ENERGY*SOLUTIONS*

July 14, 2016
ES/NRC 16-014
Docket No. 71-9320

ATTN: Document Control Desk
Director, Division of Spent Fuel Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: **Response to Request for Additional Information for the Review of the Certificate of Compliance No. 9320 for the Model No. MIDUS Packaging, TAC No. L25103**

Reference: Letter from Norma Garcia-Santos (NRC) to S. Sisley (Energy*Solutions*), "Request for Additional Information for the Review of the Certificate of Compliance No. 9320 for the Model No. MIDUS Packaging, TAC No. L25103," June 17, 2016.

Dear Sir or Madam:

By the referenced letter, NRC requested that Energy*Solutions* (ES) provide additional information needed for NRC staff to complete their review of the application to amend Certificate of Compliance (CoC) No. 9320 for the MIDUS Packaging. ES hereby provides the additional information requested by NRC in the referenced letter.

Attachment 1 contains one paper copy of the RAI response. A summary of changes included in the MIDUS Transportation Packaging SAR in response to the RAI is provided in Attachment 2 of this letter. Enclosure 1 contains one (1) paper copy of the non-public version of the revised SAR that contains proprietary and security-related information that should be withheld under 10 CFR 2.390. Enclosure 2 contains one (1) paper copy of the public version of the revised SAR in which all proprietary and security-related information is redacted. Enclosure 3 contains an affidavit containing a full statement of the reasons that the proprietary information in the SAR should be withheld from the public, pursuant to the requirements of 10 CFR 2.390.

Should you or any member of your staff have questions, please contact the undersigned at (408) 558-3509.

Sincerely,

Steven E. Sisley
Cask Licensing Manager
Energy*Solutions*

NMSS20

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Attachments:
(1) Response to Request for Additional Information.
(2) Summary of Changes, MIDUS Transportation Packaging SAR, Revision 4 (2 pages).

Enclosures:
1) MIDUS Transportation Packaging Safety Analysis Report, Revision 4, July 2016, Non-Public Version (1 paper copy), **(Proprietary and Security-Related Information – Withhold Under 10 CFR 2.390).**
2) MIDUS Transportation Packaging Safety Analysis Report, Revision 4, July 2016, Public Version (1 paper copy).
3) Affidavit pursuant to 10 CFR 2.390.

cc) Norma Garcia-Santos, USNRC, NMSS, DSFM
Dan Shrum, Energy*Solutions*

The response to the NRC's Request for Additional Information (RAI) associated with the Energy*Solutions* (ES) request to amend the Certificate of Compliance (CoC) for the MIDUS Transportation Package is provided herein. Each RAI question is repeated herein and followed by the ES response and a summary of the resulting changes to MIDUS Transportation Package Safety Analysis Report (SAR).

GENERAL INFORMATION

G-1 *Revise Section 1.2.2, "Contents," of the application to indicate that the applicant takes credit for portions of the safety analyses for content No. 1 as the licensing basis for content No. 2.*

In Section 1.2.2 of the application, the applicant states the following:

"The safety analyses presented in Chapters 2 through 8 are for Content #01."

Nevertheless, in Chapter 9 of the application, the applicant takes credit for the analysis performed for content No. 1 as the safety basis for approval of content No. 2. Therefore, the statement in Section 1.2.2 does not accurately capture the applicability of the analyses in Chapters 2 through 8 to content No. 2.

This information is needed to determine compliance with 10 CFR 71.33(b).

Response to G-1:

Portions of the safety analyses presented in Chapters 2 through 8 are also applicable to content #02, as indicated in Section 9 "Evaluation of Content #02". The intent was to add a chapter to the SAR to establish the safety basis for each new MIDUS content, using the original safety analyses for the liquid ^{99}Mo payload (now Content #01) as the baseline.

Summary of SAR Changes

- Section 1.2.2 has been edited to clarify that the safety analyses presented in Chapters 2 through 8 may also be applicable to additional contents, as described in Chapters 9 and above.

