TRANSNUCLEAR
AN AREVA COMPANY

April 14, 2009
E-27814

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Subject: Application for Revision to Certificate of Compliance No. 9302 for the Model No. NUHOMS®-MP197 Packaging, Docket No. 71-9302

In accordance with 10 CFR 71.31(b), Transnuclear, Inc. (TN) herewith submits its application to revise Certificate of Compliance (CoC) 9302 for the NUHOMS®-MP197 packaging (MP197). This application proposes to add a modified version of the MP197, designated the MP197HB, and includes various NUHOMS® dry shielded canisters as authorized payloads in the MP197HB transport package. This application also proposes to update the design in order to be assigned a package identification number of B(U)F-96.

Enclosure 2 provides a brief description of, and justification for, the changes, and discusses the evaluation of the requested changes. Enclosure 3 provides a listing of MP197 Safety Analysis Report (SAR) changed and additional pages and drawings and describes the changes. Enclosure 4 provides disposition of the "-96" designator issues affecting 10 CFR 71 licensees. Enclosure 5 provides changed pages from the existing SAR. Changed areas are indicated by italicized text and revision bars. Enclosure 6 provides additional SAR changes in the form of Appendix A to the SAR. All additional SAR drawings are Revision 0. All changed and additional SAR pages are annotated "Rev. 5, 03/09."

Additional information is provided in order to facilitate expediting the staff's review of this application. Computer input and output files for structural, thermal, and nuclear analyses are listed in Enclosure 8 and provided in Enclosure 9, and Enclosure 10 provides calculations and reports.

TN has already contracted to supply various dual purpose (storage and transportation) canister designs to 19 different independent spent fuel storage installation (ISFSI) sites for various utility customers. Utilities have already loaded and put into dry storage a majority of these canister designs under the requirements of 10 CFR Part 72. All of these canister designs are a part of the payload in this MP197HB transportation package. These customers need for these canisters to be licensed for transportation. Therefore, Transnuclear requests that the NRC assign the appropriate priority for the review of this application. Recognizing that the application is complex due to the inclusion of multiple payloads, Transnuclear requests the approval of this application within 18 months.

In order to facilitate the review of the application, TN is planning to set up additional meetings with the NRC staff to provide any needed clarification.

This submittal includes proprietary SAR information which may not be used for any purpose

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other than NRC staff review of the application. This information involves Appendix A SAR drawings and certain pages. In accordance with 10 CFR 2.390, I am providing an affidavit (Enclosure 1) specifically requesting that NRC withhold this proprietary information from public disclosure. This submittal also includes security-related information on the Appendix A SAR drawings. Accordingly, a non-proprietary version of SAR Appendix A, which has proprietary and security-related information withheld, is provided as Enclosure 7.

Additionally, the information in Enclosures 9 and 10 is proprietary. Because the information provided in Enclosures 9 and 10 is entirely proprietary, it is not practicable to provide non-proprietary versions.

Should the NRC staff require additional information to support review of this application, please do not hesitate to contact Mr. Don Shaw at 410-910-6878 or me at 410-910-6930.

Sincerely,

Robert Grubb
Chief Operating Officer

cc: Christopher Staab (NRC SFST) (six copies of this cover letter and Enclosures 1 to 6, plus one copy of Enclosures 8 and 9)

Enclosures:

1. Affidavit Pursuant to 10 CFR 2.390
2. Description, Justification, and Evaluation of the Changes
3. List of Changes to the MP197 Certificate of Compliance, Revision 2 and to the MP197 Safety Analysis Report, Revision 4
4. Disposition of the "-96" Designator Issues Affecting 10 CFR 71 Licensees
5. Proposed Changes to the Existing Chapters of the MP197 Safety Analysis Report, Revision 4
6. Proposed Appendix A to the Safety Analysis Report (five volumes), Proprietary Version
7. Proposed Appendix A to the Safety Analysis Report (five volumes), Non-proprietary Version
8. Listing of Disk Numbering and Contents for Computer Files
9. One electronic copy of each computer input and output files disk listed in Enclosure 8 (Proprietary)
10. Additional Calculations and Reports, Proprietary versions, as follows:
    a. Transnuclear, Inc. Calculation No. 60979-004, "Burnup Credit Criticality Calculation With CSAS25 for NUH32PTH1 Benchmarks – Using DARWIN Depletion," Revision 0, Proprietary Version
    b. CEA TECHNICAL REPORT, "DETERMINATION OF CORRECTION FACTORS FOR IMPLEMENTING BURN-UP DETERMINATION OF CORRECTION FACTORS FOR IMPLEMENTING BURN-UP," Reference NT-SPRC-LECy-04-322, Approved 07-05-2008, Proprietary Version
    c. TN International, TECHNICAL NOTE, "ISOTOPIC NUMBER DENSITY CALCULATION WITH DARWIN SYSTEM FOR NUHOMS® 32PTH1 AND TN40

