

November 10, 2011

U.S. Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852-2738

Attn: Document Control Desk

Subject: Submission of a Request for Authorization for the NAC-LWT Cask to Allow Shipment of the Dounreay Fuel Contents Supplementing the Certificate of Compliance (CoC) No. 9225

Docket No. 71-9225

Reference: 1. Model No. NAC-LWT Package, U.S. Nuclear Regulatory Commission (NRC) Certificate of Compliance (CoC) No. 9225, Revision 55  
2. Safety Analysis Report (SAR) for the NAC Legal Weight Truck Cask, Revision 41, NAC International, April 2010

NAC International (NAC) herewith submits a request for authorization to approve shipment of the Dounreay fuel material in the NAC-LWT cask in accordance with the requirements of References 1 and 2.

NAC has been contracted by the US Department of Energy (DOE) to obtain authorization from the NRC to package and ship from Dounreay, Scotland to Savannah River Site in Aiken, South Carolina, the following five (5) special fuel assemblies in the NAC-LWT Cask:

- Three (3) 4x4 square rod arrays (two with 16 rods; one with 15 rods)
  - UO<sub>2</sub>-Mg fuel matrix / Al clad
  - 10% enriched
  - < 120 g <sup>235</sup>U per array
- One (1) concentric tube assembly (four square tubes)
  - U/Al alloy fuel / Al clad
  - Similar to DIDO assembly but uses four square (“boxes”) instead of cylindrical tubes
  - 90% enriched
  - < 170 g <sup>235</sup>U assembly
- One (1) hexagonal array (91 rods) assembly
  - U/Al alloy fuel / Al clad
  - 90% enriched
  - < 400 g <sup>235</sup>U assembly

The assemblies will be transported in the currently licensed MTR basket with the center basket opening blocked to prevent miss-loading. The total heat load for the contents is calculated to be

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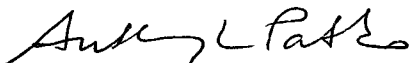
<3 watts (1998 data). The heaviest assembly weighs <11 pounds versus the currently licensed 80-lb per cell content weight limit. Contents may be contained in stainless steel and/or aluminum canisters to facilitate handling during loading and unloading. Optionally, the four fuel tube assembly may be separated and loaded into two basket openings. Spacers will be used to minimize axial movement.

Since the herein described contents are significantly below the currently licensed MTR fuel payload (weight, basket heat load, neutron and gamma source, and Curie content of the MTR basket), NAC performed a source comparison and developed technical justification for the structural, thermal, criticality and shielding disciplines. See Attachment 1 for the technical justification. A copy of the NAC proprietary calculation package and associated data files contained on DVD electronic media are included in a separate sealed envelope. An affidavit pursuant to 10 CFR 2.390 executed by Mr. Thomas Danner, Vice President, Engineering is enclosed.

Due to uncertainty of the shipment schedule, NAC hereby requests that the letter authorization issued in response to this correspondence be valid for a period of two years from the date of issuance. Should the licensing basis (References 1 and/or 2) change prior to the shipment taking place, NAC will communicate its need for an extension of the validity, or modification of the references of the letter authorization in a timely manner.

If you have any comments or questions, please contact me on my direct line at 678-328-1274.

Sincerely,



Anthony L. Patko  
Director, Licensing  
Engineering

Attachment 1 – Dounreay Fuel Shipment Technical Justification

Enclosures

Attachment 1

Dounreay Fuel Shipment

Technical Justification

## Attachment 1

### Structural

The bounding weights of the Dounreay fuel in a single MTR basket cell is 5 kg (11 pounds). This is significantly enveloped by the 80-pound limit per cell for the MTR basket (NAC-LWT SAR, Revision 41, Table 2.2.1-1, Note 2). A calculation was performed to evaluate the structural integrity of the Dounreay fuel for the normal and accident conditions of transport in the MTR-28 fuel basket for the NAC-LWT transport cask. In this configuration, the fuel is supported along the full length of the fuel in the MTR basket. The structural evaluations include side and end drops of the fuel in the cask using the design basis decelerations for the NAC-LWT transport cask. Hand calculations using a static loading were performed to determine the fuel rod bending stresses for the cask side drop and compressive stresses and buckling analyses for the cask end drop. The minimum safety factor for the fuel for the side drop was 1.99 and the minimum safety factor for buckling (including the compressive load) was 1.33. The calculations confirm that the fuel remains intact for the transport condition.

### Thermal

Due to the low heat load, no additional thermal evaluations were performed. The maximum allowable heat load for the LWT-MTR basket is greater than 1 kW, which significantly bounds the <3-watt heat load for the Dounreay fuel contents.

### Criticality and Shielding

Criticality and shielding analyses were initially performed in 1998 for five special assemblies to be transported in the NAC-LWT. These analyses demonstrated that a) sources were an order of magnitude smaller than the MTR basket design payload and b) that the  $k_{\text{eff}}$  for this configuration would be below 0.6, conservatively evaluated.

For this authorization request, NAC has:

1. Generated new shielding and criticality calculations with updated fuel input and for criticality, an updated cask model;
2. Applied bounding assumption to the fuel input, and re-evaluated the payload with the code forming the licensing basis of the NAC-LWT MTR basket payloads (SCALE 4.3 SAS2H and CSAS25 with the 27-group library); and,
3. Evaluated the bounding configuration with various updated code sequences and libraries.

