December 17, 2009

Mr. Anthony Patko
Director, Licensing
Engineering
NAC International
3930 East Jones Bridge Road, Suite 200
Norcross, GA 30092

SUBJECT: REVISION 52 OF CERTIFICATE OF COMPLIANCE NO. 9225 FOR THE MODEL NO. NAC-LWT PACKAGE

Dear Mr. Patko:

By letter dated November 3, 2009, as supplemented by e-mail dated December 7, 2009, NAC International submitted a revised application in accordance with 10 CFR Part 71 for an amendment to Certificate of Compliance No. 9225 for the Model No. NAC-LWT package to authorize the use of impact limiters containing an alternate attachment gusset tab configuration. Changes made to the enclosed certificate are indicated by vertical lines in the margin. The staff's Safety Evaluation Report is also enclosed.

Those on the attached list have been registered as users of the package under the general license provisions of 10 CFR 71.17 or 49 CFR 173.471. This approval constitutes authority to use the package for shipment of radioactive material and for the package to be shipped in accordance with the provisions of 49 CFR 173.471. Registered users may request, by letter, to remove their names from the Registered Users List.

If you have any questions regarding this certificate, please contact me at (301) 492-3421 or Kim Hardin of my staff at (301) 492-3339.

Sincerely,

/RA/
Steven L. Baggett, Acting Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9225
TAC No. L30059

Enclosures: 1. Certificate of Compliance No. 9225, Rev. No. 52
2. Safety Evaluation Report
3. Registered Users List

cc w/encls. 1& 2: R. Boyle, Department of Transportation
J. Shuler, Department of Energy
Registered Users

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OFC:	SFST	E	SFST		SFST		SFST		SFST	
NAME:	SBaggett									
DATE:	12/17/09									

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SAFETY EVALUATION REPORT

Docket No. 71-9225
Model No. NAC-LWT Package
Certificate of Compliance No. 9225
Revision No. 52

SUMMARY

By letter dated November 3, 2009, as supplemented by e-mail dated December 7, 2009, NAC International (NAC or the applicant) requested a revision to Certificate of Compliance (CoC) No. 9225 for the Model No. NAC-LWT package. NAC requested the authorization to use impact limiters containing an alternate attachment gusset tab configuration.

Two NAC International Drawings were revised to update the CoC for this request.

Accordingly, CoC No. 9225 has been amended based on the statements and representations in the application, and staff agrees that the changes do not affect the ability of the package to meet the requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 71.

EVALUATION

The submittal was evaluated against the regulatory standards in 10 CFR Part 71, including the general standards for all packages, standards for fissile material packages, and performance standards under normal conditions of transport (NCT) and hypothetical accident conditions (HAC). Staff reviewed the application using the guidance in NUREG-1617, "Standard Review Plan for Transportation Packages for Spent Nuclear Fuel," NUREG-1609, "Standard Review Plan for Transportation Packages for Radioactive Material," and its Supplement 2, "Standard Review Plan for Transportation Packages for Irradiated Tritium-Producing Burnable Absorber Rods (TPBARs)."

Based on the statements and representations in the application, as supplemented, and the conditions listed in the CoC, the staff has reasonable assurance that the design has been adequately described and evaluated and meets the requirements of 10 CFR Part 71.

REFERENCES

NAC International, application dated December 10, 2008.

NAC International, supplements dated November 3 and December 7, 2009.

1.0 GENERAL INFORMATION

1.1 Package Description

The Model No. NAC-LWT package is shipped by truck, within an ISO container, or by railcar, as a Type B(U)F-96 package, as defined in 10 CFR 71.4. Changes to the packaging in this application are defined on the revised drawings.

1.2 Packaging Drawings

The applicant submitted two revised drawings. The revised drawings include:

LWT 315-40-05, Rev. 10	NAC-LWT Transport Cask, Upper Impact Limiter
LWT 315-40-05, Rev. 10	NAC-LWT Transport Cask, Lower Impact Limiter

The drawings were revised to incorporate changes to incorporate the impact limiter alternate attachment gusset tab configuration to support this revision.

1.3 Contents

There are no changes to the authorized contents in this revision request.

1.4 Evaluation Findings

NRC staff evaluated the Model No. NAC-LWT package and documented the security assessment separately, as it contains sensitive information that cannot be made publicly available. The security assessment should be reviewed prior to approval of any amendment to this application.

2.0 STRUCTURAL AND MATERIALS REVIEW

The staff reviewed the application to revise the Model No. NAC-LWT package structural and material design and evaluation to assess whether the package will remain within the allowable values or criteria for normal conditions of transport (NCT) and hypothetical accident conditions (HAC) as required in 10 CFR Part 71.