BENCHMARKS," Reference CAL-08-00125206-002-00, Approved 18/11/08, Proprietary Version

d. TN International, TECHNICAL NOTE, "Burnup Credit Criticality Calculation for NUHOMS® 32PTH1 Benchmarks - Using CRISTAL V1.0 System," Reference CAL-08-00130786-002-00, Approved 18/11/08, Proprietary Version
e. TECHNICAL NOTE, IRSN – RADIATION PROTECTION AND NUCLEAR SAFETY INSTITUTE, "CONTRIBUTION TO THE QUALIFICATION OF THE STANDARD APOLLO2-MORET 4 PROCESS FOR THE CRISTAL CRITICALITY PACKAGE," Reference DSU/SEC/T/2005-235/D.R. - Revision A, Proprietary Version
f. Transnuclear, Inc. Calculation No. MP197HB-0262, "Development of Failure Strain and Fracture Toughness for High Burnup Fuel Cladding," Revision 0, Proprietary Version
g. NSTS(04)4869 Issue 2, Sub. Ref: FIP 03 Rep 027, "Fuel Integrity Project: Bend tests on irradiated fuel, Series 11 and 12," Proprietary Version
h. SOM Ref.: 477303C050201, Ind.: B, "Post-Test Calculation of the Available Lateral Bending Tests of Serie 11," Proprietary Version
i. Transnuclear, Inc. Calculation No. MP197HB-0501, "Shielding Qualification Tables (SQTs) for MP197HB Transport Cask Loaded with 24PT4, 24PTH, 24PTHF, 32PT, 32PTH, 32PTH1, 37PTH, 61BT, 61BTH, 61BTHF and 69BTH DSC.," Revision 0, Proprietary Version

AFFIDAVIT PURSUANT
TO 10 CFR 2.390

Transnuclear, Inc.)
State of Maryland) SS.
County of Howard)

I, Robert Grubb, depose and say that I am Chief Operating Officer of Transnuclear, Inc., duly authorized to execute this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.390 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought is contained in Enclosures 6, 9 and 10 and as listed below:

Enclosures 6 and 9 Proprietary Information

1) Safety Analysis Report (SAR) Drawings, as follows:

MP197HB-71-1001 Rev 0 through
MP197HB-71-1009 Rev 0
MP197HB-71-1011 Rev 0
MP197HB-71-1014 Rev 0

NUH24PT4-71-1001 Rev 0 through
NUH24PT4-71-1003 Rev 0

NUH32PT-71-1000 Rev 0 through
NUH32PT-71-1007 Rev 0

NUH24PTH-71-1000 Rev 0 through
NUH24PTH-71-1004 Rev 0
NUH24PTH-71-1008 Rev 0
NUH24PTH-71-1009 Rev 0

NUH32PTH-71-1001 Rev 0 through
NUH32PTH-71-1014 Rev 0

NUH32PTH Type 1-71-1000 Rev 0 through
NUH32PTH Type 1-71-1004 Rev 0
NUH32PTH Type 1-71-1010 Rev 0

NUH32PTH1-71-1000 Rev 0 through
NUH32PTH1-71-1004 Rev 0
NUH32PTH1-71-1010 Rev 0

NUH37PTH-71-1001 Rev 0 through
NUH37PTH-71-1004 Rev 0
NUH37PTH-71-1011 Rev 0
NUH37PTH-71-1012 Rev 0

NUH61BT-71-1000 Rev 0 through
NUH61BT-71-1010 Rev 0

NUH61BTH-71-1000 Rev 0
NUH61BTH-71-1100 Rev 0 through
NUH61BTH-71-1106 Rev 0

NUH69BTH-71-1001 Rev 0 through
NUH69BTH-71-1004 Rev 0
NUH69BTH-71-1011 Rev 0 through
NUH69BTH-71-1015 Rev 0

2) SAR Appendix A.2.13.11
3) Portions of SAR Chapter A.3
4) Portions of SAR Chapter A.5
5) Portions of SAR Chapter A.6
6) Portions of SAR Appendix A.6.5.1
7) Portions of SAR Appendix A.6.5.2
8) Portions of SAR Appendix A.6.5.4
9) Portions of SAR Appendix A.6.5.5
10) Portions of SAR Appendix A.6.5.6
11) Portions of SAR Appendix A.6.5.7
12) Computer input and output files

