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DOE Packaging Certification Program

Safety Evaluation Report for Request to Amend Certificate of Compliance Number 9979 to Authorize Resetting the Shipping Periods of Condition 9 of the Certificate Based on the Results of Leak Detection or Sample Analysis of Hydrogen Gas Concentration in the 30-Gallon Drum

Docket No. 19-50-9979

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This Safety Evaluation Report (SER) documents the U.S. Department of Energy (DOE) Packaging Certification Program (PCP) independent technical review of the application and supplements submitted for the Savannah River Operations Office (SR) by the Savannah River National Laboratory (SRNL) to amend DOE Certificate of Compliance (CoC) Number 9979 to authorize resetting the authorized shipping period for packages loaded with CoC Tables 2 or 4 contents, based on leak detection or sample analysis of the hydrogen gas concentration in the 30-gallon drum head space.

Evaluation

By letter dated April 5, 2019, [1] as supplemented August 28, 2019 [2], SRNL prepared and submitted an application for SR to DOE PCP to amend DOE CoC 9979 to authorize a procedure for measuring hydrogen gas concentration in the 30-gallon drum head space and resetting the shipping period for Condition 5(d)(9) of the CoC for Tables 2 and 4 contents when the measured hydrogen gas concentration is no greater than 0.25% by volume.

There were no changes to the package design or authorized contents to implement this change to package operations; however, the applicant made the following page-changes [3] to supplement the Safety Analysis Report for Packaging (SARP).[4]

- SARP Chapter 3 - page 3-20 revised to add supporting text in Section 3.3.2 and page 3-32 revised to add the Los Alamos National Laboratory (LANL) report [5] of field measurements and sample results of five packages to the list of references in reference Section 3.6; and
- SARP Chapter 7 - page 7-12 revised to add Section 7.4.4 to implement the procedure for measuring hydrogen gas concentration and page 7-13 revised to add the LANL report to the list of reference in Section 7.6.

The applicant also included a chapter-by-chapter SARP evaluation in the body of the application letter of the impact of the proposed changes.

LANL sampled 5 of 68 packages. These packages were loaded with solid, non-combustible, low-level waste (CoC Table 2) packed in convenience cans, and were in storage at LANL for at least 13 months prior to sampling. Gas chromatography results of the hydrogen gas concentration of these samples drums by ranged from 3 parts-per-million (ppm) hydrogen (0.0003% by volume) to 542 ppm hydrogen (0.05% by volume).

PCP staff concurs that the LANL field measurements and sample results provide an adequate basis for resetting the shipping period in Condition 5(d)(9) of the CoC when the results of probing the 30-gallon drum with a portable hydrogen leak detector or using a syringe-type sampler to collect samples of the headspace gas for analysis using gas chromatography, to demonstrate the concentration of hydrogen in the 30-gallon drum does not exceed 0.25% by volume. The 0.25% by volume limit for resetting the shipping period by measurement is consistent with the analysis [6] that supports resetting shipping period by the diffusion or purging methods described in the operations procedures in Section 7.4.3 of the SARP.

Based on the statements and references in the applicant's chapter-by-chapter evaluation, SARP Rev. 5 page changes to Chapters 3 and 7, and PCP staff's confirmatory evaluation, staff finds the operating procedure described in Section 7.4.4 acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71 have been met.

Condition of Approval

The 9979 certificate revision was changed from Revision 14 to Revision 15, with the following changes:

- 5.(d) Condition 9 was revised to add "… The shipping period may be reset by the detection or sampling methods described in the operations procedures in Section 7.4.4 of the SARP, as supplemented.
- 5.(d) Condition 14, was revised to "… Revision 14 of this certificate may be used until September 30, 2020."
- Supplement 5.(e)(20) was added to "*Safety Analysis Report for Packaging – Model 9979 Type AF-96*, S-SARP-G-00006, Revision 5, Pages-changes: 3-20, 3-32, 7-12, and 7-13, April 5, 2019."
- Supplement 5.(e)(21) was added to "*Safety Analysis Report for Packaging – Model 9979 Type AF-96*, S-SARP-G-00006, Revision 5, Page-change: 7-12, August 28, 2019."

Conclusion

Based on the statements and representations in the application, as supplemented, and PCP staff's confirmatory evaluation, staff finds the operating procedures in Section 7.4.4 for resetting the shipping period for acceptable, and will provide reasonable assurance that the regulatory requirements of 10 CFR Part 71 have been met.

References

[1] *Application for 9979 Package CoC Amendment: 30-Gallon Drum Hydrogen Gas Measurement and Sampling,* SRNL-L4500-2019-00016, Rev. 0*,* Letter from Robert Watkins to James Shuler, April 5, 2019, with enclosures (9979_C3_Rev5_p3-20.pdf, 9979_C3_Rev5_p3-32.pdf, 9979_C7_Rev5_p7-12.pdf, and 9979_C7_Rev5_p7-13.pdf).

[2] *Revised 9979 SARP Page Change Addressing Docket 19-50-9979*, SRNL-L4500-2019-00036, Rev. 0, August 28, 2019, Letter from Robert Watkins to James Shuler, August 28, 2019, with enclosure (9979_C7_Rev5_p7-12.pdf).

[3] *Safety Analysis Report – 9979 Type AF Packaging,* S-SARP-G-00006*,* Revision 5, Page-changes: 3-20, 3-23, 7-12, and 7-13, April 5, 2019, and Page-change 7-12, August 28, 2019.

[4] *Safety Analysis Report – 9979 Type AF Packaging,* S-SARP-G-00006, S-SARP-G-00006, Revision 4, March 2015, as supplemented.

[5] *Hydrogen Gas Concentration in Model 9979 Type AF Containers at Los Alamos National Laboratory*, S. B. French, LA-CP-18-20604, Revision 0, September 2018.

[6] *Hydrogen Concentration Reduction in a 30 Gallon Drum*, M-CLC-A-00654, Revision 0, December 12, 2018.