results.

5.4.3 Flux-to-Dose-Rate Conversion

The applicant used gamma flux-to-dose conversion factors that are contained in the point-kernel code library. The applicant applied the neutron flux-to-dose conversion factors to the fluxes generated by the neutron transport code in addition to a conservative quality factor. Staff finds this acceptable as the conversion factors have been previously reviewed by staff and the conservative quality factor overestimates dose contribution. The applicant presents these factors in Table 5.4-1 of the SARP.

5.4.4 External Radiation Levels

The applicant applied an additional scaling factor to the external dose rates for normal conditions of transport, which are presented in Table 5.1-2 of the SARP. The applicant did not apply this additional factor to the hypothetical accident conditions dose rates in Table 5.1-3 of the SARP. Staff finds this acceptable as there is significant margin between the peak dose rates and the limits in 10 CFR Part 71.

5.5 Conclusion

Based on staff review of the methods, analyses, information presented in the application, and prior staff review, for the reasons discussed above, staff finds reasonable assurance that the shielding requirements of 10 CFR Part 71 will be met with the proposed contents and packaging design.

6.0 Criticality Evaluation

The package does not contain fissile material.

7.0 OPERATING PROCEDURES

In the application, Naval Reactors provided procedures that are specific to the S8G-P core barrel within its CBDC for preparing the package for loading, loading the contents, preparing the package for transport, and unloading the package.

The staff reviewed the Operating Procedures in Chapter 7 of the application to verify that the package will be operated in a manner that is consistent with its design evaluation. On the basis of its evaluation, the staff concludes that the combination of the engineered safety features and the operating procedures provide adequate measures and reasonable assurance for safe operation of the proposed design basis fuel in accordance with 10 CFR Part 71.

8.0 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

The applicant provided acceptance tests for the S8G-P core barrel in the PWR-2. The acceptance tests for the reusable PWR-2 outer container have not been changed by this amendment. The acceptance tests for the S8G-P in its CBDC include visual inspection and measurements; weld examination, structural test; and shielding tests. The tests ensure that the package is fabricated in accordance with the drawings. The pressure tests is performed to satisfy the requirements of 10 CFR 71.85(b), since the maximum normal operating pressure is greater than 5 psig. The test is a pressure drop test.

Since the S8G-P core barrel and its CBDC is for a one-time use, a maintenance program is not required.

CONDITIONS

The following changes have been made to the Certificate:

Condition 5.a was revised to delete the description of the D1G core barrel and add a description of the S8G-P core barrel and its CBDC.

Condition 5.b was revised to delete the D1G core barrel and add the S8G-P core barrel.

Condition 6 was revised to state the package must be operated, maintained and acceptance tested in accordance with the operating procedures, acceptance tests and maintenance program in the Naval Reactors letter G#C98-10723 dated February 13, 1998, as supplemented.

The “REFERENCES” section was revised to include the date of the letter requesting the amendment and its supplement.

CONCLUSION

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. 9791, Revision No. 10.