Enclosure 10 Proprietary Information

a. Transnuclear, Inc. Calculation No. 60979-004, "Burnup Credit Criticality Calculation With CSAS25 for NUH32PTH1 Benchmarks – Using DARWIN Depletion," Revision 0
b. CEA TECHNICAL REPORT, "DETERMINATION OF CORRECTION FACTORS FOR IMPLEMENTING BURN-UP DETERMINATION OF CORRECTION FACTORS FOR IMPLEMENTING BURN-UP," Reference NT-SPRC-LECy-04-322, Approved 07-05-2008
c. TN International, TECHNICAL NOTE, "ISOTOPIC NUMBER DENSITY CALCULATION WITH DARWIN SYSTEM FOR NUHOMS® 32PTH1 AND TN40 BENCHMARKS," Reference CAL-08-00125206-002-00, Approved 18/11/08
d. TN International, TECHNICAL NOTE, "Burnup Credit Criticality Calculation for NUHOMS® 32PTH1 Benchmarks - Using CRISTAL V1.0 System," Reference CAL-08-00130786-002-00, Approved 18/11/08
e. TECHNICAL NOTE, IRSN – RADIATION PROTECTION AND NUCLEAR SAFETY INSTITUTE, "CONTRIBUTION TO THE QUALIFICATION OF THE STANDARD APOLLO2-MORET 4 PROCESS FOR THE CRISTAL CRITICALITY PACKAGE," Reference DSU/SEC/T/2005-235/D.R. - Revision A
f. Transnuclear, Inc. Calculation No. MP197HB-0262, "Development of Failure Strain and Fracture Toughness for High Burnup Fuel Cladding," Revision 0
g. NSTS(04)4869 Issue 2, Sub. Ref: FIP 03 Rep 027, "Fuel Integrity Project: Bend tests on irradiated fuel, Series 11 and 12"
h. SOM Ref.: 477303C050201, Ind.: B, "Post-Test Calculation of the Available Lateral Bending Tests of Serie 11"
i. Transnuclear, Inc. Calculation No. MP197HB-0501, "Shielding Qualification Tables (SQTs) for MP197HB Transport Cask Loaded with 24PT4, 24PTH, 24PTHF, 32PT, 32PTH, 32PTH1, 37PTH, 61BT, 61BTH, 61BTHF and 69BTH DSC.," Revision 0

These documents have been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by Transnuclear, Inc. in designating information as a proprietary trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced documents, should be withheld.

1) The information sought to be withheld from public disclosure involves certain safety analysis report drawings and analyses related to the design of the modified NUHOMS®-MP197 transport cask and certain calculations for criticality analysis using a burnup credit methodology related to the analysis of NUHOMS® transportation casks, all of which are owned and have been held in confidence by Transnuclear, Inc., plus certain reports and experimental data used to expedite NRC staff review of the burnup credit analysis methodology, some portions of which are owned by Transnuclear's parent company and some portions of which were obtained under a proprietary agreement with others, and have been held in confidence by Transnuclear, Inc.

2) The information is of a type customarily held in confidence by Transnuclear, Inc. and not customarily disclosed to the public. Transnuclear, Inc. has a rational basis for determining the types of information customarily held in confidence by it.

3) The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.390 with the understanding that it is to be received in confidence by the Commission.

4) The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

5) Public disclosure of the information is likely to cause substantial harm to the competitive position of Transnuclear, Inc. and to other owners of the information because:

   a) A similar product is manufactured and sold by competitors of Transnuclear, Inc.

   b) Development of this information by Transnuclear, Inc. and other owners of the information required expenditure of considerable resources. To the best of my knowledge and belief, a competitor would have to undergo similar expense in generating equivalent information.

   c) In order to acquire such information, a competitor would also require considerable time and inconvenience related to the development of a design and analysis of a dry spent fuel transportation system.

   d) The information required significant effort and expense to obtain the licensing approvals necessary for application of the information. Avoidance of this expense would decrease a competitor's cost in applying the information and marketing the product to which the information is applicable.

   e) The information consists of certain safety analysis report drawings and analyses, certain calculations for criticality analysis using a burnup credit methodology, and certain reports and experimental data associated with the burnup credit analysis methodology, related to the design and analysis of dry spent fuel storage and transportation systems, the application of which provide a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to unfairly get a better competitive position with Transnuclear, Inc., take marketing or other actions to improve their product's position or impair the position of Transnuclear, Inc.'s product, while avoiding the expense of developing similar data and analyses in support of their processes, methods or apparatus.

   f) In pricing Transnuclear, Inc.'s products and services, significant research, development, engineering, analytical, licensing, quality assurance and other costs and expenses must be included. The ability of Transnuclear, Inc.'s competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.

Further the deponent sayeth not.

Robert Grubb
Chief Operating Officer, Transnuclear, Inc.

Subscribed and sworn to me before this 14th day of April, 2009.

Notary Public

My Commission Expires 10/14/2012

Description, Justification, and Evaluation of the Changes

1.0 Introduction

The scope of this revision to CoC 9302 for the NUHOMS®-MP197 packaging is to update the design in order to be assigned a package identification number of B(U)F-96 and to add a modified MP197 model, designated the MP197HB. The MP197HB authorized contents include nine dry shielded storage canister (DSC) designs, plus a secondary container, as payloads.