2.1 Structural Review Description

The amendment request was for incorporation of a weld repair method for the NAC LWT transportation package impact limiter attachment lugs. This weld repair was not previously specified on any licensing drawings nor previously submitted for NRC staff review. The weld repair deviates from a normal code acceptance requirement for weld strength, thus requiring additional design analysis of this condition. The amendment provides a revised stress analysis to support the licensee's assertion that the necessary design requirements are met despite the reduced strength weld.

2.2 Evaluation

The NAC-LWT impact limiter is primarily fabricated from welded aluminum and aluminum alloy components. Welding is performed in accordance with American Welding Society (AWS) D1.2 “Structural Welding Code-Aluminum” requirements and the guidance of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Sections IX and XI.

The applicant identified a new maintenance repair method for one of the impact limiter components (the four impact limiter attachment lugs). This repair method, which involves welding, requires special consideration because any weld repair to this component will result in a significant reduction in the strength of the component. Thus, the weld deviates from normal construction code requirements which specify weld strength to be greater than base material strength.

The impact limiter attachment lugs are fabricated from age-hardened type 6061-T651 aluminum alloy. “Age-hardened” refers to a special heat treatment process which is employed to strengthen various aluminum alloys. Normally, any age-hardened aluminum alloy is considered “unweldable” because a significant loss of strength occurs when the material is welded. The resulting weld will typically have a strength level approximately equal to that of unalloyed type 1100 aluminum. This reduction in strength means compliance with the normal code requirement for weld strength cannot be met.

The lug repair is a simple full-penetration butt joint in a ½ inch by 2 inch bar of type 6061-T651 aluminum.

To determine the feasibility of the proposed repair method, the licensee conducted weld procedure tests to characterize the weld strength. It was determined that a minimum weld strength of 10 ksi yield and 20 ksi ultimate tensile strength could be reliably achieved with the applicant’s weld method. This ultimate strength level is significantly less than the ASTM minimum base material ultimate tensile strength of around 32 ksi for type 6061-T651 aluminum.

With the repair weld strength thus established, the licensee reviewed the existing stress analysis to compare this reduced weld strength with the design stresses during various design conditions, including design accident loads. The licensee found that the design loads were less than the weld strength levels achieved in the repair weld procedure development tests. Thus, the reduced weld strength was deemed by the licensee to be adequate for design purposes.

Staff noted that the analysis performed by the applicant to demonstrate adequate margin was inconsistent when considering Normal Conditions of Transport and Hypothetical Accident Conditions. When considering Normal Conditions, the applicant only considered two of four gusset plate impact limiter attachment tabs (gusset tabs) when determining a margin of safety of 0.30 against Yield Stress. However, when evaluating accident conditions, the applicant took credit for all four of the attachment tabs resulting in a Margin of Safety of 0.74 against Ultimate Tensile Strength. The staff requested that the applicant justify this discrepancy and the applicant provided additional calculations and supporting arguments which allowed the staff to make an affirmative finding. The basis of the applicant’s justification consisted of demonstrating that the tolerances of the gusset tabs and associated connecting hardware were such that sufficient plastic flow

could occur, thereby engaging all four gusset tabs in the load path. The same situation was not applicable to Normal Conditions because the acceptance criteria of material yield precluded any additional load paths due to plastic flow, therefore only two gusset tabs could reasonably be relied upon to carry the load.

2.3 Conclusion

The NRC staff has assessed the weld property data provided by the licensee. The staff finds that the reported weld strength data is similar to that for unalloyed type 1100 aluminum. This is the expected result for a weld in an age-hardened aluminum alloy.

With respect to the stress levels in service compared to the strength of the weld, the licensee has shown that a minimum 30 percent margin of strength exists for all design conditions. This is an adequate margin to assure safe performance of the transportation package.

With respect to the deviation from the AWS D1.2 welding code, the decreased weld strength has been shown to be acceptable from the design standpoint by the aforementioned stress analysis. Thus, for this specific weld repair, this alternative to the normal code requirement regarding weld strength is acceptable to the staff.

The staff finds that the requested amendment to permit the specified weld repair to the NAC-LWT impact limiter attachment lugs is acceptable.

Based on the statements and representations in the application, staff agrees that the applicant has shown that the use of the NAC-LWT meets the structural and material requirements of 10 CFR Part 71 for this revision.

CONDITIONS

The CoC has been revised as follows:

Condition No. 5(a)(3)(i):

Two drawings were revised.

Condition No. 18:

Allows the use of Revision 51 of this certificate for one year.

CONCLUSION

Based on the statements and representations in the application, as supplemented, and the conditions listed above, the staff concludes that the Model No. NAC-LWT package design has been adequately described and evaluated and that these changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9225, Revision No. 52,
on December 17, 2009.