November 6, 2008

Mr. Richard Boyle, Chief
Radioactive Materials Branch
Office of Hazardous Materials
Technology
U.S. Department of Transportation
400 Seventh Street, S.W.
Washington, DC 20590

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION

Dear Mr. Boyle:

This refers to your request dated March 21, 2008, for a recommendation concerning the revalidation of the Model No. 1860A Package, Australian Certificate of Approval No. AUS/2007-13/B(U)-96, Revision 0. Enclosed are requests for additional information needed to continue the review for revalidation of the 1860A. We request that you provide this information by December 1, 2008. Inform us at your earliest convenience, but no later than November 17, 2008, if you are not able to provide the information by that date. To assist us in re-scheduling your review, you should include a new proposed submittal date and the reasons for the delay.

If you have any questions regarding this matter, you may contact me at (301) 492-3321.

Sincerely,

**/RA/**

Chris Staab, Project Manager
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-3082
TAC No. L24201

Enclosure: Request for Additional Information

cc: J. Chamberlin, Department of Energy
John J. Miller, International Isotopes, Inc.

Mr. Richard Boyle, Chief
Radioactive Materials Branch
Office of Hazardous Materials
Technology
U.S. Department of Transportation
400 Seventh Street, S.W.
Washington, DC 20590

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION

Dear Mr. Boyle:

This refers to your request dated March 21, 2008, for a recommendation concerning the revalidation of the Model No. 1860A Package, Australian Certificate of Approval No. AUS/2007-13/B(U)-96, Revision 0. Enclosed are requests for additional information needed to continue the review for revalidation of the 1860A. We request that you provide this information by December 1, 2008. Inform us at your earliest convenience, but no later than November 17, 2008, if you are not able to provide the information by that date. To assist us in re-scheduling your review, you should include a new proposed submittal date and the reasons for the delay.

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REQUEST FOR ADDITIONAL INFORMATION
Docket No. 71-3082
Model No. 1860A Package
Australian Certificate of Approval No. AUS/2007-13/B(U)-96, Revision 0

1. Shielding

1.1 Modify the shielding analyses to demonstrate that the maximum package dose rates have been identified and meet the limits for both normal conditions of transport (NCT) and hypothetical accident conditions (HAC) for the appropriate mode of transportation (i.e., exclusive use or non-exclusive use), properly accounting for the package shielding and source configurations (including shielding dimensions and tolerances and total source strengths) and justifying the analysis assumptions.

The applicant seeks to demonstrate the package can meet the dose rate limits for non-exclusive use transport. The supporting shielding calculations, however, appear to consistently use a greater amount of lead shielding (about 4 to 10.5 mm) than the technical drawings in the accompanying engineering report indicate is in the package. The same is true for the tungsten shielding, though to a much lesser extent, in the applicable package configurations. Staff calculations indicate that this difference significantly impacts the predicted dose rates; dose rates for Cobalt-60 with the actual shielding thicknesses in Configuration A, for example, resulted in a TI greater than 10, indicating that the dose rate limits and transportation requirements for exclusive use apply. The shielding analyses should use the actual shielding thicknesses, including the design tolerances (as design tolerances may also significantly affect dose rates). Staff also notes that some calculations do not appear to include the entire source strength (see pages 128 – 133 of the application) though it appears from the accompanying figures that the contributions from all segments of the source are important to the dose rates at the "points of measurement." Additionally, the current method for applying transmission factors through multiple shielding materials should be justified given that gamma transmission through materials does not vary linearly with mean free path and the spectrum seen by the second shielding material is not the same as that seen by the first shielding material, which would appear to make the method invalid.

The applicant's analyses also appear to be based upon several assumptions that are not explained or justified in the application. These assumptions include the source position being maintained in the cask center, the distribution of the Cobalt-60 pencils' source strengths, and the presence of sufficient shielding materials in appropriate configurations between the source and the ends of the source drawer tube (such that the analyzed locations are the maximum dose rate positions). There are also areas of reduced shielding (e.g., contamination test ports) that do not appear to have been considered. Staff notes that the accessible package surface is at the surface of the drawer tube caps and not the exterior of the crumple shield at the package ends. Technical drawings of items, such as the source drawer(s), that are relied upon for source positioning and shielding should also be included as part of the justification.