2.0 Brief Description of the Changes

In order to update the design to be assigned a package identification number of B(U)F-96, the only necessary change was to replace the term “transport index” with “criticality safety index” in SAR Chapter 1 and SAR Chapter 6.

The NUHOMS®-MP197HB packaging consists of the NUHOMS®-MP197HB Transport Cask, which is utilized for the off-site transport of one of several NUHOMS® Dry Shielded Canisters (DSCs) or a secondary container with dry irradiated and/or contaminated non-fuel bearing solid materials. The NUHOMS®-MP197HB packaging can be used to transport several types of Boiling Water Reactor (BWR) fuel assemblies with or without fuel channels or Pressurized Water Reactor (PWR) fuel assemblies with or without control components. The fuel assemblies are contained in a single NUHOMS® DSC. The NUHOMS®-MP197HB packaging is designed for a maximum heat load of 32 kW depending on the NUHOMS® DSC being transported and the cask configuration.

Because there are two different Outside Diameters (ODs) for the DSCs and secondary containers, an aluminum inner sleeve is used for smaller diameter DSCs and secondary containers. The inner sleeve is designed with slots to accommodate the existing rails inside the cask and to provide rails inside the sleeve on which the smaller diameter DSCs or secondary containers slide during horizontal loading or unloading of the cask. To accept the varying lengths of the DSCs and secondary containers, stainless steel or aluminum spacers are provided to limit axial movement of the payload.

3.0 Justification of the Changes

TN has already contracted to supply various dual purpose (storage and transportation) canister designs to 19 different independent spent fuel storage installation (ISFSI) sites for various utility customers. Utilities have already loaded and put into dry storage a majority of these canister designs under the requirements of 10 CFR Part 72. All of these canister designs are a part of the payload in this MP197HB transportation package. These customers need for these canisters to be licensed for transportation.

4.0 Evaluation of the Changes

TN has evaluated the MP197HB transportation packaging for structural, thermal, shielding, containment, and criticality adequacy and has concluded that the changes described herein have no significant adverse effect on safety. This evaluation is documented in Safety Analysis Report Appendix A, included in this application.

List of Changes to the MP197 Safety Analysis Report, Revision 4

Chapter/Page/ Drawing/etc.	Source/Reason for Change	Description of Change(s)
SAR cover page	Update to Revision 5, plus TN logo and address have changed	Transnuclear, Inc. address and logo are updated. SAR Revision level is now contained on this page.
SAR TOC Page vi	Appendix A	TOC accounts for Appendix A
SAR 1-1	Update to B(U)F-96, and Appendix A	Transport index changed to criticality safety index (CSI) SAR introductory section accounts for Appendix A.
SAR 6-2	Update to B(U)F-96	Transport index changed to criticality safety index (CSI)
SAR Appendix A	Addition of the MP197HB cask	An entire appendix is added, which provides the safety analysis for the MP197HB transport cask and contents

Disposition of the “-96” Designator Issues Affecting 10 CFR 71 Licensees

Issue No.	Issue	Impact on “-96” Designator Regarding the NUHOMS®-MP197
Issue 1	Changing Part 71 to the International System of Units (SI) Only	No effect. Units used in SAR are unchanged
Issue 2	Radionuclide Exemption Values	Does not apply to MP197
Issue 3	Revision of A_1 and A_2	Current values are used
Issue 4	Uranium Hexafluoride (UF6) Package Requirements	Does not apply to MP197
Issue 5	Introduction of the Criticality Safety Index Requirements	SAR Chapters 1 and 6 updated to include the CSI
Issue 6	Type C Packages and Low Dispersible Material	Not adopted in 10 CFR 71
Issue 7	Deep Immersion Test	This is evaluated in SAR Section 2.7.4.3
Issue 8	Grandfathering Previously Approved Packages	Does not apply to MP197
Issue 9	Changes to Various Definitions	Does not apply to MP197
Issue 10	Crush Test for Fissile Material Package Design	Does not apply to MP197 because of package weight
Issue 11	Fissile Material Package Design for Transport by Aircraft B. NRC-Initiated Issues	Does not apply to MP197
Issue 12	Special Package Authorizations	Does not apply to MP197
Issue 13	Expansion of Part 71 Quality Assurance (QA) Requirements to Certificate of Compliance (CoC) Holders	Current QA program meets Subpart H
Issue 14	Adoption of the American Society of Mechanical Engineers (ASME) Code	Not adopted in 10 CFR 71
Issue 15	Change Authority for Dual- Purpose Package Certificate Holders	Not adopted in 10 CFR 71
Issue 16	Fissile Material Exemptions and General License Provisions	Does not apply to MP197
Issue 17	Decision on Petition for Rulemaking on Double Containment of Plutonium (PRM–71–12)	Does not apply to MP197
Issue 18	Contamination Limits as Applied to Spent Fuel and High-Level Waste (HLW) Packages	Not adopted in 10 CFR 71
Issue 19	Modifications of Event Reporting Requirements	No effect on MP197

Enclosure 5 to TN E-27814

Proposed Changes to the Existing Chapters of the MP197 Safety Analysis Report, Revision 4

PROPRIETARY

AREVA

TRANSNUCLEAR INC.