**Attachment 1**

**Criticality and Shielding (continued)**

Updated codes include newer versions of SCALE (including T-DEPL) and MCNP for criticality. All evaluations demonstrate that the payload requested meets all shielding and criticality limits. Proprietary PDF copies of the calculations files are included with the authorization request. The fuel types requested are listed below:

<b>Parameter</b>	<b>Type A</b>	<b>Type B</b>	<b>Type C</b>
# of Assemblies	3	1	1
Type of Assembly	4x4 Rod Lattice (Max 16 rods)	Concentric Tubes (4)	Hexagonal 91- Rod Lattice
Fuel Matrix Material	UO <sub>2</sub> -Mg	U-Al	U-Al
Clad Material	Al/Al Alloy	Al/ Al Alloy	Al / Al Alloy
Min U-235 Enrichment, w/o	8	85	85
Max U-235 Enrichment, w/o	12	95	95
Max U per Assembly, g	1,400	220	500
Maximum Burnup, MWd/MTU	20,000	15,000	60,000
Minimum cool time, yrs	25	10	20

- Note: a) Fuel assemblies may be placed in handling canister  
 b) Tubes comprising the Type B assembly may be placed into separate basket openings (after potential disassembling of assembly)

**NAC INTERNATIONAL  
AFFIDAVIT PURSUANT TO 10 CFR 2.390**

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Thomas A. Danner (Affiant), Vice President, Engineering, of NAC International, hereinafter referred to as NAC, at 3930 East Jones Bridge Road, Norcross, Georgia 30092, being duly sworn, deposes and says that:

1. Affiant has reviewed the information described in Item 2 and is personally familiar with the trade secrets and privileged information contained therein, and is authorized to request its withholding.
2. The information to be withheld consists of
  - Calculation No. 65008000-5001 Rev. 0, and data files on CD
  - Calculation No. 65008000-6001 Rev. 0, and data files on CDNAC is the owner of the information contained on the aforementioned pages, so they are considered NAC Proprietary Information.
3. NAC makes this application for withholding of proprietary information based upon the exemption from disclosure set forth in: the Freedom of Information Act (“FOIA”); 5 USC Sec. 552(b)(4) and the Trade Secrets Act; 18 USC Sec. 1905; and NRC Regulations 10 CFR Part 9.17(a)(4), 2.390(a)(4), and 2.390(b)(1) for “trade secrets and commercial financial information obtained from a person, and privileged or confidential” (Exemption 4). The information for which exemption from disclosure is herein sought is all “confidential commercial information,” and some portions may also qualify under the narrower definition of “trade secret,” within the meanings assigned to those terms for purposes of FOIA Exemption 4.
4. Examples of categories of information that fit into the definition of proprietary information are:
  - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by competitors of NAC, without license from NAC, constitutes a competitive economic advantage over other companies.
  - b. Information that, if used by a competitor, would reduce their expenditure of resources or improve their competitive position in the design, manufacture, shipment, installation, assurance of quality or licensing of a similar product.
  - c. Information that reveals cost or price information, production capacities, budget levels or commercial strategies of NAC, its customers, or its suppliers.
  - d. Information that reveals aspects of past, present or future NAC customer-funded development plans and programs of potential commercial value to NAC.
  - e. Information that discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information that is sought to be withheld is considered to be proprietary for the reasons set forth in Items 4.a, 4.b, and 4.d.

**NAC INTERNATIONAL**  
**AFFIDAVIT PURSUANT TO 10 CFR 2.390 (continued)**

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5. The information to be withheld is being transmitted to the NRC in confidence.
6. The information sought to be withheld, including that compiled from many sources, is of a sort customarily held in confidence by NAC, and is, in fact, so held. This information has, to the best of my knowledge and belief, consistently been held in confidence by NAC. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements, which provide for maintenance of the information in confidence. Its initial designation as proprietary information and the subsequent steps taken to prevent its unauthorized disclosure are as set forth in Items 7 and 8 following.
7. Initial approval of proprietary treatment of a document/information is made by the Vice President, Engineering, the Project Manager, the Licensing Engineer, or the Director, Licensing – the persons most likely to know the value and sensitivity of the information in relation to industry knowledge. Access to proprietary documents within NAC is limited via “controlled distribution” to individuals on a “need to know” basis. The procedure for external release of NAC proprietary documents typically requires the approval of the Project Manager based on a review of the documents for technical content, competitive effect and accuracy of the proprietary designation. Disclosures of proprietary documents outside of NAC are limited to regulatory agencies, customers and potential customers and their agents, suppliers, licensees and contractors with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
8. NAC has invested a significant amount of time and money in the research, development, engineering and analytical costs to develop the information that is sought to be withheld as proprietary. This information is considered to be proprietary because it contains detailed descriptions of analytical approaches, methodologies, technical data and/or evaluation results not available elsewhere. The precise value of the expertise required to develop the proprietary information is difficult to quantify, but it is clearly substantial.

Public disclosure of the information to be withheld is likely to cause substantial harm to the competitive position of NAC, as the owner of the information, and reduce or eliminate the availability of profit-making opportunities. The proprietary information is part of NAC’s comprehensive spent fuel storage and transport technology base, and its commercial value extends beyond the original development cost to include the development of the expertise to determine and apply the appropriate evaluation process. The value of this proprietary information and the competitive advantage that it provides to NAC would be lost if the information were disclosed to the public. Making such information available to other parties, including competitors, without their having to make similar investments of time, labor and money would provide competitors with an unfair advantage and deprive NAC of the opportunity to seek an adequate return on its large investment.

NAC INTERNATIONAL  
AFFIDAVIT PURSUANT TO 10 CFR 2.390 (continued)

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STATE OF GEORGIA, COUNTY OF GWINNETT

Mr. Thomas A. Danner, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated herein are true and correct to the best of his knowledge, information and belief.

Executed at Norcross, Georgia, this 10th day of November, 2011.

  
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Thomas A. Danner  
Vice President, Engineering  
NAC International

Subscribed and sworn before me this 10<sup>th</sup> day of November, 2011.

  
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Notary Public

