Safety Evaluation Report for the SAFESHIELD 2999A Package Docket 99-7-9519, SARP 2999A, Revision 5, October 17, 2011

Docket No. 10-50-9519

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Summary

By a letter from R.O. Murphy to James M. Shuler, dated November 17, 2011, the National Nuclear Security Administration (NNSA), Los Alamos Site Office submitted to the U.S. Department of Energy (DOE) Packaging Certification Program (PCP), Office of Packaging and Transportation, an application request[1] to update the 9519 Safety Analysis Report for Packaging[2] (SARP) for SAFESHIELD 2999A Type B Container from Revision 4 to Revision 5. This revision was submitted to incorporate Product Deviation Request (PDR) 275, which was previously approved by the DOE Headquarters Certifying Official. This Safety Evaluation Report (SER) addresses the update from SARP Revision 4 to Revision 5.

The essential change in the approved PDR 275 as incorporated in Revision 5 of the SARP is for the Cavity Liner to be machined from a solid billet of material rather than being manufactured from two pieces that are then welded together. Use of welding resulted in distortion of the cavity liner in the production models. The principal engineering justification for accepting the Cavity Liner machined from a solid billet is that there is no change in the materials or dimensions of the Cavity Liner. The finished dimensions and material properties are the same for the machined Cavity Liner as for the welded Cavity Liner but without any distortion.

On the basis of the statements and representations in the November 17, 2011, letter; Revision 5 of the SARP dated October 17, 2011; and DOE PCP staff's confirmatory evaluation as summarized in this SER; DOE PCP finds Revision 5 of the SARP acceptable and that the SARP has adequately incorporated the information from PDR 275. The requirements in the current Certificate of Compliance[3] (CoC) will remain in effect for Revision 5 of the SARP. DOE PCP concluded that an additional condition of approval needed to be added to Revision 3 of the CoC as follows:

"All production Cavity Liner units shall be machined from a solid billet of material."

1. GENERAL INFORMATION AND DRAWINGS

Detailed packaging descriptions, drawings, and contents can be found in the SARP. The components of the packaging containment vessel include a cavity liner with an integral top flange, a closure flange, and O-rings. The body assembly consists of a base plate, a body shell, lead shielding, and a lifting plate.

The revised packaging design for Cavity Liner units machined from a solid billet of material is defined by the following Croft Associates Ltd. drawing lists, which in turn identify the individual design drawings:

DL-1C-4540, Sheet 1/1, Issue G	Drawing List for Packaging Design No. 2999A
DL-0C-4490, Sheet 1/3, Issue G	Drawing list for Flask Design No. 2993
DL-0C-4490, Sheet 2/3, Issue F	Drawing list for Flask Design No. 2993
DL-0C-4490, Sheet 3/3, Issue E	Drawing list for Flask Design No. 2993

The following drawing changes were made in Revision 5 of the SARP to reflect the Cavity Liner units machined from a solid billet of material as defined in the above drawing lists:

Drawing Number	Action Taken
1C-4540 Revision E	Revision D replaced with Revision E
0C-4490 Revision F	Revision E replaced with Revision F
2C-4492 Revision D	Drawing removed from SARP
0C-4493 Revision F	Revision E replaced with Revision F
2C-4499 Revision D	Drawing removed from SARP
2C-4500 Revision D	Drawing removed from SARP
1C-5818 Revision A	Drawing added to SARP

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which includes only the inclusion of the previously approved PDR 275 information, DOE PCP finds that there are no new general information/drawing related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

2. STRUCTURAL

The essential change in the approved PDR 275 as incorporated in Revision 5 of the SARP is for a one-piece Cavity Liner to be machined from a solid billet of material rather than being manufactured from two pieces that are then welded together. The principal engineering justification for accepting the one-piece Cavity Liner machined from a solid billet is that there is no change in the materials or dimensions of the Cavity Liner. The finished dimensions and material properties are the same as for the welded Cavity Liner.

In addition, the wall thickness is specified as 5 mm, and this full thickness is guaranteed by machining from a solid billet. No new machining techniques are involved. The one-piece Cavity Liner is machined from a single solid billet in the same way that the Top Flange and the Cavity Liner are machined from two solid billets. The leak testing and annealing (stress relieving) are the same for the one-piece Cavity Liner as was done for the two-piece welded Cavity Liner.

Prior to beginning work on the billet, a slice will be taken from each end of the billet and checked for piping (axial cracking) by helium leak testing. This is done to reduce manufacturing risk and increase confidence that the finished component will not have an axial leak. This is a

prudent practice but not a requirement, because any leaks would be discovered at final leak testing.

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which only includes the previously approved PDR 275 information, DOE PCP finds that there are no new structural related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

3. THERMAL

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which only includes the previously approved PDR 275 information, DOE PCP finds that there are no new thermal related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

4. CONTAINMENT

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which only includes the previously approved PDR 275 information, DOE PCP finds that there are no new containment related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

5. SHIELDING

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which only includes the previously approved PDR 275 information, DOE PCP finds that there are no new shielding related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

6. CRITICALITY

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which only includes the previously approved PDR 275 information, DOE PCP finds that there are no new criticality related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

7. OPERATIONS

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which only includes the previously approved PDR 275 information, DOE PCP finds that there are no new operations related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

8. ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which only includes the previously approved PDR 275 information, DOE PCP finds that there are no new acceptance tests and maintenance program related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

9. QUALITY ASSURANCE

On the basis of the review of the information presented in the request to update the SARP to Revision 5, which only includes the previously approved PDR 275 information, DOE PCP finds that there are no new quality assurance related issues that need to be addressed relative to this request. DOE PCP also concludes that Revision 5 of the SARP is acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71, 49 CFR Part 173, and DOE Order 460.1C have been met.

References

1. Letter request to update the 9519 Safety Analysis Report for Packaging (SARP) for SAFESHIELD 2999A Type B Container From Revision 4 to Revision 5 submitted to Dr. James M. Shuler, Environmental Management, by the National Nuclear Security Administration (NNSA), Los Alamos Site Office (November 17, 2011).

2. Safety Analysis Report for Packaging, SAFESHIELD 2999A Revision 5, Package Docket 99-7-9519 October 17, 2011.

3 U.S. Department of Energy Certificate of Compliance, USA/9519/B(U)-96 (DOE), Revision 0, Certificate Number 9519, issued October 12, 2005, expiration date of October 31, 2010.