

Nuclear Assurance Corporation  
24 Executive Park West  
Atlanta, Georgia 30329  
(404) 325-4200  
Telex: 549567, 542703

715 Horizon Drive  
Grand Junction, Colorado 81501  
(303) 245-4320  
TWX: 9109296334

Weinbergstrasse 9  
8001 Zurich, Switzerland  
(01) 470844  
Telex: 57275

October 2, 1980  
CRJ/80/158/ETS

Mr. C. E. MacDonald  
Chief, Transportation Certification Branch  
Division of Fuel Cycle and Material Safety  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. MacDonald:

As we discussed this morning, we ran a few cases to check the sensitivity of the chi-square test as we applied it to the NAC-1D cask. The attached graphs show the results of these tests.

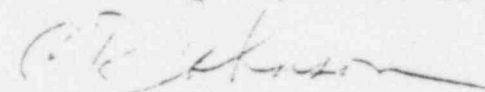
We artificially changed three data points in each of three samples used in applying the chi-square test to the cavity dimensions of the D cask. The graphs are plots of what happens to the chi-square value as a function of artificially changed diametral differences. For example, in the first case, we changed three dimensions in the cavity zone between 4.5 and 36.5 inches. The changes were made at locations 18.5, 24.5 and 30.5 inches, where the original changes from the 1970 to the average of the 1980 values were -.004, -.006 and +.005 inches, respectively. The original chi-square value for this zone of the cask was 59.65 with boundaries at 36.7 to 60.4. When we changed the three points by 15, 30 and 45 mils, the chi-square value as well as the chi-square boundaries changed and, as noted on the graph, we exceed the chi-square boundary when we artificially changed the values by 30 mils.

Based on these comparisons, we conclude that the chi-square test is capable of detecting cavity configuration changes that would be representative of buckling while at the same time the chi-square test is not so sensitive that it will give us an excessive number of false indications of cavity configuration changes.

We will be happy to discuss this further with you.

