AEROTEST OPERATIONS, INC.

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May 19, 2021

AEROTEST RADIOGRAPHY AND RESEARCH REACTOR
DOCKET NO. 50-228/LICENSE NO. R-98.

ATTENTION: Document Control Desk
U.S. Nuclear Regulatory Commission
White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Subject: Response to RAI 28 and 29.

Ladies and Gentlemen:

This letter and attachments are a follow-up from the NRC staff's communication 3/30/21 ML21047A468 requesting supplemental information (RAI). RAI numbered 28 and 29 appear unrelated to the License and Technical Specifications; my response to those items is provided in the attached document.

Should you have any questions or require additional information regarding this submission, please contact AO President David M. Slaughter, Ph.D. at (801) 631 5919 or dmsraven@gmail.com.

I declare under penalty of perjury that the statements above are correct and truthful.

Sincerely yours,

David M. Slaughter, Ph.D.
President, Reactor Administrator, Manager
Aerotest Operations, Inc.

Enclosure: Response to RAI 28 and 29 (ML21047A468)

ADZD
NRR

Response to RAI 28 and 29
(ML21047A468)

RAI 28

28.1 Aerotest has 12 fresh fuel elements in a secure on-site location; RAI No. 3 applies only to irradiated fuel.

28.2.1 Two aluminum cladded fuel elements, S/N 630E and 612E that possess cracked cladding remain in the pool not canned. The observation of gas bubbles near S/N 1787E was noted in a July 2013 inspection with no confirmation. The S/N 1787E element was inspected in October 2017 for any damage including blisters, swelling, bowing and cracks. No damage was found. There are a total of 24 fuel elements that possess cracks.

28.2.2 There are no damaged stainless steel cladded fuel elements.

28.2.3 Two cracked elements remained in the pool to show that leaching of fission products is unlikely (ML13247A668); the outcome supports the historical data (from GA) indicating that no significant leaching occurs of fission products when fuel meat is exposed to water (and/or air) under the existing storage conditions. Thus, the two cracked aluminum will not be canned using the current canister design. It is anticipated that these two fuel elements will be used to develop and implement an integrated packaging for storage and transportation taking into consideration the characterization of the fuel, the ergonomics of storing and handling, the needed surveillances, and the restrictions with DOE's transportation cask .

28.3 Twenty-two cracked fuel elements have been placed in canisters. The existing canister design was provided in an earlier Aerotest's June 8, 2020 communication. The differential in weight of the canister is the key surveillance parameter. The weight significantly increases when water leaks in and as it replaces the inert gas. As for performance, there has been no change in measured weights suggesting no failures. The existing canisters have a limited future due to its incompatibility with DOE's offsite transportation cask.

28.4 An additional TS is not needed; there is no practical difference in the stainless-steel cladded fuel element and the stainless-steel canister containing fuel. The common purpose of both is providing cladding for the fuel meat. The supplemental cladding design of the canister must and shall be changed. Incorporating a special TS concerning the canister design creates a barrier to the required change. The surveillance and frequency obligations for inspection of the fuel elements possessing no cracks and fuel canisters are described in the section entitled "IX Fuel Handling and Fuel Inspection Procedures" found in the Aerotest Facility Operating Procedure Manual.

28.5.1-4 Tank water is recirculated; water is extracted from the lower portion of the tank approximately 3-feet above the tank floor (near the fuel) and returned at the top of the tank. The extracted flow of water after leaving the tank is first measured with a gamma detector for a real time indication of gamma emitters that may be present in the water. At the same location, water is extracted periodically from a valve to be analyzed for the presence of selected radioisotopes by our in-house and commercial testing

laboratories. After passing the inflow gamma detector, it goes through resin column and heat exchanger before discharging back to the upper portion of reactor tank.

Initially in 2012, each monthly water sample extracted was evaluated for a range of radioisotopes (8 possible fission products); the results from the commercial testing laboratory show no detectable trace amounts except Cs-137 and Sr-90. In 2017, the frequency of water extracted for inhouse and commercial analyses were changed from monthly to quarterly evaluations. The commercial testing laboratory continued to evaluate the presence of radioisotopes Cs-137 and Sr-90. In 2019, reviewing the consistency of results allowed us to continue our quarterly extraction of water for the inhouse analysis but changed the frequency of commercial testing of Cs-137 from quarterly to annually.

Our present pool water testing includes quarterly samples that are analyzed by our in-house NaI gamma spectrometer with an additional sample extracted in the 4th quarter (December). The second 4th quarter sample is evaluated for the presence of Cs-137 by a commercial testing laboratory. The last two years, 2020 and 2021, the amounts of Cs-137 reported from the commercial testing laboratory are 1.09 pCi/l $\pm$ 0.95 (MDA= 2.05) and 0.00 pCi/l $\pm$ 0.07 (MDA=1.48), respectively.

28.5.5 The possibility of a significant measurable release would be highly unlikely given the chemical and physical circumstances surrounding the fuel and storage environment. The resin column is designed and sized to handle possible fission product releases such as those associated with loss of canister seal or repackaging of the cracked fuel elements,

28.6 The simple design parameter for the canister assumed that the fuel meat was highly soluble in water and/or the fission products were significantly leachable in water having a neutral PH. (Based on the historical research by GA of the UZHx fuel, both assumptions are incorrect.)

The licensee reviewed the engineering documents, relevant 10 CFR 50.59 documents submitted by Aerotest to the NRC Staff, and the associated NRC staff review and acceptance. The 10CFR 50.59 process on the canister design failed to address technical information concerning the UZrHx chemical characteristics, the ergonomics of handling the canister, the compatibility of the canister with the Aerotest's transfer cask, and the physical requirements for DOE's shipping cask.

If the fuel meat were unstable when exposed to water (which is not an accurate assessment) as the current implemented design suggests, the repackaging of the cracked elements could potentially result in significant radiation/contamination event. This outcome is very unlikely. (The engineering company who built the canister fulfilled the simple design specification provided by Aerotest and is not at fault.)

28.7 There has not been any water leaks past or present from the tank pool. The water level measurements are taken monthly for Costa County and quarterly for the NRC. Loss of water by evaporation is minimal with fuel in storage (no reactor operation), low water and reactor room temperatures (approximately 60 degrees Fahrenheit), and a covering over the top of the tank. The tank level results indicate a steady level at approximately 6 inches below the top of the tank lip. In the last 12 months, no water was added.

RAI 29

29.1 There are several pre-approval decommissioning activities that are planned; they include but not limited to tasks listed here: perform facility and environmental characterization, redesign and repackage cracked aluminum cladded fuel elements, develop relevant decommissioning, and waste management procedures, and remove non-essential items and waste not directly related to the decommissioning of the reactor.

29.2 Aerotest President/Reactor Administrator will be responsible for controlling the activities before and after the approval of the decommissioning plan.