



CONVERSATION RECORD

April 4, 2016

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU

See below.

DATE OF CONTACT

03/30/2016

TYPE OF CONVERSATION

☐ E-MAIL☒ TELEPHONE☐ INCOMING☒ OUTGOING

E-MAIL ADDRESS

TELEPHONE NUMBER

(888) 447-9153

ORGANIZATION

Croft Associates Limited and Missouri University Research
Reactor (MURR)

DOCKET NUMBER(S)

71-9338

LICENSE NUMBER(S)

CONTROL NUMBER(S)

SUBJECT

Additional Information Request Teleconference

SUMMARY

NRC participants: Chris Allen, Dan Forsyth, Jorge Solis, Antonio Rigato, Caylee Kenny and Steve Ruffin

Croft participants: Sarah Bryson and Robert Vaughn

MURR participants: Michael Flagg, Jacqueline Cox, Amber Gaddy and John Ernst

Prior to the call, the attached requests for additional information (RAIs) were provided to the applicant. RAIs 1.1, 1.2 and 3.1. were not discussed as these RAIs were fully understood by the applicant. For RAI 3.2, the applicant asked if staff wanted instantaneous properties or a model in response to the RAI. When staff clarified that additional calculations were being requested, the applicant asked if examples of previous calculations could be provided since other packages had been authorized to carry liquid iodine-131 in similar quantities to the amount requested in this amendment. Unfortunately, staff could not point to similar calculations to assist the applicant. In discussing RAI 3.3, the applicant stated they assumed all beta particle energy was deposited in the liquid and that the gamma decay energy deposited in the liquid was determined using a Monte Carlo computer code output in their calculations. Staff expressed appreciation for this information and requested this information be provided in the applicant's response.

The applicant explained for RAI 4.1 that, in determining the new O-ring groove dimensions, they had performed calculations for the

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ACTION REQUIRED (IF ANY)

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NAME OF PERSON DOCUMENTING CONVERSATION

Chris Allen

SIGNATURE

William C. Allen

CONVERSATION RECORD (continued)

SUMMARY: (Continued from page 1)

new O-ring groove radii and depth using manufacturer's data as a starting point, and asked if these calculations were being requested by staff. Staff responded that all the information mentioned by the applicant in discussing the RAI would be sufficient to address the RAI. There was no discussion of RAI 4.2; therefore, the applicant proceeded to provide background information relevant to the shielding RAI. Staff thanked the applicant for this clarifying information and requested it be included in the RAI response.

Although the applicant had no questions regarding RAI 7.1, the regulatory citation was questioned. Since staff did not have a copy of the regulations at that moment, staff committed to reviewing the applicability of the regulatory citation, and communicating with the applicant their findings at a later date. Relevant to RAI 8.1, the applicant committed to providing additional details to assist users in identifying when damaged keg studs needed to be replaced, and staff indicated such information could be included either on the drawings or in the Chapter 8 text.

After updating the applicant on the status of the RAI letter, the phone call ended at approximately 11:30 A.M. eastern standard time.

Request for Additional Information
Docket No. 71-9338
Model No. 3977A Package

By application, dated December 14, 2015 (ADAMS accession number ML15351A324), Croft Associates Limited submitted an application for amendment of Certificate of Compliance No. 9338 for the Model No. 3977A package. This RAI letter identifies information needed by staff in connection with its review of the application.

Each individual RAI describes information needed by the NRC staff to complete its review of the application to determine whether the applicant has demonstrated compliance with the regulatory requirements.

Drawing Review

- 1.1 Revise Drawing No. 2C-6176 as necessary to identify under what conditions the PTFE liner is optional.

Although Note 3 on Drawing No. 2C-6176 states that the PTFE liner is optional, the safety analysis report (SAR) change pages provided with the application do not identify instances where the stainless steel liner is used without the PTFE liner. In addition, in reviewing historical documents associated with this package, staff determined that the applicant previously addressed this question during the initial issuance of Certificate of Compliance No. 9338 and stated "...[t]he liner shall be used for all contents types carried in the stainless steel insert..." (ADAMS accession number ML13114A172).

This information is necessary to satisfy the requirements in 10 CFR 71.33(a)(5).

General Information Review

- 1.2 Identify the correct mass of the stainless steel insert.

Table 1-3-5 states the stainless steel insert mass is 730 g and Table 1-1 states the stainless steel insert mass is 1451 g.

This information is necessary to satisfy the requirements in 10 CFR 71.33(a)(5).

Thermal Review

- 3.1 Review all units to ensure that they are correct for the parameters they represent and revise as necessary.