Based upon all these considerations, it is not clear that the locations and values of the maximum package dose rates (surface and 1 m) have been identified and that these dose

rates will meet the NCT and HAC limits. Staff notes that calculations using MicroShield with appropriate models or actual dose rate measurements on the various package configurations may be used to demonstrate compliance with the radiation limits.

This information is needed to confirm compliance with TS-R-1 paragraphs 530, 531, 532, 533(c), 573, and 657(b).

1.2 Modify the descriptions of package operations on page 237 to clarify that only sources that meet the contents limits in the certificate will be loaded and transported in the package and that defective packages will not be used.

Page 237 of the application describes operations for "First Use, Maximum Activity Determination." Item d appears to allow for use of a defective package; any package for which radiation measurements at first use indicate maximum permissible contents limits that are less than that allowed by the certificate should be considered defective and be properly dispositioned. A similar description found on page 60 of the application should also be modified. Also, the paragraph after Item h (page 237) appears to indicate that a source that does not meet the contents limits of the certificate may be used to determine the acceptability of a package and/or such a source may be transported in the package. Such a scenario would not provide an accurate indication of whether a package has been properly fabricated, nor would it be certain that the source is acceptable for transport in the package.

This information is needed to confirm compliance with TS-R-1 paragraphs 416 and 501(b).

1.3 Modify the application to clarify that the following items are performed during pre-transport operations:

a. external contamination surveys on loaded and unloaded/empty packages
b. internal contamination surveys on empty packages that previously contained radioactive material
c. surface dose rate measurements for loaded and unloaded/empty packages
d. verification of unloaded package being empty, and
e. removal/disabling of lift attachments for loaded and unloaded packages.

It is not clear from the current application, particularly Tables 61, 62, 64, 87, 88, and 90, that the identified items are performed. The applicant should also clarify that these items are performed, as appropriate, for the post-transport operations, as it is also not clear the identified items are performed upon receipt of the package (see Tables 63, 65, 66, 89, and 91 of the application).

This information is needed to confirm compliance with TS-R-1 paragraphs 502(a), 502(b), 508, 516, 520(c), and 531.

1.4 Provide the information associated with items 1, 2 and 7 listed in Table 60 of the application.

Items 1, 2 and 7 listed in Table 60 do not appear to be included in the application. Based on their description in Table 60, they include information important to understanding the package operations and maintenance and inspection operations.

This information is needed to confirm compliance with TS-R-1 paragraph 502.

1.5 Clarify whether lead/tungsten slugs are inserted into the drawer tube and whether this insertion is done prior to or after the contamination wipe test, explaining how the shielding evaluation accounts for the configuration if the slugs are inserted prior to the test.

Some figures included in the shielding analyses for the various package configurations indicate the presence of lead and/or tungsten slugs in the source drawer tube. Descriptions of the package operations indicate a contamination wipe test is performed on the drawer when the package drawer tube is closed. In order for the wipe to reach the source drawer, the wipe must be able to penetrate through the lead/tungsten slugs, which would present a streaming path. The actual operations should be clarified and the shielding evaluation modified, as needed, to account for the shielding configuration in the source drawer tube.

This information is needed to confirm compliance with TS-R-1 paragraphs 530 and 531.

2. Thermal

2.1 Provide the location of the 0.26 m length from one of the drawings, used in determining the temperature along the fin located on page 26 of the Performance Evaluation of the Cask.

This value was used in calculating the temperature along the fin. The applicant did not make it clear exactly the location of the 0.26 m length within any of the drawings.

This value is needed to confirm compliance with TS-R-1 paragraph 728(b).