CONTAINMENT

Co-4-1 *Revise the pre-shipment leakage rate test acceptance criterion in the application and on the applicable licensing drawings (e.g., No. TYC01-1605, "Closure Devices") to ensure consistency within the application and with ANSI N14.5, "American National Standard for Radioactive Materials - Leakage Tests for Packages for Shipment.*

Among the requirements in 10 CFR Part 71, the applicant shall:

i) *"Identify any established codes and standards proposed for use in package design, ..., testing, maintenance, and use."*

ii) *Include "a description of the leak testing procedures."*

The applicable industry standard containing criteria to perform leak testing on packages used for transporting radioactive materials is ANSI N14.5. For the pre-shipment leakage rate test, Section 7.6.4 of ANSI N14.5, "Acceptance criterion," states the following:

> *"The acceptance criterion for preshipment leakage rate testing shall be either (1) a leakage rate of not more than the reference air leakage rate, L_R, or (2) no detected leakage when tested to a sensitivity of at least 10^{-3} ref-cm^3/s."*

It seems that the discussions in the application are not consistent in terms of the leakage rate test acceptance criterion used prior to shipping the authorized content(s) in the Model No. MIDUS package. For example:

- *Sections 4.4.4, "Pre-shipment leakage rate test," 7.4, "Other Operations," and 7.4.1, "Pre-Shipment Leak Detection Equipment," of the application, in addition to note No. 3 on licensing drawing No. TYC01-1605, "Closure Devices," Revision 0, sheet 1 of 2, refer to the pre-shipment leakage rate test acceptance criterion as 10^{-3} reference cubic centimeter per second (ref-cm^3/s).*
- *Section 7.4.2 of the application, "Pre-Shipment Leak Testing Procedures," step No. 5, states the following:*

  > *"The test passes if there is no indicated leakage (at the pressure measurement sensitivity, ΔP)."*

Note that the sections mentioned in this question are examples and the applicant should ensure that statements are consistent throughout the application.

This information is needed to determine compliance with 10 CFR 71.31(c), 71.37(b), and 71.51

Response to Co-4-1:

Specifications for the preshipment leakage rate test acceptance criterion have been revised to clarify that the acceptance criterion is no detected leakage when tested to a sensitivity of at least 10^{-3} ref-cm^{-3}/s.

Summary of SAR Changes

- Drawing TYC01-1605 has been revised to clarify that the acceptance

criteria for preshipment leakage rate is no detected leakage when tested to a sensitivity of at least 10^{-3} ref-cm^{-3}/s.

- SAR Section 4.4.4 has been revised to clarify that the acceptance criteria for preshipment leakage rate is no detected leakage when tested to a sensitivity of at least 10^{-3} ref-cm^{-3}/s.
- SAR Section 7.4 has been revised to clarify that the acceptance criteria for preshipment leakage rate is no detected leakage when tested to a sensitivity of at least 10^{-3} ref-cm^{-3}/s.

MATERIALS EVALUATION

M-1 *For the payload internals of the Model No. MIDUS:*

a) Provide the material specifications and the types of materials used as materials of construction, and

b) Explain how the applicant evaluated the possibility of significant chemical, or other reaction(s) between the authorized (Content No. 1) and/or proposed (Content No. 2) contents and stainless steel (SS).

Table 1 of drawing No. TYC01-1601, "MIDUS Transportation Package general Arrangement of Packaging and Content," identifies the type, form, and user- supplied payload internals, as follows:

i) molybdenum-99 (^{99}Mo) chemical composition containing sodium hydroxide (NaOH), in liquid form, and

ii) SS flasks, with SS caps, with or without elastomeric seals.

Literature suggests that selection of SS for handling sodium hydroxide (NaOH), a strong base, is important to resist adverse chemical reactions. SS Types 304 and 316 can be resistant to stress corrosion cracking (SCC) at temperatures below 80 degrees Celsius (°C). In order to decrease the risk of SCC (common to Types 304 and 316) at higher temperatures, the service temperatures should not exceed 95°C.

This information is needed to determine compliance with 10 CFR 71.33 (a)(5) and 71.43(d).

