



Department of Energy  
National Nuclear Security Administration  
P.O. Box 5400  
Albuquerque, NM 87185



September 19, 2019

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
11555 Rockville Pike  
Rockville, MD 20852

Dear Sir:

This letter is in regard to Docket No. 71-9355, CoC No. 9355. The purpose of this letter is to submit the National Nuclear Security Administration's (NNSA) supplemental response to the Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI) for the Model 435-B Transport Package. The NRC's request was contained in the NRC letter from Norma Garcia-Santos to Ahmad M. Al-Daouk, subject: *Request for Additional Information for Review of the Certificate of Compliance No. 9355, Revision 3, for the Model 435-B Packaging (CoC No. 9355)*, dated May 3, 2019 and the email from Norma Garcia Santos of NRC to Chad Thompson of NNSA, Subject: Request for Information: Materials Evaluation, dated June 21, 2019. NNSA's responses are included in the enclosures.

Questions regarding this application may be addressed to Chad E. Thompson at 505-845-4114.

Sincerely,

Ahmad M. Al-Daouk  
NNSA Certifying Official  
Deputy Associate Administrator for Enterprise  
Stewardship

Enclosures:

1. *NNSA Response to NRC Request for Additional Information, Docket No. 71-9355, Model No. 435-B, SAR Revision 5* – 1 hardcopy
2. *435-B Transport Package Safety Analysis Report, Revision 5.1, September 2019* – 1 electronic copy
3. *Roadmap of Detailed Changes Made to the 435-B SAR from Rev. 5 to Rev. 5.1, September 2019* – 1 hardcopy

cc w/o enclosures:

W. Gordon, NA-LA  
S. M. Durham, NA-LA  
T. Taplin, NA-212  
C. Thompson, NA-531  
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September 5, 2019

**NNSA Response to NRC Request for Additional Information**

**Docket No. 71-9355**

**Model No. 435-B, SAR Revision 5**

By letter dated May 3, 2019, NRC requested additional information (RAI) regarding the 435-B package amendment, SAR Revision 5. A teleconference was held on June 17, 2019, to further discuss the RAIs. Added questions were supplied to NNSA by email on June 21, 2019. The RAIs with the corresponding responses are given below. These responses are implemented in SAR Revision 5.1 as appropriate.

**RAI-Co-1** Provide the following descriptions in the Model No. 435-B safety analysis report:

- a. standards used to certify personnel that develops and approves written leakage rate testing procedures;
- b. qualifications of personnel that develops and approves written leakage rate testing procedures;
- c. standards used to certify personnel that performs leakage rate testing; and
- d. qualifications of personnel that performs leakage rate testing.

Sections 7.4, 8.1.4, and 8.2.2 of the Model No. 435-B application include a description of leakage rate testing procedures. In these sections, the staff noted that the applicant does not mention the following regarding nondestructive testing (NDT) personnel:

1. if only personnel certified as an American Society for Nondestructive Testing (ASNT) Level III examiner for leakage testing shall develop and approve written leakage rate testing procedures, and;
2. if personnel performing leakage rate testing shall be qualified and certified in accordance with Recommended Practice No. SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing."

Please specify whether the written leakage rate testing procedures are developed, approved, and performed by qualified and certified NDT personnel for leakage testing in accordance with industry standards to ensure that the package is designed, constructed, and prepared for shipment to comply with the requirements in 10 CFR Part 71.

This information is needed to determine compliance with the requirements in 10 CFR 71.31(c), 71.51(a)(1), and 71.51(a)(2).

**RAI-Co-1 Response:** NNSA notes that both Chapter 7 and Chapter 8 of the 435-B SAR reference ANSI N14.5 – 2014, *Leakage Tests on Packages for Shipment*. Section 8.8 of this standard states in part:

*Leakage rate testing procedures shall be approved by personnel whose qualification and certification in the nondestructive method of leak testing includes certification by a*

*nationally recognized society at a level appropriate to the writing and/or review of leakage rate testing procedures.*

The phrase "...certification by a nationally recognized society..." implies certification to the standards of the American Society for Nondestructive Testing (ASNT), which is the only applicable nationally recognized society in this country. Similarly, "...at a level appropriate to the writing and/or review of leakage rate testing procedures" implies certification to Level III. Thus, the requirement in the SAR to follow ANSI N14.5 – 2014 includes the requirement that leakage rate testing procedures must be approved by personnel certified by ASNT as a Level III test technician.

Similarly, Section 8.8 of ANSI N14.5 – 2014 states in part:

*Leakage rate testing shall be performed by personnel that are qualified and certified in accordance with the requirements of [Reference 5], in Section 9.*

Reference 5 of ANSI N14.5 is ASNT Recommended Practice No. SNT-TC-1A. Thus, the requirement in the SAR to follow ANSI N14.5 – 2014 includes the requirement that leakage rate testing must be performed by personnel qualified and certified in accordance with ASNT SNT-TC-1A.

In summary, the answer to questions #1 and #2 above is: written leakage rate testing procedures for the 435-B package are developed, approved, and performed by qualified and certified NDT personnel for leakage testing in accordance with industry standards. For these reasons, no further detail, other than reference to ANSI N14.5 – 2014, is necessary in the text of the SAR.