2.2 State precisely where the thermocouple on the surface of the package is located. Clarify whether the temperatures labeled “OVEN TEMPERATURE” are considered the package surface temperatures for the fire. Clarify the locations that these temperatures represent.

It is not clear from the applicant where the thermocouple is located on the surface of the package, nor the intended function of that thermocouple. One would expect the surface of the package to approach the fire/oven temperature during the test, especially if there were portions of the package that were seeing direct flame impingement.

This information is needed to confirm compliance with TS-R-1 paragraph 728(a).

2.3 Provide evidence that the furnace environment met the requirements of paragraph 728 of TS-R-1, for external “forced” convection, as recommended in S-T-2 Section 728.8.

Within the application, the applicant denotes their fire test took place inside of an industrial oven where the cask was placed (after some preheating), heated to temperatures exceeding 800°C, and held there for 30 minutes. It is not clear if the industrial oven provided sufficient forced or external convection to the surface of the package to represent the characteristics of the fire accident.

This information is needed to confirm compliance with TS-R-1 paragraph 728 and S-T-2, Section 728.8.

2.4 Provide a discussion of the effect of thermal radiation on the thermal analysis of the package fins and surface. If accounting for thermal radiation would significantly increase the calculated temperature, provide revised calculations and demonstrate that all components remain within allowable temperature limits.

The applicant has not made it clear how radiation was accounted for from the surface. Because of this factor, a potential increase in either fin or surface temperature could take place. The applicant needs to prove that the heat transfer analysis done on the package is realistic and conservative.

This information is needed to confirm compliance with TS-R-1 paragraph 652.

2.5 Provide the value obtained or used as the maximum normal operating pressure (MNOP) of the package.

The applicant did not clearly state the value of the maximum normal operating pressure of the package used.

This value is needed to confirm compliance with TS-R-1 paragraph 662.

2.6 Specify if the proposed contents for revalidation are only for special form material. Clarify the relevant IAEA containment performance standards for the metallic and rubber seals discussed in the application, with respect to the proposed contents.

This information is needed to determine the scope of the validation request and reliance upon the seals to meet IAEA standards for. The certificate appears to be for special form material, but the application material also discusses seal performance for non-special form material. Note that this may influence the type and need for some information requested here in other technical areas.

Thermal Editorial Comments

- Clarify the referenced URL located on page 25 of the Engineering **"**PERFORMANCE EVALUATION OF THE A & DM 1860 PROTOTYPE CASK."

A URL was provided. However, staff clicked on given URL and the statement "Page Not Found" came.

**-** Clarify the apparent discrepancy between the fin equation used in determining temperature on page 27 of the PERFORMANCE EVALUATION OF THE A & DM 1860 PROTOTYPE CASK and the one used in the given source.

The equation written in the application was $m = (h*P*k*A)^{1/2}$. The equation should be written as follows: $m = (h*P / k*A)^{1/2}$ according to the listed reference "Fundamentals of Heat and Mass Transfer, 4$^{th}$ Edition."

- Clarify the value for perimeter used in determining temperature on page 27 of the PERFORMANCE EVALUATION OF THE A & DM 1860 PROTOTYPE CASK.

The value written in the PERFORMANCE EVALUATION OF THE A & DM 1860 PROTOTYPE CASK was 0.258 meters. Revise the application to reflect the value of perimeter to be 0.528 meters.

3. Structural

3.1 Indicate the design life of the package, and provide the basis of an estimate of 300,000 as the number of cycles the package is expected to be subjected to, in its design life.

Analysis to verify that no component was found at risk from fatigue failure from tie-down loads during the design life was not performed. The staff recognizes that the fatigue in 300 series stainless steel is not considered to be an issue for design life cycles below $10^6$ cycles. However, a justification which defends the estimate of 300,000 cycles during the design life is missing.

This information is needed so the NRC Staff can verify that the applicant has met the requirements of IAEA paragraph 650.

