The Honorable John Shimkus
Chairman, Subcommittee on Environment and the Economy
US House of Representatives
2125 Rayburn House Office Building
Washington, DC 20515-6115

Letterbook No.: CAMCA-15-019

November 11, 2015

Subject: **Response to Additional Questions for the Record**

Reference: Letter from the Honorable John Shimkus, US House of Representatives, to Robert Quinn, EnergySolutions, October 29, 2015

Dear Mr. Shimkus,

On behalf of Energy*Solutions* and the Spent Fuel Transportation Task Force of the Nuclear Infrastructure Council, I am pleased to provide responses to the additional questions for the record per reference request. Responses are provided in the attachment to this letter.

Thank you for the opportunity to testify and to provide the requested additional information. If any clarification or further information is needed, please feel free to contact me at (408) 558-3517 or rdquinn@energysolutions.com.

Sincerely,

Robert D. Quinn
Vice President, Cask & Container Technology
Energy*Solutions*

cc: The Honorable Paul Tonko, Ranking Member, Subcommittee on Environment and the Economy

Attachment

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Committee on Energy and Commerce
Subcommittee on Environment and the Economy
Hearing titled, "Transporting Nuclear Material: Design, Logistics, and Shipment"
on October 1, 2015

Responses to: Additional Questions for the Record, dated October 29, 2015

Prepared and Submitted by: Robert Quinn
Vice President Cask and Container Technology, EnergySolutions
and
Chair, U.S. Nuclear Infrastructure Council, Spent Fuel Transportation Task Force

Questions from: The Honorable John Shimkus

Question: The National Academies 2006 report "Going the Distance" included a recommendation that NRC perform additional analyses of very long fire duration scenarios. To your knowledge, has NRC performed such additional analysis, and if so, what was the outcome of the analyses?

Response: As discussed in the cited National Academies' report, NRC evaluation of two additional packages were planned for the conditions of the Baltimore Howard Street tunnel fire, in addition to the package evaluated and presented by NRC to the National Academies committee. The evaluation and results of NRCs assessment of all three packages for this fire is provided in NUREG/CR-6886 R2. The summary section of this report states, "The results of this evaluation also strongly indicate that neither spent nuclear fuel (SNF) particles nor fission products would be released from a spent fuel transportation package carrying intact spent fuel involved in a severe tunnel fire such as the Baltimore tunnel fire. None of the three package designs analyzed for the Baltimore tunnel fire scenario (TN-68, HI-STAR 100, and NAC LWT) experienced internal temperatures that would result in rupture of the fuel cladding. Therefore, radioactive material (i.e., SNF particles or fission products) would be retained within the fuel rods."

NRC has performed additional analyses, and a summary of these additional analyses and the results thereof are documented in the latest update of NUREG-2125, "Spent Fuel Transportation Risk Assessment" (published January 2014). This NRC report concludes that the existing regulatory requirement for thermal test is adequate for NRC-approved packages to survive these long duration fires.

It should be noted that these fires, such as the Baltimore Howard Street tunnel fire, are in part the result of additional fuel sources that are co-mingled in the commercial train shipment. As noted in the testimony on October 1, 2015, the spent fuel rail shipments as planned by the DOE will be on dedicated trains, so there would not be rail tanker cars with additional fuel sources to feed such a fire. In addition, the Association of American Railroads has revised its operating standards to preclude passing in tunnels when a spent fuel shipment is underway. This would preclude flammable contents from a separate commercial rail shipment from being in a tunnel at the same time as a dedicated train carrying spent fuel.

Question: What is being done to address the concerns with transport of high burnup spent fuel, and how long will it be before it is possible for NRC to license a cask for such transportation?

Response: Physical testing and analytical work performed by the Electric Power Research Institute, and reviewed by the NRC, show that high burnup fuel can in fact be transported safely, and it is no more vulnerable to the motions and vibrations incident to transport than lower burnup fuels. As noted on in a fact sheet on high burnup spent fuel on NRC's web site ("Backgrounder on High Burnup Spent Fuel," Updated 9/30/2015), "the NRC is conducting tests at Oak Ridge National Laboratory on high burnup fuel samples under stresses greater than the loads expected during normal transport. These tests have already shown that high burnup fuel is very strong. This information further confirms that long-term storage and eventual transportation of high burnup fuel is safe."

With respect to NRC licensing of casks for transport of high burnup fuel, the NRC has already certified cask designs for storage and transportation of high burnup spent fuel. For example, the NRC issued a certificate of compliance to AREVA TN for their NUHOMS®-MP197HB transportation cask (NRC CoC 9302 Rev. 7) to transport high burnup spent fuel in April 2014.

Additional confirmatory testing and study of high burnup fuel is being planned by industry to continue to advance the state of knowledge, particularly as related to long term effects of storage on high burnup fuels. As noted in the aforementioned NRC fact sheet, this testing is expected to confirm the current understanding of the behavior of high burnup spent fuel.

Question: Can you provide any additional information on the Aberdeen TOW missile test?

Response: Although detailed information regarding this test is not readily available for public review, what is known is that the test was performed for a company that wanted to sell missile shields for casks. It should also be noted that the CASTOR cask chosen for the test is fabricated of nodular cask iron. Such material is known for being brittle. No casks made of this material are licensed for transportation in the US.

NRC witnessed the tests, and the NRC conclusion was the resulting breach was so small that any radiation dispersal would be minimal and very localized. Based on the test results, the NRC determined that protective shields would not be required for SNF shipments in casks certified by the Commission. Licensed transport casks are made of ductile steels, which are significantly more resilient to impact.