Page 3-15 of the Safety Analysis Report (SAR) in a free volume of 216.4°C along with heating of the gases on loading this would lead to a MNOP of 2.23 bara. The units used for both volume and pressure are incorrect. The staff needs to verify that adequate units are used for the parameters they represent.

This information is needed to determine compliance with 10 CFR 71.71.

- 3.2 Provide detailed calculations, as well as all assumptions used in these calculations, which demonstrate that the heating from hydrogen ignition is negligible.

Page 3-15a of the SAR states that the heating created by ignition of all of the hydrogen generated over 28 days would be negligible compared to the heating of the package by the decay of I-131. However, the assumed initial temperature and pressure of both the containment vessel and associated contents are not provided. In order to assess both the accuracy of this statement and the adequacy of the containment system if hydrogen ignition occurred, staff needs to review the detailed calculations and all assumptions which substantiate this statement. Identify the maximum temperature and pressure of the containment vessel and associated contents due to hydrogen ignition with the detailed calculations.

This information is needed to determine compliance with 10 CFR 71.71.

- 3.3 Identify the gamma energy used in the hydrogen generation analysis and prove it bounds all expected values.

Page 10 of 13 of the Hydrogen Generation Analysis – MURR Technical Note states that I-131 decays emitting beta particles with an average energy of 0.19 MeV and gammas with an average energy of 0.364 MeV. However, it appears the gamma energy value used in the analysis is the most likely gamma energy and not necessarily the average. If the average gamma energy is higher than the value used in the analysis, the hydrogen generation rate could be under predicted.

This information is needed to determine compliance with 10 CFR 71.71.

Containment Review

- 4.1 Provide the basis for the new O-ring groove dimensions.

The staff needs to verify the acceptability of the proposed containment system relaxed O-ring groove dimensions; therefore, the applicant should provide the basis for their choice of new O-ring groove dimensions, e.g.; manufacturer data sheets.

This information is needed to determine compliance with 10 CFR 71.33(a)(5).

- 4.2 Clarify the material used for the containment vessel O-ring and justify removal of the O-ring test from Section 2.3.2 of the SAR.

The applicant proposes to remove an O-ring test from page 2-25 of the SAR because, as the applicant states on page five of "SAR Update Matrix for Addition of Liquid I-131" (ADAMS Accession No. ML15351A333), the O-ring material was changed during the original application and this test should have been removed. The applicant states they are correcting this error. However, Drawing 1C-5944, Issue C, identifies the containment seal material as Fluoroelastomer (Base material Viton GLT) while page 2-19 of SAR Revision 5 states that the containment seal material is Ethylene Propylene Rubber. Consequently, the staff needs clarification on the containment seal material and the basis for the removal of the O-ring test in Section 2.3.2 of the SAR.

This information is needed to determine compliance with 10 CFR 71.33(a)(5).

Shielding Review

- 5.1 Clearly identify the location of maximum dose rate resulting from the 3D Monte Carlo evaluations and the correlating Microshield evaluation.

The values in Table 5-6 do not correspond to the expected thicknesses shown in the drawings in reference AMEC/SF6652/001 even if the evaluation were to be at a point on the outer radial surface of the package at the same elevation of the point source. Therefore, it is not clear that the slab thicknesses used in the Microshield evaluation correspond to the location of maximum dose rate, described as "just above the top steel annulus" in reference AMEC/CRM37327/TN_001. This location is at an elevation above the containment vessel, and both Rev. 5 and Rev. 6 of the SAR state that Microshield calculations were only run at the location of highest dose. The application also states that the Microshield evaluation used nominal thicknesses. However, it is not clear if the Microshield evaluation occurred in either the radial direction from the point source, the vertical direction from the point source, or if another path was used to determine the slab thickness in the Microshield evaluation.

This information is required to determine compliance with 10 CFR 71.47.

Operations Review

- 7.1 Identify how flammable and combustible gases will be purged from the containment vessel prior to content removal.

The hydrogen gas generation analysis report submitted in support of the application postulates that hydrogen gas could escape from the product container into the containment vessel. Therefore, if a flammable and combustible atmosphere exists inside the containment vessel and does not ignite during transit, the unloading procedures need to address how the package recipient will safely remove the contents.

This information is needed to ensure compliance with 10 CFR 71.87(f).

Maintenance Review

- 8.1 Clarify when damaged keg closure studs (Item 16 on the Bill of Materials) and hardware (nuts and washers) will be replaced.

Section 8.2.3.2 indicates that damaged keg closure studs will be replaced according to drawing 0C-5942. However, it is unclear from this drawing and Section 8.2.3.2 what procedure or criteria will be invoked for stud and/or hardware replacement.

This information is needed to determine compliance with 10 CFR 71.87(b).