**RAI-St-1** Provide a complete structural evaluation for the disposal canister.

The application presents one sentence in Section 2.7.1.7 in which the disposal canister is identified as similar to the LTSS (and IBL 437) for the purposes of lodgment design and evaluation, but no structural evaluation of the disposal canister, similar to the IBL 437 evaluation in Section 2.7.1.6.4, was presented by the applicant. Since the disposal canister was not tested, an evaluation should be performed demonstrating structural capacity and performance of the disposal canister.

This information is needed to ensure compliance with 10 CFR 1.73(c)(1).

**RAI-St-1 Response:** A new Section 2.7.1.6.5 has been added to include a structural evaluation of the disposal canister in the free drop event.

**RAI-OP-1** Use the correct term "vent port" instead of "lid port" in Items 17 and 18 of Section 7.1.5.2 of the application when describing the drying or evacuation of the Disposal Canister cavity.

Section 7.1.5.2, "Procedural Requirements," Item No. 17 describes that the Disposal Canister cavity is vacuum dried by connecting a vacuum pump and a shutoff valve to the lid port and evacuating the cavity until the internal pressure is 1-2 torr. Then, the vacuum pump is isolated from the canister cavity. Item No. 18 also describes the term lid port plug.

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The vent port and test port are located on the lid. Therefore, it is not clear if the lid port refers to the vent port or test port. The vent port is connected to the vacuum pump during the drying process of the Disposal Canister cavity. The applicant needs to use the term "vent port" instead of "lid port" to prevent an operator error when connecting the vacuum pump and shutoff valve to the vent port and ensure that the Disposal Canister cavity is properly dried.

This information is required to determine compliance with 10 CFR 71.33(a)(5)(iv) and 71.37(b).

**RAI-Op-1 Response:** As discussed during the above-referenced teleconference of June 17, 2019, NNSA used the term "vent port" in Section 1.2.1.6.2 of the SAR, and "lid port" for the same item in Section 7.1.5.2. This inconsistency caused the evident confusion. In fact, the disposal canister does not have a seal test port, and there is only one port in the lid, used for vacuum drying and for venting the cavity. To avoid confusion with the packaging's vent port, the word "vent" has been changed to "lid" in Section 1.2.1.6.2. All references to the port in the lid of the disposal canisters now use the term "lid port".

**RAI-Co-2**

Provide a description that the containment boundary sealing washer and vent port plug are tightened to an appropriate torque value prior to performing the pre-shipment leakage rate test. Include this information in Sections 7.1.2.1, 7.1.2.2, 7.1.2.3, and 7.1.2.4.2.

Section 7.1.2.3, "Loading the Disposal Canisters into the 435-B," step No. 27, and Section 7.1.2.4.2, "Loading the IBL 437 into the 435-B," step No. 30, of the application describe the pre-shipment leakage rate testing of the main containment O-ring seal and vent port sealing washer. Section 7.1.2.3, step No. 28, and Section 7.1.2.4.2, step No. 31, the applicant explains that the vent port plug is tightened to 48 - 60 inch-pound (in-lb) torque after the pre-shipment leakage rate test. However, the applicant did not include in the application's operating procedures chapter a step to describe the vent port plug is tightened to 48 - 60 in-lb torque prior to performing the pre-shipment leakage rate test.

The American National Standards Institute (ANSI) N14.5-2014, "American National Standard for Radioactive Materials - Leakage Tests on Packages for Shipment," describes that the purpose of the pre-shipment leakage rate test is to confirm that the containment system is properly assembled prior to shipment. Providing the vent port plug torque value in the operating procedures prior to performing the pre-shipment leakage rate test ensures the containment system is properly assembled.

To ensure consistency throughout the application, this concept also applies to the pre-shipment leakage rate tests and vent port plug torque value in Sections 7.1.2.1, "Loading the LTSS into the 435-B," and 7.1.2.2, "Loading the Inner Container (IC) into the 435-B," (which includes the new Hopewell Devices contents) of the application.

This information is needed to determine compliance with the requirements in 10 CFR 71.51(a)(1) and 71.51(a)(2).

**RAI-Co-2 Response:** To ensure proper testing of the vent port, the following changes have been made to Revision 5.1 of the SAR:

- a. For the case where helium leakage rate testing is performed in accordance with Section 8.2.2.2 of the SAR, Section 8.2.2.2, Step 2, has been changed to read:  
"Assemble the 435-B package with the two O-ring seals installed in the lower flange and the closure bolts tightened. Ensure the vent and seal test port plugs are installed with their associated sealing washers and tightened to 48 – 60 in-lb. Assembly information is given in Appendix 1.3.3, *Packaging General Arrangement Drawings*."
- b. For the case of the preshipment leakage rate test, Section 7.4.2, Step 1, has been changed to read:  
"Assemble a leakage rate test apparatus that consists of, at a minimum, the components illustrated in Figure 7.4-1, using a calibrated volume with a range of 6 – 31 cubic inches, and a calibrated pressure transducer with a minimum sensitivity of 100 millitorr. Connect the test apparatus to the test volume. NOTE: For leakage rate testing of the containment O-ring seal, connect to the seal test port, with the test port plug open. For testing of the vent port sealing washer, connect to the vent port, with the vent port sealing washer and vent port plug installed and tightened to 48 – 60 in-lb."
- c. The following Steps have been deleted:  
Section 7.1.2.1, Step 27,  
Section 7.1.2.2, Step 20,  
Section 7.1.2.3, Step 28,  
Section 7.1.2.4.2, Step 31.

