



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

May 29, 2018

Mr. Dan Tallman  
Manager, Rancho Seco Assets  
Sacramento Municipal Utility District  
Rancho Seco Nuclear Generating Station  
14440 Twin Cities Road  
Herald, CA 95638-9799

SUBJECT: REQUEST FOR SUPPLEMENTAL INFORMATION FOR ACCEPTANCE REVIEW OF THE APPLICATION FOR RENEWAL OF THE RANCHO SECO INDEPENDENT SPENT FUEL STORAGE INSTALLATION LICENSE NO. SNM-2510 (CAC/EPID NOS. 001028/L-2018-RNW-0005; 000993/L-2018-LNE-0004)

Dear Mr. Tallman:

By letter dated March 19, 2018, the Sacramento Municipal Utility District (SMUD) submitted an application for renewal of the Rancho Seco Independent Spent Fuel Storage Installation, License No. SNM-2510 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18101A024). The submittal of the license renewal application was timely per the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 72.42(b) and (c). In an email dated, April 12, 2018, I acknowledged receipt of your application and informed you of the NRC staff's acceptance review (ADAMS Accession No. ML18108A052).

The purpose of this letter is to provide the results of the NRC staff's acceptance review of this license renewal application. The staff used the following regulatory documents to perform its acceptance review:

- Spent Fuel Storage and Transportation Office Instruction – 14 (SFST – 14), "Acceptance Review Process," (ADAMS Accession No. ML101130519)
- NUREG - 1927, Revision 1, "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel" (ADAMS Accession No. ML16179A148)

The NRC staff has reviewed your application and concluded that it did not provide technical information in sufficient detail to enable the NRC staff to begin a detailed review and make an independent assessment regarding the acceptability of the proposed system in terms of regulatory requirements, and the protection of public health and safety, and the environment.

The NRC staff has determined that we need the information identified in the enclosed request for supplemental information (RSI); observations are also provided. As defined in SFST – 14, "observations" include questions (identified by the NRC staff during the acceptance review), which do not rise to the level of an RSI that needs to be resolved before the requested licensing action could be accepted for review, but may require NRC staff to issue a request for additional information (RAI) during the detailed technical review. SMUD may respond to the observations

in response to the RSIs to avoid the need for a RAI on the questions during the staff's detailed technical review.

We request that you provide this information by June 25, 2018. Inform us at your earliest convenience, but no later than June 11, 2018, if you are not able to provide the information by that date. This letter also confirms our phone call on May 23, 2018, with respect to the supplemental information needed and the date for your submittal.

If you have any questions regarding this matter, please contact me at (301) 415-7213 or Wendy.Reed@nrc.gov.

Sincerely,

**/RA/**

Wendy A. Reed, Ph.D., Chemist  
Renewals and Materials Branch  
Division of Spent Fuel Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 72-11  
License No.: SNM-2510  
CAC/EPID Nos.: 001028/L-2018-RNW-0005;  
000993/L-2018-LNE-0004

Enclosure:  
RSI and Observations

cc: Rancho Seco ISFSI Service List

Rancho Seco ISFSI Service List

cc:

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SUBJECT: REQUEST FOR SUPPLEMENTAL INFORMATION FOR ACCEPTANCE REVIEW OF THE APPLICATION FOR RENEWAL OF THE RANCHO SECO INDEPENDENT SPENT FUEL STORAGE INSTALLATION LICENSE NO. SNM-2510 (CAC/EPID NOS. 001028/L-2018-RNW-0005; 000993/L-2018-LNE-0004), DOCUMENT DATE: MAY 29, 2018

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**ADAMS Accession No.: ML18150A086**

<b>OFC</b>	NMSS/DSFM/RMB	NMSS/DSFM/RMB	NMSS/DSFM/SFLB	NMSS/DSFM/RMB
<b>NAME</b>	WReed	DDunn via email	WWheatley via email	HGonzalez
<b>DATE</b>	05/25/18	05/25/18	05/25/18	05/29/18

Request for Supplemental Information and Observations  
Sacramento Municipal Utility District (SMUD)  
Docket No. 72-11  
License No. SNM-2510  
License Renewal

This RSI identifies further information needed by the NRC staff to complete its acceptance review of the renewal application. NUREG-1927, Revision 1, "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel" and Spent Fuel Storage and Transportation Office Instruction – 14 (SFST – 14), "Acceptance Review Process," were used by the staff in its review of the application.

Each individual RSI describes information needed by the staff for it to begin a detailed review of the application and to determine whether the applicant has demonstrated compliance with the regulatory requirements.