Response to M-1:

The type of stainless steel used for the product bottle and payload internals was intentionally not specified in order to allow operational flexibility in the event that material changes were necessary to meet the needs of the isotope producer (including

the effects of adverse reactions). As stated in Section 3.3.2 of the SAR, the product bottle and other payload internals are user-supplied items and not part of the certified packaging; and they are not credited as barriers in the safety analyses.

The evaluation of chemical, galvanic, and other reactions, including stress corrosion cracking, is discussed in Section 2.2.2 of the SAR. As indicated in Table 2-24 of the SAR, interactions between the product and stainless steel have been considered for transportation conditions and service conditions at the medical isotope facility. There is no credible risk of SCC in the stainless steel material used for the product bottle and payload internals because their temperature remains below 95°C under NCT. The maximum temperature of the product bottle and payload internals is approximately equal to the bulk average temperature of the gas inside the cask cavity. As shown in SAR Figure 3-3, the cask cavity gas bulk average temperature remains below 80°C under NCT heat. Therefore, it is concluded that chemical reactions between the contents and the stainless steel product bottle and payload internals, such as SCC, will not occur under NCT. This conclusion is supported by the considerable 10-year experience base from operating 30 MIDUS units in weekly shipments worldwide in which no significant reactions have occured between the liquid payload and stainless steel product bottle.

Summary of SAR Changes

- None.

M-2 *For drawing No. TYC01-1602, "General Arrangement of Cask Assembly":*

a) Sheet 1 of 4 - Verify whether note No. 4 is a resistance "Seam Weld" as identified in the American Welding Society (AWS) standard weld symbols or simply "jargon" used to describe a "groove weld." Revise the drawing, if appropriate.

ANSI/AWS defines a seam weld as a continuous weld made between or upon overlapping members. A groove weld is defined as a weld made in a groove between the work pieces.

b) Sheet 4 of 4 - Explain the process of welding the casing plate to the shield lid and how the root of the weld will be free from contamination due to melting of depleted uranium (DU) directly and/or capillary attraction of melted DU through the gap between the casing plate and shield lid.

Section E-E weld symbol shows a single bevel groove weld, all around, for welding the casing plate to the shield lid. Provide in discussion whether the shield lid is stepped (dimension of step (run), depth of bevel, and depth of weld).

This information is needed to determine compliance with 10 CFR 71.33(a)(5).

Response to M-2:

a) The note was intended to convey that a full penetration weld was required on the longitudinal seam, not to mean a "seam weld". The word "seam" will be removed from the note for clarity.

b) The Shield Plate assembly Top Plate has a step that forms a backing to the Casing Plate weld. The step also prevents the DU from contaminating the weld. The weld is a full penetration weld and therefore the thickness is the full thickness of the Casing Plate. Detailed dimensions for the step are not included in the SAR drawings, in accordance with the guidance in NUREG/CR-5502, because those design features do not affect the package evaluation. MIDUS fabrication experience has shown no signs of weld contamination due to DU melting during the welding of the thirty production units and three test units.

Summary of SAR Changes

- TYC01-1602: Drawing has been revised to remove word "seam" from note 4 given on sheet 1 of 4 of the drawing.

M-3 *Explain the rationale for using generic weld symbols (e.g., joint welds) on drawing No. TYC01-1602, sheet 2 of 4 and sheet 3 of 4, and not identifying the specific joint design*

For example, the applicant uses specific welding symbols in drawing No. TYC01-1602, sheet 4 of 4, and in drawing No. TYC01-1603. Nevertheless, drawing No. TYC01-1602, sheet 2 of 4, Section C-C, show a weld all around symbol, with two parallel lines of unequal length above the reference line. The staff does not recognize these weld symbols and cannot locate these within the ANSI/AWS standard.

This information is needed to determine compliance with 10 CFR 71.33(a)(5) and 71.111.

Response to M-3:

The use of CJP for the welds on drawing TYC01-1602 sheet 2 of 4 and 3 of 4 permits the fabricator to use the weld joint that is best for the position in which the weld will be made. The callout for the single bevel welds on both drawing TYC01-1602 sheet 4 of 4 and drawing TYC01-1603 sheet 2 of 3 is due to the stepped joint that is provided. The two parallel lines of unequal length above the reference line should be a single line to represent a "flush or flat" weld surface.