NUHOMS®-MP197 TRANSPORT PACKAGING SAFETY ANALYSIS REPORT

Revision 5

TRANSNUCLEAR INC.
7135 Minstrel Way • Suite 300 • Columbia, MD 21045

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See Appendix A for a Table of Contents for Appendix A.

CHAPTER 1

GENERAL INFORMATION

1.1 INTRODUCTION

This Safety Analysis Report (SAR) presents the evaluation of a Type B(U) spent fuel transport packaging developed by Transnuclear, Inc. and designated the NUHOMS®-MP197 packaging. This SAR describes the design features and presents the safety analyses, which demonstrate that the NUHOMS®-MP197 complies with applicable requirements of 10 CFR 71 [1]. The format and content of this SAR follow the guidelines of Regulatory Guide 7.9 [2].

The NUHOMS®-MP197 packaging consists of the NUHOMS®-MP197 Transport Cask, which is utilized for the off-site transportation of NUHOMS®-61BT Dry Shielded Canisters (DSCs) in accordance with 10CFR71 [1]. The packaging is intended to be shipped as exclusive use. The *Criticality Safety* Index *(CSI)* for nuclear criticality control for the packaging is determined to be zero (0) in accordance with 10 CFR 71.59. See Chapter 6.

Transnuclear, Inc. has a NRC approved quality assurance program (Docket Number 71-0250) which satisfies the requirements of 10 CFR 71 Subpart H.

Chapters 1 through 8 of this SAR address the NUHOMS®-MP197 packaging with the NUHOMS®-61BT DSC payload containing BWR spent fuel assemblies. Appendix A to this SAR addresses the NUHOMS®-MP197HB packaging with the payloads described in Section A.1.2.3.

Table 6-3 lists the fuel parameters for the standard BWR fuel assemblies. The design basis fuel chosen for the NUHOMS®-MP197 Packaging criticality analysis is the GE 10×10 fuel assembly because it is the most reactive fuel assembly of the authorized contents, as demonstrated in the appendix to this chapter.

An infinite array of packages with optimal internal and interspersed moderation is evaluated to demonstrate compliance with 10CFR71.59(a)(1) and 10CFR71.59(a)(2). For 10CFR71.55(b), the effect of external reflection for a single cask is evaluated by modeling the confinement boundary (canister) surrounded by full density water. The variation in external reflection is provided by progressively modeling the various cask shells surrounding the canister, in separate calculations, surrounded by full density water. Because an infinite array of packages is used to evaluate both NCT and HAC, the *criticality safety* index *(CSI)* for *nuclear* criticality *control* is zero.

6.3 Model Specification

The following subsections describe the physical models and materials of the NUHOMS®-MP197 packaging used for input to the CSAS25 module of SCALE-4.4 [6.1] to perform the criticality evaluation.

6.3.1 Description of Calculational Model

The cask and the DSC were explicitly modeled using the appropriate geometry options in KENO V.a of the CSAS25 module in SCALE-4.4.

Two models were developed. The first model is a full-active fuel height model and full-radial cross section of the DSC alone with water boundary conditions on the ends and reflective boundary conditions on the sides. The model does not include the gaps between the poison plates. This model is more fully described in Section 6.6.2. This model is only used to determine the most reactive fuel assembly/channel combination and to justify use of the lattice average enrichment for the intact fuel analysis. The second model is a full-active fuel height model and full radial cross section of the cask and DSC with reflective boundary conditions on all sides. This model includes the worst case gaps between the poison plates and the basket internals modeled at minimum material conditions. This model includes the GE12 10×10-fuel assembly only because this assembly type is determined to be the most reactive fuel assembly type of the authorized contents. The GE12 10×10-fuel assembly is modeled as a 10×10 array comprising 92 fuel rods, including fuel, gap and cladding and two large water holes. The fuel cladding OD is also reduced by 0.010 inches in the final models to conservatively bound fuel manufacturing tolerances.