**RSI-1.** Provide supplemental information that describes the scoping evaluation and, if necessary, aging management review results for the greater than class C (GTCC) waste (i.e., the contents) stored at the Rancho Seco Independent Spent Fuel Storage Installation (ISFSI). Table 2-1 of the renewal application does not address the GTCC waste and Chapter 3 of the application does not include aging management review results for the GTCC waste.

The staff needs this information to proceed with its review to determine if the Rancho Seco ISFSI license renewal application meets the regulatory requirements of 10 CFR 72.42(a) and (b).

**RSI-2.** Provide the susceptibility evaluation, Calculation 502917-AMR03, Revision 0, Rancho Seco ISFSI Site Chloride-Induced Stress Corrosion Cracking Susceptibility Ranking [3-63] referenced in Application Section 3.4.4.2 Discussion of Aging Mechanisms. The Rancho Seco ISFSI Pre-Application Inspection Conclusions states:

*The Rancho Seco ISFSI site is a fundamentally benign environment for potential degradation of metal and concrete since it is not near a source of salt water, or operating cooling towers.*

*A susceptibility evaluation, Calculation 502917-AMR03, Revision 0, "Rancho Seco ISFSI Site Chloride-Induced Stress Corrosion Cracking Susceptibility Ranking" [3-63], has been performed for the Rancho Seco ISFSI in accordance with the methodology described in EPRI Report 3002005371, Susceptibility Assessment Criteria for Chloride-Induced Stress Corrosion Cracking (CISCC) of Welded Stainless Steel Canisters for Dry Cask Storage Systems [3-62] to determine the CISCC susceptibility ranking at the Rancho Seco site...*

*Based on the results of the susceptibility evaluation [3-63], the potential for CISCC on the external surface of the Rancho Seco DSC shell assembly is minimal. Therefore, cracking due to CISCC is an aging effect that does not require management.*

The staff note that based on aerial images/maps and Application Figure E-2 Rancho Seco Owner-Controlled Area and maps of the area, the Rancho Seco ISFSI is less than 1000 meters from the cooling towers of the Cosumnes power plant. According to EPRI's Susceptibility Assessment Criteria for Chloride-Induced Stress Corrosion Cracking (CISCC) of Welded

Stainless Steel Canisters for Dry Cask Storage Systems, cooling towers within 1000 meters of an ISFSI should be considered in the potential for CISCC.

It is not clear from the information provided in the renewal application how, or if, the cooling towers of the Cosumnes power plant were considered in the CISCC susceptibility assessment.

The staff needs this information to proceed with its review to determine if the Rancho Seco ISFSI license renewal application meets the regulatory requirements of 10 CFR 72.42(a) and (b).

**RSI-3.** Provide AREVA TN Calculation 502917-0501 Rancho Seco License Renewal Combustible Gas Generation Analysis, Rev 0, [A-9] referenced in Application Section A.2.4 Combustible Gas Generation. This analysis was performed to determine the amount of combustible gases generated as a result of irradiation of neutron shield material for the MP187 TC during its function as a TC during the assumed transport scenario at the Rancho Seco ISFSI site.

In addition, provide supplemental information, as required, to support the assessment in Application Sections 3.7.5.2 Supplemental Evaluation - Combustible Gas Generation and A.2.4 Combustible Gas Generation is statistically insignificant. The analysis concludes that:

*...the very small fractional loss of hydrogen will have an insignificant impact on the ability of the TC neutron shield material to perform its design shielding function over the Period of Extended Operations (PEO).*

The information provided in this assessment addresses the loss of hydrogen from the neutron absorber material and does not address the potential for an accumulation of combustible gasses.

The staff needs this information to proceed with its review to determine if the Rancho Seco ISFSI license renewal application meets the regulatory requirements of 10 CFR 72.42(a) and (b).

**RSI-4.** Provide the following calculations/analyses:

1. AREVA TN Calculation 502917-0201 Rancho Seco License Renewal Dry Storage Canister (DSC) Thermal Fatigue Analysis, Rev. 1, [A-7] identified in Application Section A.2.1 Fatigue Analysis of the NUHOMS® DSC Shell Assembly. This Calculation includes the evaluation of the effects of cyclic loading (fatigue) for 60 years on the mechanical properties of the Dry Shielded Canister (DSC per Rancho Seco ISFSI License Renewal Application Acronym List page xi) shell assembly for the Rancho Seco ISFSI.
2. AREVA TN Calculation 502917-0200 Rancho Seco License Renewal MP187 Multi-Purpose Cask Thermal Fatigue Analysis, Rev. 0, [A-6] referenced in Application Section A.2.2 Fatigue Analysis of the NUHOMS® MP187 Transfer Cask (MP187 TC). This calculation evaluated the integrity of the MP187 TC due to fatigue loading.
3. AREVA TN Calculation 502917-0500 Rancho Seco License Renewal Boron Depletion and Fluence Analysis, Rev. 0, [A-8] referenced in Application Section A.2.3 Boron Depletion, Gamma Irradiation, and Neutron Fluence Analysis. This calculation was conducted to determine the amount of boron depletion of the poison plate material for

the Fuel Only (FO) and Fuel with Control Components (FC) DSC types at the Rancho Seco site.