3.2 Provide revised analyses using appropriate Yield strength, and Tensile strength of Stainless Steel 403 material used for the cask tie-down brackets.

For the cask tie-down brackets analyses provided on Drawing No 1860A-01-181 strength, sheets 1 through 3, the staff could not verify the yield strength and tensile strength used. Provide reference and revise the analyses as necessary to reflect the accurate values for these strength parameters.

This information is needed to verify compliance with IAEA paragraph 650 requirements.

3.3 Revise all related drawings to show the actual as-built conditions of the package, and provide the pertinent pages of the *Bearing Service Centre* (BSC) O-ring catalog.

Deep Water Immersion test was not conducted. The applicant has claimed compliance to this clause by reasoned argument (as allowed by clause 701d of the regulations). The package can be compromised on the failure of the gasket at each end cap. However, the package contains O-rings under each of the 2 end plates which maintain an air tight joint seal. The details of the O-ring are currently not specified on the 1860 cask Drawing 32030. The applicant has stated that the package will be equipped with the metaflex gasket that has a high pressure rating.

As these O-rings are considered to be the most vulnerable point in terms of the water immersion test, the Staff needs this information to verify that the O-rings used can withstand the pressure requirements of 2MPa (20Bar) to comply with the requirements of paragraph 730 of TS-R-1.

4. Materials

4.1. Specify the welding standard used in the fabrication of the Model 1860. Include in your explanation the following: weld procedure/process qualification, welder qualification, destructive and non-destructive testing criteria/qualification, pre and post heat selection and weld filler material selection, etc.

This information is not directly provided in the Model 1860 Type B(U) Package Safety Analysis, Revision 1.10. Refer to pages 433 thru 673 of the "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.2. Welded Stainless Steel, 440C, is used for the following component numbers: 1860A-A1-024/023, B1-028/024/023/010, C1-010, D1-010 and E1-028/024/023. Identify if any of these components are welded and identify what welding precautions you will use if any of these components are welded.

This alloy is not commonly welded due to its tendency to air harden. If it must be welded, preheat to 500 degrees Fahrenheit (260 degrees Celsius) and post weld treat at 1350-1400 degrees Fahrenheit (732-760 degrees Celsius) for 6 hours followed by a slow furnace cooling to avoid cracking. Use similar filler metal and high heat inputs during operations. Refer to pages 516, 518, 552, 554, 556, 590, 592, 606, 608 620, 622, 624, 664, and 666 of the "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.3. Clarify whether flange blanks are welded to the adapter end flange. If so explain why no weld symbol is used and reference RAI 4.1 in the explanation.

Component number 1860A-01-121 Flange Blanks are fitted to component numbers 1860A-A1/B1/E1-123 Filling Port Flange and 1860A-A1/B1/E1-122 Adapter End Flange, and appear to be welded. Refer to pages 520, 522, 558, 560, 626 and 628 of the "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.4. Appendix 20 of the "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10," states that the Metaflex Seal temperature range is up to 400 degrees C (752 degrees F) in an oxidizing environment. Verify whether the Metaflex Seal Metaflex Type C, Supagraf + 316 Stainless Steel, Component Number 1860A-A1-382 was used during the Hypothetical Accident Condition (Fire) test. Justify whether the Metaflex Seal will maintain seal integrity.

The Model 1860 design incorporates a metal seal which uses wafer technology to provide a sealing face to withstand a pressure greater than 2MPa. The metal seal is used opposed to a traditional rubber seal, such that in the event of a fire the high temperatures will not affect the sealing capability of the package. The package will be transported with the metal seal in place during each shipment.

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.5. For Component numbers 1860A-B1-011/012 Adapter End Drawer Tube and Filling Port End Drawer Tube, respectively, clarify if the welding symbol tail dimensions are in millimeters. Clarify whether the welds are to be welded all around. Clarify if these dimensions are the fillet leg size. Provide a description of the type joint design. Provide the dimensional/fit-up requirements for the tube end-to-end sleeve inner land. Clarify whether the corrosion/crud trap is a concern between the Drawer Tube and the Adapter End Sleeve/Filling Port End Sleeve.