Summary of SAR Changes

- Drawing TYC01-1602 has been revised to clarify the flush weld surface callouts (change the parallel lines of unequal length to a single solid line) in

three places.

M-4 *Discuss welding of the pour-hole covers on drawing No. TYC01-1603 as follows:*

a) Sheets 2 and 3 of 3 - Explain if melting of polyurethane foam on the backside of these welds will contaminate the welds (e.g., density).

b) Sheet 2 of 3 - Justify that the stepped configuration is sufficient to preclude contamination of the root from melting of polyurethane foam.

c) Sheet 3 of 3 (overpack assembly) - Provide the dimensions, weld joint configuration, and whether the design is sufficient to preclude contamination of the root from melting of polyurethane foam.

Weld symbol shows a single bevel groove weld, all around, welded flush for welding the pour hole covers to the outer shell of the bottom overpack assembly.

This information is needed to determine compliance with 10 CFR 71.33(a)(5).

Response to M-4:

a) Local melting of the polyurethane foam during welding does not contaminate the welds because the pour-hole cover and overpack shell have a mating step that forms backing for the weld.

b) Past experience fabrication on thirty production MIDUS units plus three test articles has shown that the stepped backing design is effective in preventing weld contamination from the foam.

c) See response to (b). Detailed dimensions for the step are not included in the SAR drawings, in accordance with the guidance in NUREG/CR-5502, because those design features do not affect the package evaluation.

Summary of SAR Changes

- No Changes to the SAR.

M-5 *Provide the properties and specifications of the lubricant specified on note No. 2, drawing No. TYC01-1605, sheet 1 of 2, as it may cause possible detrimental effects to the function and/or operation of the O-rings and associated sealing surfaces.*

Lubricants should not:
i) cause shrinkage, excessive swelling, excessively soften;
ii) solidify over the anticipated temperature range; or
iii) break-down and produce gummy or gritty deposits.

Lubricants should be:
i) capable of forming thin, strong films over the metal being lubricated that

the O-ring cannot wipe away, and

ii) compatible with the fluid being sealed if used inside the system.

This information is needed to determine compliance with 10 CFR 71.39 and 71.43(d).

Response to M-5:

Note 2 on drawing TYC01-1605 specifies that O-rings are to be lubricated in accordance with manufacturer's recommendations. Detailed properties and specifications for the O-ring lubricant are not provided on SAR drawing, in accordance with the guidance in NUREG/CR-5502, because that information would not affect the package evaluation. However, the manufacturer's recommended O-ring lubricant used on the ethylene propylene (EP) O-rings on the MIDUS package is silicone-based. The silicone-based O-ring lubricant was evaluated for material interactions with decontamination fluid, stainless steel, the liquid ^{99}Mo product solution, EP O-rings and Nylon screws, as shown in SAR Table 2-24, and found to be compatible. Furthermore, the 10-year experience base from operating 30 MIDUS units has shown there are not any deleterious reactions due to the O-ring lubricant.

Summary of SAR Changes

- No changes to the SAR.

M-6 *Provide the properties and specifications of the "ANTI-SIEZE" coating. In addition, verify the spelling of the word "ANTI-SIEZE" and clarify if it is a trademark name.*

The applicant mentions the "ANTI-SIEZE" coating on note Nos. 1 and 4 of drawing No. TYC01-1605, sheet 1 of 2. The staff needs additional information of this coating materials to determine if it may cause detrimental effects to the function and/or operation of thread and associated contact surfaces.

Lubricants should meet several essential needs for threaded connections:

i) control friction for obtaining true torque values - Correct lubrication and tightening of critical connections ensures proper assembly seating.

ii) Lubricants should reduce the destructive contact between dissimilar metals and withstand greater temperature stresses.

iii) allow for non-destructive disassembly.

This information is needed to determine compliance with 10 CFR 71.43(d).

Response to M-6:

Detailed properties and specifications for the thread lubricant are not provided on SAR drawing, in accordance with the guidance in NUREG/CR-5502, because that information would not affect the package evaluation. However, pure nickel thread lubricant is used on the MIDUS package. The correct spelling is "anti-seize" and it is not a trademark.