**Requests for Additional Information sent by email from Norma Garcia Santos to Chad Thompson on June 21, 2019:**

1. Provide material, weld and NDE specifications for both the IBL 437 Type 1 and Type 2, Figures 2.7-10 through 2.7-13 of the SAR, payload canisters and source baskets including welding details/symbols.

The Model 435-B transport package SAR, Revision 5, does not provide drawings and/or figures with material and weld specification for the IBL 437 Type 1 and 2. Information similar to Figures 1.2-19 through 1.2-21 and Figures 2.7-3 and 2.7-9 of the SAR with added welding/NDE details is required. The application shall include a description of the proposed package components in sufficient detail to identify the package accurately and provide a sufficient basis for evaluation of the package.

This information is needed to determine compliance with 10 CFR 71.33.

**Response:** The IBL 437 is an obsolete irradiation device for which no referenceable drawings exist. Figures 2.7-10 through 2.7-13 were generated from measurements taken from two specimens of the IBL 437 that had been sawn in half. The materials of construction of the IBL 437 are carbon steel, stainless steel, and lead. It is not possible to identify the ASTM specification or grade of the material. No information is available to indicate the weld sizes or symbols, or the NDE applied to the finished weld.

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Recalling the design basis of the 435-B package, the safety demonstration for each content family or type is based on two evaluations showing that:

- a) The shielding of the payload or device is adequate to meet regulatory dose rates
- b) The retention of the source in the shielded position or within the shielded container is adequately secure to ensure the shielding is effective.

The structural details of the device or payload beyond these two evaluations have not been a part of the safety demonstration from the beginning because the devices or containers are large, structurally robust objects that are not subject to gross failure under moderate impact, and because the devices are supported by dunnage structures (the lodgments or the dunnage within the Inner Container) that distribute the impact loads on the device in a manner that will prevent gross deformations or puncture loading. Further information on devices is available to NRC in the registry of devices (SSDR numbers are given in the application).

2. Provide complete material/welding/NDE specifications including welding details/symbols for Figures 2.7-3 and 2.7-9 of the SAR, for canister, transport shield and source baskets.

Material specifications are required for the carbon steel shells and structural parts including the paint. Specifications are also required for the stainless steel (including type) for the internal sleeves, tubes or pipes. Welding/NDE specifications/requirements are required. The application shall include a description of the proposed package components in sufficient detail to identify the package accurately and provide a sufficient basis for evaluation of the package.

This information is needed to determine compliance with 10 CFR 71.33.

**Response:** As discussed in the response to Question 1 above, provision of the welding or NDE details for the Hopewell devices is not necessary in order to demonstrate the safety of transporting these devices in the 435-B, considering the design basis and the safety demonstration of the package.

3. Provide welding/NDE specifications/requirements for Figures 1.2-19 through 1.2-21, including welding details/symbols.

Welding/NDE specifications/requirements are required. The application shall include a description of the proposed package components in sufficient detail to identify the package accurately and provide a sufficient basis for evaluation of the package.

This information is needed to determine compliance with 10 CFR 71.33.

**Response:** As discussed in the response to Question 1 above, provision of the welding or NDE details for the disposal canisters is not necessary in order to demonstrate the safety of transporting these devices in the 435-B, considering the design basis and the safety demonstration of the package.

## Roadmap of Detailed Changes Made to the 435-B SAR from Rev. 5 to Rev. 5.1

The table below identifies and summarizes the changes made to the 435-B SAR, Revision 5, to create Revision 5.1. Revision 5.1 has been created to implement the responses to NRC RAIs on Revision 5. The location and discussion of all changes are provided in the table. All changes are marked in the SAR text with revision bars.

Section Reference	Change	Comment
Section 1.2.1.6.2	Change 'vent' to 'lid'.	Response to RAI-OP-1.
Section 1.2	Correct the stated quantity of lid bolts for the light disposal canister in Figure 1.2-21 from 8 to 12	Correction of typographical error. Not a design change.
Section 2.7.1.6.5	Added section.	Response to RAI-St-1.
Section 2.12.1	Added reference #34.	Response to RAI-St-1.
Section 5.5.5	Correct the stated quantity of lid bolts for the light disposal canister in Figure 5.5.5-4 from 8 to 12	Correction of typographical error. Not a design change.
Section 7.4.2	Revised Step #1.	Response to RAI-Co-2.
Section 7.1.2.1, Step 27 Section 7.1.2.2, Step 20 Section 7.1.2.3, Step 28 Section 7.1.2.4.2, Step 31.	These steps are deleted.	Response to RAI-Co-2.
Section 8.2.2.2	Revised Step #2.	Response to RAI-Co-2.