

# **CBC** Columbiana Boiler Company

*Containers & Cylinders for Chemicals & Gases  
UF<sub>6</sub> & UO<sub>2</sub> Packaging · Galvanizing & Tinning Kettles*

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May 18, 2000

Mr. David H. Tiktinsky, Project Manager  
Licensing Section, Spent Fuel Project Office  
Office of Nuclear Material Safety and Safeguards  
United States Nuclear Regulatory Commission  
11545 Rockville Pike  
Rockville, MD 20852

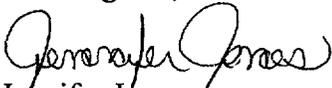
**Re: Informal Changes to SAR for the ESP-30X Protective Shipping Package for 30-inch  
UF<sub>6</sub> Cylinders, Revision 2, dated March 2000**

Dear Mr. Tiktinsky,

As per our conversation, please find enclosed page 2-6 which has been revised to include the tie-down calculation.

I have enclosed ten copies of the above referenced page [one for each SAR submitted]. Your assistance in replacing that page is greatly appreciated. Please feel free to contact myself or Mr. Trevor Rummel should you have any questions.

Best Regards,



Jennifer Jones  
Radioactive Packaging Officer

NIMSSOIPublic

With the package loaded sideways on a carrier, the 10 g longitudinal load creates a coupling moment through the center of gravity placing a vertical load ( $V_t$ ) on 4 bolts on one side of the package to counteract the moment; the 5 g transverse load creates a similar vertical load ( $V_t$ ) on 4 bolts on one end of the package as follows:

$$V_t = 10 \times 9,365 \text{ lb} \times 22"/40" = 51,508 \text{ lb}$$

$$V_t = 5 \times 9,365 \text{ lb} \times 22"/58" = 17,761 \text{ lb}$$

The maximum total vertical load on a bolt ( $V$ ) due to the forces calculated above plus that due to a 2g vertical load is:

$$V = (2 \times 9,365/8) + (51,508/4) + (17,761/4) = 19,659 \text{ lb/bolt}$$

The maximum tensile strength on a bolt is:

$$S = \frac{19,659 \text{ lb}}{0.75^2 \times 3.14/4} = 44,521 \text{ lb}$$

Shear stress under the bolt head is:

$$S = \frac{19,659 \text{ lb}}{1.25" \times 3.14 \times 0.5"} = 10,017 \text{ psi}$$

The factor of safety against shearing the bolts is  $105,000 \text{ psi}/(29,640 \text{ psi} + 10,017 \text{ psi}) = 2.6$ .

## **2.6 Normal Conditions of Transport**

### **2.6.1 Heat**

Effects from heat due to normal conditions of transport are described in **Section 3**.

### **2.6.2 Cold**

An ambient temperature of  $-40^\circ\text{F}$  with no insolation and no decay heat results in a package with a uniform temperature of  $-40^\circ\text{F}$ . An ambient temperature of  $-40^\circ\text{F}$  will not have an adverse effect on the ESP-30X. The ductility of the steel in the overpack is not seriously affected by temperatures in this range.