SAR Table 2-24 shows the material interactions considered during the evaluation of package's materials of construction of possible galvanic, chemical and other reactions. The pure nickel thread lubricant was evaluated for contact with decontamination fluid, stainless steel, and Ni-Cr-Mo fasteners (thread inserts). Furthermore, the 10-year experience base from operating 30 MIDUS units has shown there are not any deleterious reactions due to the anti-seize coating.

Summary of SAR Changes

- None.

M-7 *For drawing No. TYC01-1607, provide the following information:*

a) *Criteria for Visual Inspection – Either identify the inspection criteria or provide the applicable industry standard for the visual inspection related to note No. 2, drawing No. TYC01-1607, sheet 1 of 2. As part of your response include the qualified process or procedure that a qualified inspector will use to qualify and to determine the "adequate" flow of brazing material.*

   Note 2 states to visually examine all accessible surfaces for adequate flow of brazing metal through joint. However, the applicant does not cite an industry code or inspection criteria as the basis for this non- destructive evaluation.

b) *Impacts on the Installation Process of Polyurethane Foam - Explain how furnace brazing inside surfaces of the overpack will affect installation of polyurethane foam.*

   Note No. 2, drawing No TYC01-1607, sheet 1 of 2, directs that "to furnace braze using Bag-8 brazing metal at ring and end of legs." Furnace brazing will subject the surfaces to oxidation resulting in a tightly adhering scale which may adversely impact the installation of the polyurethane foam.

c) *Lack of brazing symbols - Explain the lack of brazing symbols, brazing location, number of brazed joints, and brazing filler material identification to ASME Section IX. Also, explain how the CoC holder ensures that the spider is secured in order to fulfill its safety function.*

   In note No. 2, drawing No. TYC01-1607, sheet 1 of 2, the applicant notes the following:

   (1) furnace braze using Bag-8 brazing metal at ring and end of legs.

(2) the thermal spider will be either torched or furnace brazed, the material is SB-162 Copper, also listed in Table 2-11 of the application, as Copper B152.

In Section 2.3.1 of the application, the applicant notes the following:

...for plate and shell type Class 2 supports, the fabrication of non- containment structural components of the package will follow applicable requirements of ASME Code, Subsection NF.

In Section 3.1.1, "Design Features," of the application, the applicant states the following:

"...The spider is seized to enhance the transfer of the payload's decay heat load from the interior of the package during NCT conditions, while limiting the transfer of heat into the package under HAC conditions."

This information is needed to determine compliance with 10 CFR 71.119.

Response to M-7:

a) Brazing procedures and operators are qualified to the requirements of ASME Section IX. The term "adequate flow" is verified by visually establishing that brazing material is present at all accessible edges of the brazed joint.

b) The inside surface of the Overpack is cleaned after brazing and prior to installation of the polyurethane foam, which assures proper installation of the polyurethane foam. Examination of a sectioned test article confirmed that the foam uniformly filled the cavity surrounding the thermal spider.

c) Brazing symbols were not placed on the drawing in order to allow the fabricator to qualify either furnace or torch brazing procedures. Note 2 of the drawing specifies the requirements for the brazing in lieu of a symbolic specification.

Summary of SAR Changes

- None.

M-8 *Provide an evaluation to justify the reduction of the previously approved fracture toughness, a minimum Charpy V-notch impact energy of 10 ft-lb at 70 °F to 6 ft-lb at 70 °F, considering the calculations and inspections remained unchanged.*

The applicant proposes using depleted uranium (DU) alloyed with 2% by weight of molybdenum (U-2% Mo) for fabricating the shielding components of the package. The applicant revised fracture toughness evaluation (the Charpy V-notch impact energy of 10 ft-lb at 70 °F to 6 ft-lb at 70 °F) in Section 2.1.2.5 of the application without evaluating the adequacy of the new material specification for the design of

the Model No. MIDUS package in order to ensure compliance with 10 CFR Part 71.

This information is needed to determine compliance with 10 CFR 71.43(d).