The staff needs this information to proceed with its review to determine if the Rancho Seco ISFSI license renewal application meets the regulatory requirements of 10 CFR 72.42(a) and (b).

**OBSERVATION (OBS)-1.** Application Section 3.2.2.2 Rancho Seco ISFSI Operating Experience includes PDQ 02-0003 which states:

*Scratch on TC rail after inserting DSC No. 8. During insertion of DSC No. 8 into HSM No. 6, one of the internal rails of the TC was scratched, leaving material deposited at the end of the rail. A work order was completed to remove the raised material and Quality Control verified the surface finish was sufficient in the worked areas.*

The staff note that the work conducted to resolve the issue appears to be conducted on the transfer cask. The condition of the DSC is not described and the implications for the aging management of DSC No. 8 are not provided.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-2.** Application Section 3.2.4.4 Chloride Sample Analysis Results describes the analysis of atmospheric deposits collected from surrogate surfaces near the Rancho Seco ISFSI. The staff note that the description does not address the following:

1. How was the sample collected and how was it determined that the collection methods allow a direct comparison to the previous analyses included in this table?
2. How long the surface was open to atmosphere, but not exposed to rain and snow prior to sample collection?

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-3.** Application Section 3.2.4 Rancho Seco ISFSI Pre-Application Inspection states:

*The DSC with the longest time in service is DSC Serial No FO24P-P01, which was loaded in HSM No. 20 on April 19, 2001. This DSC has been in service for over 15 years and had an initial decay heat of 9.005 kW. This low heat load results in low DSC shell surface temperatures and continues to lower the DSC shell temperatures over the 15-year operating period, thus increasing relative humidity inside the HSM and potentially promoting incubation of ambient contaminants.*

The staff note that this information is not complete as it does not address how the selected DSC compared to the other DSCs at the Rancho Seco ISFSI. Additional information such as a comparison of the initial heat loads and time in service is necessary to support that the selected DSC was appropriate for a pre-renewal application inspection.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-4.** Application Section 3.2.2.2 Rancho Seco ISFSI Operating Experience DQ 01-0001 (page 3-10) which states:

*During the HSM erection in early 1996, a problem was found with the paint on all of the HSM heat shields. It was determined that the existing heat shield paint was not qualified to the anticipated temperatures of the HSM.*

The staff note that the description of this operating experience is incomplete. Specifically the description does not address the following questions:

1. The inspection described occurred in 1996 during construction and the ISFSI License was originally granted in 2000. Clarify whether the problem identified was the result of an event such as exposure to elevated temperature or related to a non-conformance or improper coating selection.
2. Was an extent of condition performed? If so, what was the result of that assessment?
3. Is there a potential for iron contamination of the DSC from corrosion of the heat shields and if so, was that considered in the ISFSI Aging Management Review?

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-5.** Application Figure 3-6 DSC Bottom and Support Rail, East Side, between Support #2 and Support #3 shows the bottom of the DSC and the painted steel DSC support structure inside the HSM. The staff note that the picture appears to show evidence of paint blisters on the rail support beam that does not appear to be addressed in operating experience or considered in the aging management review.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-6.** The staff note the following observations in Application Section 3.4.4.2 Discussion of Aging Mechanisms:

1. General Corrosion is focused on carbon steel. The last sentence of the first paragraph refers to “the specific metal involved.” It is not clear if this means the type of carbon steel (i.e., plain carbon steel vs. a weathering steel) or something else.
2. Elevated Temperature (Page 3-70) is not an aging mechanism. The content of this section addresses thermal embrittlement or thermal aging.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).