Refer to pages 548 and 550 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10." Incomplete information has been provided to evaluate design fabrication.

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.6. Provide the specification for Component number SE001002, O-Ring, Rubber. Justify that the O-ring seal will maintain seal integrity without destructive testing results such as Hypothetical Accident Conditions (fire) and the water immersion test.

Test report conclusions, page 56 of the "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10," states that from the limited testing conducted it was verified that the A&DM Model 1860 is compliant with the performance requirements of the Type B(U) regulations. In completing the evaluation of the A&DM 1860 prototype package in terms of performance, it was recommended that the package design specifies an o-ring that is compatible with the environmental variations as set-out in the regulations, i.e. -95kPa to 2000kPa, -40ºC to 70ºC, radiation.

Page 410 of the "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10," states that the water immersion test was not physically conducted since there was

insufficient time to conduct, only one prototype package, and because there is sufficient evidence to demonstrate compliance. The arguments for this clause are based on the readily available specifications for o-ring seals which is used to seal the package and is considered to be the most vulnerable point in terms of the water immersion test. The package contains O-rings under each of the 2 end plates which maintain an air tight joint seal. The details of the o-ring are currently not specified on the Model 1860 cask drawing 32030, however the prototype package did have o-rings in its assembly. It can be shown that there are o-rings available that can withstand the pressure requirements of 2MPa (20Bar), refer to the *Bearing Service Centre* (BSC) O-ring online o-ring catalogue.

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.7 For Component number 1860A-01-120 Locking Sleeve, Type 304 Stainless Steel is welded to component number 1860A-B1-109, End Cap Flange, Type 316 Stainless Steel. Confirm that the welds are welded all around. Verify that the dimensions are the fillet leg size. Explain why the locking sleeve shown to be welded to component number 1860A-B1-028, End Cap, is Welded Stainless Steel, 440C.

Incomplete information has been provided to evaluate design fabrication. Refer to pages 552 and 562 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.8 Provide the weld procedure/NDE/criteria /qualifications, etc. for welding Component number 1860A-C1/D1-105, Primary Attenuator, Tungsten, 97% NiFe to component number 1860A-B1-102, Drawer Tube Flange, Type 316 Stainless Steel. Confirm that the welds are welded all around. Verify the dimensions are fillet leg size. In Detail A, what is the weld symbol shown to fuse the primary attenuator and the drawer tube flange? What are the dimensions required for this weld? Clarify what is meant by "Fused at Join both flanges."

Clarify the component number 1860A-D1-011, Adapter End Drawer Tube and component number 1860A-D1-012, Filling Port End Drawer Tube, referred to as Welded Aluminum-6061, but referred to as component number 1860A-B1-102, Drawer Tube Flange, component number 1860A-D1-101, Drawer Tube and component number 1860A-B1-103, Adapter End Sleeve, is all Type 316 Stainless Steel.

Tungsten is welded by the gas tungsten arc welding (GTAW) process and the electron beam process. Sufficient thickness is required for the GTAW process. GTAW used with direct current electrode negative is recommended. Welding is recommended in a pure inert atmosphere gas chamber or dry box. The filler metal compositions should be the same as

the base metal. The base metal in the heat-affected zone becomes embrittled by grain growth and recrystallization as a result of the welding temperatures. Recrystallization raises the transition temperature so that the welds tend to be brittle. Tungsten is notch sensitive, craters and notch effects such as undercutting must be avoided.

Incomplete information has been provided to evaluate design fabrication. Refer to pages 588, 600, 602, and 604 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.9 Provide the type and specification of stainless steel for component number 1860A-E1-105, Drawer Ring Pedestal B, component number 1860A-E1-106, Drawer Ring Pedestal A and component number 1860A-E1-107 Filling Port End Ring.