Response to M-8:

The RAI states that the applicant proposes using DU alloyed with 2% by weight molybdenum (U-2% Mo). Note that this is not a change from the original application. The current CoC and associated SAR revision both specify U-2% Mo; and the thirty operating MIDUS units were all fabricated to this specification. Therefore, there should not be a new concern regarding chemical, galvanic, or other reactions (i.e., compliance with 10CFR71.43(d) is not affected by this amendment application).

The required Charpy V-notch impact energy for the DU was reduced from 10 ft-lb to 6 ft-lb based on the currently available DU feed material in the U.S. However, this change does not alter the previous evaluation of compliance with 10 CFR 71. As discussed in Section 2.3 of the initial SER, it is unlikely that in an accident the DU would fracture in such a way that a through-wall streaming path would result because it is retained within an annulus with a very small void space and any direct streaming path would be very small. Accordingly, the staff concluded that there was reasonable assurance that the DU would not fracture under accident conditions, and that in the unlikely event that it did fracture, the post-accident dose rates would not exceed the regulatory limit of 1 rem/hr at one meter from the external surface of the package.

Summary of SAR Changes

- None.

The following is a summary of the changes incorporated in Revision 4 of the MIDUS Transportation Package Safety Analysis Report (SAR). The revisions indicators in the margins of Revision 3 of the MIDUS Transportation Package SAR have also been maintained in Revision 4 to indicate the cumulative changes that have been made in association with the request to amend the MIDUS CoC. However, the summary of the changes incorporated in Revision 3 of the MIDUS Transportation Package SAR are not repeated below.

Summary of Changes, MIDUS Transportation Package SAR, Revision 4 (2 pages)

Section	Page(s)	Change	Purpose
1.2.2	1-5	Revised to clarify that the safety analyses presented in Chapters 2 through 8 for Content #01 may also be applicable to additional contents.	Revised in response to RAI question G-1.
1.3.2	1-9	Updated the revisions on Drawing Nos. TYC01-1601, -1602, -1604, and -1605.	Drawings revised in response to RAI and other editorial corrections.
1.3.2	Dwg. No. TYC01-1601	Sht. 1 of 2, Notes: add flagnote symbol around the note numbers for notes 2, 3, and 4 that were inadvertently omitted in previous revision.	Editorial correction.
1.3.2	Dwg. No. TYC01-1601	Sht. 1 of 2, Section View: Change cross-hatch style of overpack base foam core to match style used on overpack lid.	Editorial corrections (not marked with revision clouds)
1.3.2	Dwg. No. TYC01-1601	Sht. 2 of 2, Table 1: Improve resolutions of table text and border.	Editorial corrections (not marked with revision clouds)
1.3.2	Dwg. No. TYC01-1602	Sht. 1 of 4, Note 4: Removed word "seam" from note text.	Revised in response to RAI question M-2.
1.3.2	Dwg. No. TYC01-1602	Sht. 2 of 4, Section C-C and Sht. 3 of 4, Section D-D: Change "grind flush" symbol on CJP weld call-out to a single solid line (3 places).	Revised in response to RAI question M-3.

Summary of Changes, MIDUS Transportation Package SAR, Revision 4 (2 pages)

Section	Page(s)	Change	Purpose
1.3.2	Dwg. No. TYC01-1602	Sht. 4 of 4, Section E-E: Moved Section E-E label inside drawing border and corrected view to show captive bolt in correct location.	Editorial corrections.
1.3.2	Dwg. No. TYC01-1604	Sht. 1 of 3, Detail C: Added "Containment Shell" call-out that was inadvertently omitted in previous revision.	Editorial correction.
1.3.2	Dwg. No. TYC01-1605	Sht. 1 of 2, Note 3: Revised to clarify acceptance criterion for pre-shipment leak test.	Revised in response to RAI question Co-4-1.
1.3.2	Dwg. No. TYC01-1605	Sht. 1 of 2, Top and Expanded Views: Added lid stenciling for S/N and weight that was inadvertently omitted in previous revision.	Editorial correction.
4.4.4	4-6	Revised to clarify acceptance criterion for pre-shipment leak test.	Revised in response to RAI question Co-4-1.
7.4	7-9	Revised to clarify acceptance criterion for pre-shipment leak test.	Revised in response to RAI question Co-4-1.