**OBS-7.** Application Section 3.4.4.4 Coating Evaluation states the following:

*All of the DSCs in storage service at the Rancho Seco ISFSI have been sealed, dried, and backfilled with helium. There is no event defined in the Rancho Seco ISFSI licensing basis that would expose the DSCs to a water environment through the PEO.*

The staff note that the statement in the application is inconsistent with the content of the section, which is referring to the potential to expose coated components contained within the DSCs to water.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-8.** Application Section 3.4.4.5 Temporary Attachment Evaluation states:

*Although the local temperature can be above the sensitization range at the location of the weld, the heat affected zone (HAZ) is limited to approximately a 0.125-inch depth, which is much less than the seam welds that extend through the thickness.*

The staff note that the evaluation is not supported with an assessment such as a technical paper, a reference to an industry report or operating experience.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-9.** Application aging management review of the DSCs in Tables 3-3, 3-4, 3-5, 3-6, HSMs in Table 3-8, and the TC in Table 3-10 only identify components and aging effects that are managed by aging management programs (AMPs). The staff note that the aging management review tables are not complete because aging effects that are managed by a time limited aging analysis are not identified.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-10.** Application Sections 3.5.4.6 Summary of Aging Effects Requiring Management, 3.6.4 Summary of Aging Effects Requiring Management, C.2.4.2 FSAR Section 9.8.3.2 – Results of Aging Management Review – HSM, C.2.4.3 FSAR Section 9.8.3.3 – Results of Aging Management Review – Concrete Basemat have sections titled “Changes in Material.” The staff note that these sections appear to address changes in material properties.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-11.** Application Section 3.5.4.5 Coatings Evaluation, which states:

*The lubricant suffers no radiation effects because it consists entirely of graphite. Thus, lubricant failure would not prevent the HSM or the DSC from satisfactorily accomplishing its intended functions. Therefore, dry lubricant deterioration is not an effect requiring aging management.*

The staff note that the evaluation does not address whether lubricant deterioration would affect canister retrievability.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-12.** Application Section 3.7.4.2 Discussion of Aging Mechanism - Galvanic Corrosion states:

*There are no instances for the MP187 TC where two or more dissimilar metals are joined together in a conducting environment, setting up conditions for a possible galvanic reaction. Therefore, loss of material due to galvanic corrosion is not an aging effect requiring management.*

The staff note that the assessment does not appear to consider the potential for galvanic corrosion of the stainless steel components to the transfer cask in contact with graphite.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-13** Application Section 3.8.2 Spent Fuel Assemblies Materials Evaluated bounds the spent fuel assemblies stored at Rancho Seco. Application Section 3.8.2 states:

*According to EPRI TR-108757 [3-35], "storage temperatures are too low to anneal out the radiation damage in stainless steel or nickel-based alloys [and] no significant changes are expected to occur in stainless steels and nickel-based superalloys during dry storage."*

The staff note that as stated, it is not clear that the analysis in EPRI TR-108757 bounds the conditions for the assemblies stored at the Rancho Seco ISFSI.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-14.** The staff note that Application Section B.3 DSC External Surfaces Aging Management Program appears to be inconsistent with other aging management programs, which also include the following statement in the Confirmation Process:

*A tollgate will be established to assess effectiveness of corrective actions and update the AMP as necessary on a periodic basis.*

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-15.** Application Section B.5.2 Environment identifies only a sheltered environment for the TC AMP. Application Section B.5.5.4 states the following:

*The TC cask was used at SMUD during fuel loading and transfer operations that concluded in August 2002 for all DSCs except the GTCC canister, which concluded in 2006. All of the DSCs are in storage in the HSMs and the TC will only be used when the DSCs are to be retrieved from the HSMs for offsite shipment. Therefore, pre-service inspections are more appropriate for the TC at SMUD.*

In addition, Application Section A.2.2.1 Atmospheric to Service Pressure Cycle states:

*For on-site vertical storage conditions the cask is designed to serve as a pressure boundary during vertical storage of a leaking DSC.*

The staff note that the Transfer Cask Aging Management Program does not describe how the range of past and possible future operational environments for the TC are considered. Specifically the staff note that the aging management review does not appear to consider either (1) aging effects such as exposure to radiation; or (2) the potential role of the TC to store a leaking DSC (if such an event were to occur).

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-16.** Clarify the following items in Application Tables B-1 and B-2:

1. Explain what an equivalent comparison inspection is and provide examples representative for each case.
2. The Frequency of Inspection and Trending columns appear to call out incorrect sections of the application. For example, Table B-2 Frequency (page B-36) calls out AMP Section 5.2 (7). It appears that this should call out B.5.5 (7). Correct as required.

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).

**OBS-17.** Clarify the following items in Application Table B-3:

1. MP187 External Surfaces Acceptance Criteria does not address wear. Application Section B.5.3 Aging Effects Requiring Management and B.5.5 (3) specifically identifies wear as a parameter that is monitored.
2. MP187 External Surfaces Acceptance Criteria does not address cracking. Application Section B.5.5 (3) states: *The surfaces of the cask cavity inner liner are examined for surface conditions and for indications of corrosion, cracking or excessive wear.*

This information is necessary to assure compliance with 10 CFR 72.42(a) and (b).