Figure 6-2 is a sketch of each KENO V.a unit showing all materials and dimensions for each unit and an annotated cross section map showing the assembled geometry units in the radial direction of the model. The assembly-to-assembly pitch is a variable in the model with the fuel assemblies modeled in the center of the fuel cells and pushed towards the center and away from the center of the basket. The poison plates are modeled with

Listing of Disk Numbering and Contents for Computer Files
(all files are Proprietary)

Disk ID No. (size)	Discipline	System	File Series (topics)	Number of Files
Disk 1 (DVD) (2.38 GB)	Structural	-	001-README.txt (Summary List of Files)	001 to 006 for a total of 6
	Structural	MP197HB Transport Cask	002-apostplotsaddle.mac to 009-mp197hbcaskmod20tishock_versaddl.rst These files are zipped into 002_to_009_files.zip file (A.2.13.1 – Elastic analysis for load case 7A – NCT Shock)	002 to 009 for a total of 8
	Structural	MP197HB Transport Cask	010-arunmp197hbcaskmod20snct.macro to 016-mp197hbcaskmod20ssd_25G.rst These files are zipped into 010_to_016_files.zip file (A.2.13.1 – Elastic analysis for load case 11 – NCT Side Drop)	010 to 016 for a total of 7
	Structural	MP197HB Transport Cask	017-arunmp197hbcaskmod20sd.macro to 022-mp197hbcaskmod20g55sd_ep.rst These files are zipped into 017_to_022_files.zip file (A.2.13.1 – Elastic-plastic analysis for load case 32 – HAC Side Drop)	017 to 022 for a total of 6
	Structural	MP197HB Transport Cask	023-arunmp197hbcaskmod20cg.macro to 030-mp197hbcaskmod20top_cg10_ep.s02 These files are zipped into 023_to_030_files.zip file (A.2.13.1 – Elastic-plastic analysis for load case 40 – HAC 10 deg top end slap down)	023 to 030 for a total of 8
	Structural	MP197HB Transport Cask	031-agenmp197hbcaskmod20a.macro to 038-mp197hbcaskmod20atop_cg10_ep.s02 These files are zipped into 031_to_038_files.zip file (A.2.13.1 – Elastic analysis for load case 44 – HAC 10 deg top end slap down)	031 to 038 for a total of 8
	Structural	MP197HB Transport Cask	039-mp197hbcask2dmod20buck.db to 043-mp197hbcask2dmod20g525bot_ipbuck.rst These files are zipped into 039_to_043_files.zip file (A.2.13.3 – Analysis for lead slump during bottom end drop)	039 to 043 for a total of 5

Listing of Disk Numbering and Contents for Computer Files
(all files are Proprietary)

Disk ID No. (size)	Discipline	System	File Series (topics)	Number of Files
Disk 2 (DVD) (3.57 GB)	Structural	Canisters	044-create_cosine_load to 049-Top_Norails_basemodel.db These files are zipped into 044_to_049_files.zip file (A.2.13.7 – Elastic analysis for load case 2NCT – Group 1 – top end side drop	044 to 049 for a total of 6
	Structural	Canisters	050-bottom-end-norails.db to 054-MP197HB-0218-norm-botnorails-ip.rst These files are zipped into 050_to_054_files.zip file (A.2.13.7 – Elastic analysis for load case 5NCT – Group 1 – bottom end side drop	050 to 054 for a total of 5
	Structural	Canisters	055-create_cosine_load to 060-Top_Norails_EP_Limit.rst These files are zipped into 055_to_060_files.zip file (A.2.13.7 – Limit load analysis for load case 2NCT – Group 2 – top end side drop	055 to 060 for a total of 6
	Structural	Canisters	061-MP197HB-0218-acc-topnorails-ep.db to 065-Top_Norails_basemodel.db These files are zipped into 061_to_065_files.zip file (A.2.13.7 – Elastic-plastic analysis for load case 2HAC – Group 1 – top end side drop	061 to 065 for a total of 5
	Structural	Canisters	066-bottom-end-norails.db to 070-MP197HB-0218-acc-botnorails-ep.rst These files are zipped into 066_to_070_files.zip file (A.2.13.7 – Elastic-plastic analysis for load case 6HAC – Group 1 – bottom end side drop	066 to 070 for a total of 5
	Structural	Canisters	071-MP197HB_0218_2D_acc_top_ep.db to 075-MP197HB-0218-2D-Axisymm-ED.db These files are zipped into 071_to_075_files.zip file (A.2.13.7 – Elastic-plastic analysis for load case 2HACED – Group 1 – end drop on the top end	071 to 075 for a total of 5

Listing of Disk Numbering and Contents for Computer Files
(all files are Proprietary)

Disk ID No. (size)	Discipline	System	File Series (topics)	Number of Files
Disk 2 (DVD) (3.57 GB) continued	Structural	Baskets	076-nuh37_basket_45deg_normal.db to 081-RG2.mac These files are zipped into 076_to_081_files.zip file (A.2.13.8 – Elastic analysis for NCT side drop – 45 degree – NUH37PTH	076 to 081 for a total of 6
	Structural	Baskets	082-Limit_Load_Non_Linear_Mat_Prop.inp to 088-RG2.mac These files are zipped into 082_to_088_files.zip file (A.2.13.8 – Limit load analysis for NCT side drop – 45 degree – NUH37PTH	082 to 088 for a total of 7
	Structural	Baskets	089-nuh37_basket_45deg_accident.db to 095-Thermal_Non_Linear_Material.inp These files are zipped into 089_to_095_files.zip file (A.2.13.8 – Elastic-plastic analysis for HAC side drop – 45 degree – NUH37PTH	089 to 095 for a total of 7
	Structural	Baskets	096-create_model3.db to 102-run_analysis.rst These files are zipped into 096_to_102_files.zip file (A.2.13.8 – Elastic analysis for NCT side drop – 45 degree – NUH69BTH	096 to 102 for a total of 7
	Structural	Baskets	103-create_model3.db to 109-run_analysis.rst These files are zipped into 103_to_109_files.zip file (A.2.13.8 – Limit load analysis for NCT side drop – 45 degree – NUH69BTH	103 to 109 for a total of 7
	Structural	Baskets	110-69BTH_45Deg_Side.inp to 115-RG2.mac These files are zipped into 110_to_115_files.zip file (A.2.13.8 – Elastic-plastic analysis for HAC side drop – 45 degree – NUH69BTH	110 to 115 for a total of 6