Clarify how the component number 1860A-E1-101 Drawer Tube Plate A, component number 1860A-E1-105, Drawer Ring Pedestal B, component number 1860A-E1-106, Drawer Ring Pedestal A, component number 1860A-E1-104, Adapter End Ring, component number 1860A-E1-107, Filling Port End Ring and component number 1860A-E1-102, Drawer Plate Side B are fabricated to form the component number 1860A-E1-010, Drawer Tube Assembly. If welded, provide the welding symbols and other relevant welding information. No welding symbols are provided.

Incomplete information has been provided to evaluate design fabrication. Refer to pages 616, 640, 642, and 644 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.10 Clarify why the component number 1860A-E1-016, End Cap Sub Assembly is referred to as Welded Stainless Steel, 440C. Clarify if the weld is to be welded all around. Verify that these dimensions are the fillet leg size.

Part number FA001017 Socket Head Cap Screw is Type 316 Stainless Steel, component number 1860A-01-120, Locking Sleeve is Type 304 Stainless Steel and component number 1860A-E1-109, End Cap is Type 316 Stainless Steel. Also, provide a complete weld symbol.

Incomplete information has been provided to evaluate design fabrication. Refer to pages 620, and 630 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.11 Verify the graphite seal referred to is the same as the metal flex seal. What is the material composition of the metal flex seal?

Incomplete information has been provided to evaluate design fabrication. Refer to pages 46, 391, 525, 575, and 647 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.12 Component number 1864-01-009, Cask Interface Plate Assembly is made up of component number 1864-01-317, Plate Handle, Mild Steel, component number 1864-01-313 Cask Interface, Mild Steel, component number 1 1864-01-212, Adapter Interface, Mild Steel component number 1864-01-215, Alignment Pin, Mild Steel and component number 1 1864-01-217, Plate Handle, Mild Steel. Clarify if the fillet weld is to be welded all around? Provide the material specification for the mild steel above. Define how the alignment pins are installed on the cask interface plate.

Incomplete information has been provided to evaluate design fabrication. Refer to pages 670 thru 673 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

4.13. Component number 1860A-01-141, Base Skid Bolt Support, Type 316 Stainless Steel is welded to component number 860A-01-144, Transverse Base Section, Type 316 Stainless Steel. Clarify the weld symbol associated with this weld.

Incomplete information has been provided to evaluate design fabrication. Refer to page 442 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)"

4.14. Explain how the Model 1860 is transported.

The Certificate of Approval of a Package Design AUS/2007-13/B(U)-96 states "The Analogue and Digital measurements P/L Model 1860A package design is only authorized for transport by road and rail" and the MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10 states: "Usually the cask will be transported within a standard aircraft cargo container."

Incomplete information has been provided to evaluate design fabrication. Refer to page 64 of "MODEL 1860 TYPE B(U) PACKAGE SAFETY ANALYSIS, REVISION 1.10" and page 1 of the "The Certificate of Approval of a Package Design AUS/2007-13/B(U)-96."

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(b) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1)."

5.1. To ensure completeness of the Maintenance and Inspection Manual, the applicant should ensure all appropriate maintenance instructions are included in the Maintenance and Inspection Manual.

Page 80 of the proposed Safety Analysis Report contains five paragraphs dedicated to Maintenance Instructions. However, these maintenance instructions are not located in the Maintenance and Inspection Manual on pages 198 – 212.

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(d) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1).

6.1. The applicant should ensure all appropriate instructions are included in the Users Manual.

Pages 61-65 of the proposed Safety Analysis Report contain proposed Operating Instructions for use of the cask. It is unclear as to whether all appropriate operating instructions are contained in the Users Manual on pages 234 – 270. For example, a maximum contents section is not contained in the Users Manual. However, this section is contained in the Operating Instructions.

This information is needed to ensure compliance with Section VIII, Approval and Administrative Requirements, Regulation 807(d) of the IAEA Safety Standard Series, "The Regulations for the Safe Transport of Radioactive Material 1996 Edition (As Amended 2003), (TS-R-1).