Enclosure 3

Affidavit pursuant to 10 CFR 2.390
(1 paper copy)

AFFIDAVIT PURSUANT TO 10 CFR 2.390

State of California)
) SS.
County of Santa Clara)

I, Steven E. Sisley, depose and say as follows:

(1) I am Cask Licensing Manager of Energy*Solutions*, and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been duly authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the document listed in Table 1. This document has been appropriately designated as proprietary.

TABLE 1

Document No.	Document Title	Rev/Date
N/A	F. Blanjaar, et. al., "Radiolytic gas formation in Mallinckrodt produced Mo99 solutions" (Attachment to Section 3.5.5 of the MIDUS Transportation Package Safety Analysis Report, TYC01-1600, Rev. 4)	Version 2.2, January 2006
N/A	F. Blanjaar, et. al., "Hydrogen generation in Mallinckrodt produced Mo99 solutions" (Attachment to Section 3.5.6 of the MIDUS Transportation Package Safety Analysis Report, TYC01-1600, Rev. 4)	Version 2.3, April 2006

(3) I have personal knowledge of the criteria and procedures used by Energy*Solutions* in designating information as trade secret, privileged, or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of 10 CFR 2.390, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, including the information as designated in paragraph (2) above, should be withheld.

(i) The information sought to be withheld from public disclosure is included in the report documenting information which is owned and has been held in confidence by Energy*Solutions*.

(ii) The information is of a type customarily held in confidence by Energy*Solutions* and not customarily disclosed to the public. Energy*Solutions* has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Energy*Solutions'* policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process or component, structure, tool, method, etc., and the prevention of its use by Energy*Solutions*' competitors, without license from Energy*Solutions*, gives Energy*Solutions* a competitive economic advantage.

(b) The information consists of supporting data (including test data) relative to a process or component, structure, tool, method, etc. and gives Energy*Solutions* a competitive economic advantage, e.g., by optimization or improved marketability.

(c) The information, if used by a competitor, would reduce the competitor's expenditure of resources or improve the competitor's advantage in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.

(d) The information reveals cost or price information, production capacities, budget levels, or commercial strategies of Energy*Solutions*, its customers or suppliers.

(e) The information reveals aspects of past, present, or future Energy*Solutions* or customer funded development plans and programs of potential commercial value to Energy*Solutions*.

(f) The information contains patentable ideas, for which patent protection may be desirable.

(g) The information is third-party Proprietary Information.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR 2.390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked and being transmitted by Energy*Solutions* to the Document Control Desk. The proprietary information has been presented to the

Nuclear Regulatory Commission and is being voluntarily provided by Energy*Solutions*.

(vi) Public disclosure of the information is likely to cause substantial harm to the competitive position of Energy*Solutions* because:

(a) Similar products are manufactured and sold by competitors of Energy*Solutions*.

(b) The development of this information by Energy*Solutions* is the result of a significant expenditure of staff effort and a considerable sum of money. To the best of my knowledge and belief, a competitor would have to undergo similar effort and expense in generating equivalent information.

(c) In order to acquire such information, a competitor would also require considerable time and inconvenience.

(d) The information consists of detailed descriptions, properties and test data. The availability of such information to competitors would enable them to modify their product to better compete with Energy*Solutions*, take marketing or other actions to improve their product's position or impair the position of Energy*Solutions*' product, and avoid developing fabrication data in support of their processes, methods, and/or apparatus.

(e) In pricing Energy*Solutions*' products and services, significant research, development, engineering, analytical, licensing, fabrication, quality assurance and other costs must be included. The ability of Energy*Solutions*' competitors to utilize such information without similar expenditure of resources may enable them to sell their product at prices reflecting significantly lower costs.

Further the deponent sayeth not.

I declare under penalty of perjury that the forgoing is true and correct.

Executed on 14 JULY 2016

Date

Steven E. Sisley
Cask Licensing Manager
Energy*Solutions*