Listing of Disk Numbering and Contents for Computer Files
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Disk ID No. (size)	Discipline	System	File Series (topics)	Number of Files
Disk 2 (DVD) (3.57 GB) continued	Structural	Fuel	116-TNI_REB3_4x4x4.db to 124-korea_16x16_1.2rtf_w8.7_center.rst These files are zipped into 116_to_124_files.zip file (A.2.13.11 – input and output files for fuel side and end drop analyses)	116 to 124 for a total of 9
Disk 3 (DVD) (2.56 GB)	Structural	Impact Limiter	125-MP197ThirdBoltsChilled.k to 249-MP197SolidsFixed.k (A.2.13.12 – input files for all LS-DYNA analyses performed)	125 to 249 for a total of 125
	Structural	Impact Limiter	250-d3plot to 294-MP197ThirdSolidsSide.k (A.2.13.12 – input and output files for the 1/3 scale side drop)	250 to 294 for a total of 45
Disk 4 (DVD) (4.34 GB)	Structural	Impact Limiter	295-d3plot to 364-d3plot153 (A.2.13.12 – input and output files for the full scale end drop)	295 to 364 for a total of 70
Disk 5 (DVD) (4.33 GB)	Structural	Impact Limiter	365-d3plot154 to 434-d3plot36 (A.2.13.12 – input and output files for the full scale end drop)	365 to 434 for a total of 70
Disk 6 (DVD) (3.91 GB)	Structural	Impact Limiter	435-d3plot37 to 504-MP197SolidsEndRoom.k (A.2.13.12 – input and output files for the full scale end drop)	435 to 504 for a total of 70
Disk 7 (DVD) (4.34 GB)	Structural	Impact Limiter	505-d3plot to 574-d3plot153 (A.2.13.12 – input and output files for the full scale side drop)	505 to 574 for a total of 70
Disk 8 (DVD) (4.33 GB)	Structural	Impact Limiter	575-d3plot154 to 644-d3plot36 (A.2.13.12 – input and output files for the full scale side drop)	575 to 644 for a total of 70
Disk 9 (DVD) (3.90 GB)	Structural	Impact Limiter	645-d3plot37 to 714-MP197SolidsSide.k (A.2.13.12 – input and output files for the full scale side drop)	645 to 714 for a total of 70

Listing of Disk Numbering and Contents for Computer Files
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Disk ID No. (size)	Discipline	System	File Series (topics)	Number of Files
Disk 10 (DVD) (2.88 GB)	Thermal	MP197HB	Index_thermal_MP197HB.xls	1 file
	Thermal	MP197HB	A001-MP197HB+BWR_AlCS.inp to A003-MP197HB+BWR_AlCS.db (MP197HB Model Generation)	A001 to A003 for a total of 3
	Thermal	MP197HB	B001-TC_69BTH_32CS.inp to B010-TC_69BTH_32CS.out (MP197HB TC finned with 69BTH and 32 kW - NCT)	B001 to B010 for a total of 10
	Thermal	MP197HB	C001-TC_24PTH_26CS.inp to C010-TC_24PTH_26CS.out (MP197HB TC (No Fins/with Inner Sleeve) with 24PTH Type 1 & 2 and 26 kW - NCT)	C001 to C010 for a total of 10
	Thermal	MP197HB	D001-NUH69BTH.inp to D003-NUH69BTH.out (69BTH Basket/DSC Model Creation)	D001 to D03 for a total of 3
Disk 11 (DVD) (2.14 GB)	Thermal	MP197HB	E001-69BTH_32CS_4.inp to E012-69BTH_32CS_4.out (69BTH basket with HLZC#4 (32kW), 100°F ambient - NCT)	E001 to E012 for a total of 12
Disk 12 (DVD) (3.39 GB)	Thermal	MP197HB	F001-TC_32BFR_HAC.inp to F015-TC_32BFR_HAC.out These files are zipped into F001_to_F015_files.zip file (TC with fins & 69BTH, 32 kW, HAC)	F001 to F015 for a total of 15
Disk 13 (DVD) (4.27 GB)	Thermal	MP197HB	G001-TC_32BFR_CD.inp to G006-TC_32BFR_CD.out (TC with fins & 69BTH, 32 kW, SS Cool-Down)	G001 to G006 for a total of 6
	Thermal	MP197HB	H001-TC_26PF_CD.inp to H006-TC_26PF_CD.out (TC with 24PTH, 26 kW, SS Cool-Down)	H001 to H006 for a total of 6
	Thermal	MP197HB	I001-37PTH_22CD_B.inp to I012-37PTH_22CD_B.out (37PTH basket, 22 kW, Post-fire,cool-down)	I001 to I012 for a total of 12

Listing of Disk Numbering and Contents for Computer Files
(all files are Proprietary)

Disk ID No. (size)	Discipline	System	File Series (topics)	Number of Files
Disk 14 (CD) (68.7 MB)	Shielding and Criticality	MP197HB	Index_nuclear_MP197HB.xls	1 file
	Shielding	MP197HB	A001-G69-g1Z4 to A020-N69Z4tal (MP197HB - 69 BTH - Response function)	A001 to A020 for a total of 20
	Shielding	MP197HB	B001-N24Z1 to B012-N24Z3tal (MP197HB - 24 PTH - Response function - Neutron)	B001 to B012 for a total of 12
	Shielding	MP197HB	C001-G32-g1Z1 to C048-G32-g4Z3tal (MP197HB - 32PTH - Response function - Gamma)	C001 to C048 for a total of 48
	Shielding	MP197HB	D001-G69mi to D004-G69mctal (MP197HB - 69BTH - Gamma - Normal Condition)	D001 to D004 for a total of 4
	Shielding	MP197HB	E001-N69a4.mi to E004-N69a4_mctal (MP197HB - 69BTH - Neutron - Accidental Condition)	E001 to E004 for a total of 4
	Shielding	MP197HB	F001-55_38.in to F010-TN_55_38.out (MP197HB - Design basis fuel - Normal Condition)	F001 to F010 for a total of 10
	Shielding	MP197HB	G001-70_43.in to G010-TN_70_43.out (MP197HB - Design basis fuel - Accidental Condition)	G001 to G010 for a total of 10
	Shielding	MP197HB	H001-GTCC.mi to H004-GTCC_mctal (MP197HB - GTCC - Normal Condition)	H001 to H004 for a total of 4
	Criticality	MP197HB	I001-t6_e50_f04_e030.i to I004-t2_e41df31_d12f4_070.i.out (MP197HB - 61BTH - Failed fuel)	I001 to I004 for a total of 4

Listing of Disk Numbering and Contents for Computer Files
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Disk ID No. (size)	Discipline	System	File Series (topics)	Number of Files
Disk 14 (CD) (68.7 MB) continued	Criticality	MP197HB	J001-g12ch120e46p405e060.i to J002-g12ch120e46p405e060.i.out (MP197HB - 69BTH - Intact fuel)	J001 to J002 for a total of 2
	Criticality	MP197HB	K001-g12e48d444p459e001.i to K002-g12e48d444p459e001.i.out (MP197HB - 69BTH - Damaged fuel)	K001 to K002 for a total of 2
	Criticality	MP197HB	L001-w17e350b4030z08.inp to L006-c14e460b5015z04.out (MP197HB - Credit Burnup - SAS2H)	L001 to L006 for a total of 6
	Criticality	MP197HB	M001-ce14-32pt-24pp-04pra-e420-b3030a.inp to M006-we17-32pth-ib-e440-b400c.out (MP197HB - Credit Burnup - Horizontal bias)	M001 to M006 for a total of 6
	Criticality	MP197HB	N001-we17-32pth-ic-e400-b4515.inp to N004-nuh32pth1-4045-c-misload-400.out (MP197HB - Credit Burnup - 32PTH1)	N001 to N004 for a total of 4
	Criticality	MP197HB	O001-ce14-32pt-16pp-00pra-e420-b4050.inp to O006-we17-32pt-24pp-16pra-e440-b4015.out (MP197HB - Credit Burnup - 32PT)	O001 to O006 for a total of 6
	Criticality	MP197HB	P001-we14-32pt-16pp-00pra-fresh15.inp to P002-we14-32pt-16pp-00pra-fresh15.out (MP197HB - Fresh - 32PT)	P001 to P002 for a total of 2
	Criticality	MP197HB	Q001-ce14-24pth-ib-e420-b3515.inp to Q004-we17-24pth-ib-e400-b3515.out (MP197HB - Credit Burnup - 24PTH)	Q001 to Q004 for a total of 4
	Criticality	MP197HB	R001-WE14-37pth-e400-b4015.inp to R004-WE17-37pth-e420-b4515.out (MP197HB - Credit Burnup - 37PTH)	R001 to R004 for a total of 4