Sincerely,

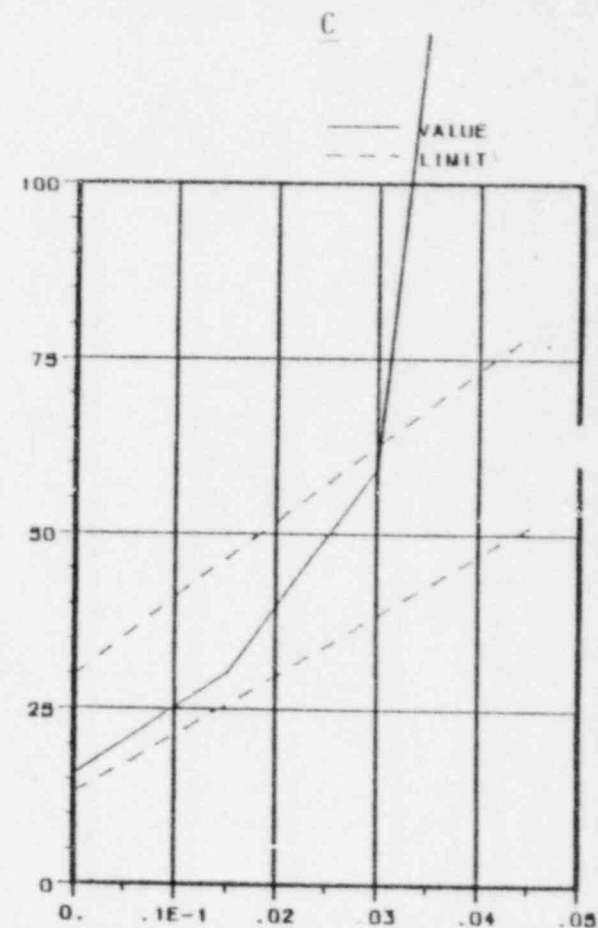
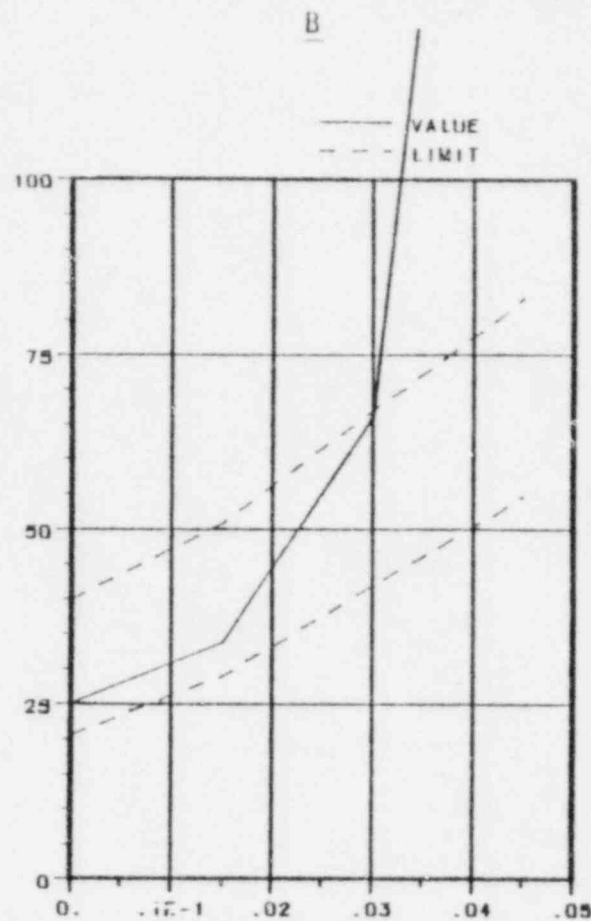
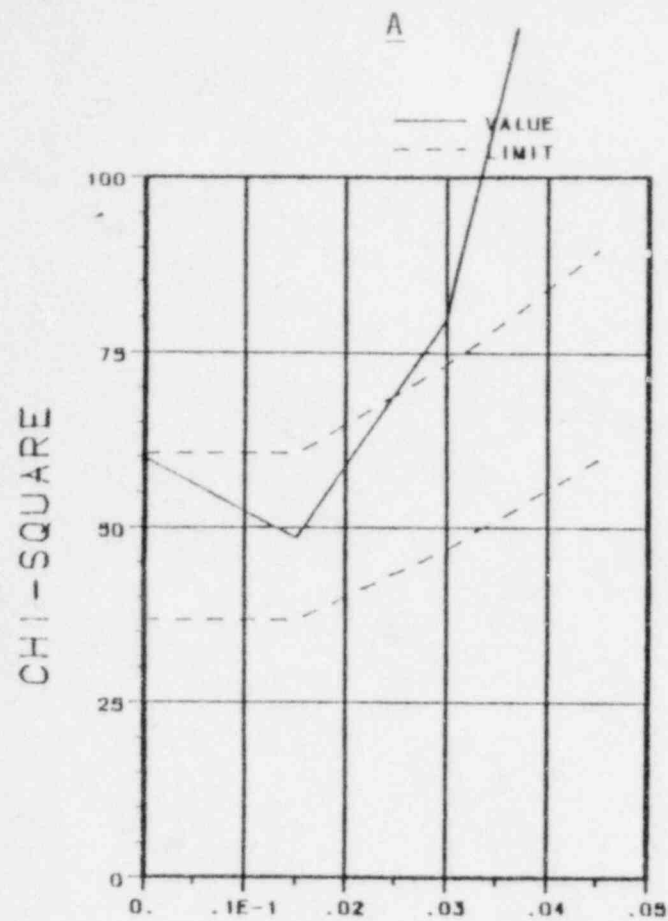
NUCLEAR ASSURANCE CORPORATION



Charles R. Johnson  
Vice President  
Engineering & Transportation Services

CRJ:cnr

8011070350



DIAMETRICAL CHANGE (INCHES)

4.5 to 36.5 inches  
Diameter Changes at:

	<u>18.5</u>	<u>24.5</u>	<u>30.5</u>
Original	-.004	-.006	+.005
Case 1	-.019	-.021	-.010
Case 2	-.034	-.036	-.025
Case 3	-.049	-.051	-.040

78.5 to 108.5 inches  
Diameter Changes at:

	<u>90.5</u>	<u>96.5</u>	<u>102.5</u>
Original	-.011	-.003	-.001
Case 1	-.026	-.018	-.026
Case 2	-.041	-.033	-.041
Case 3	-.056	-.048	-.056

114.5 to 144.5 inches  
Diameter Changes at:

	<u>120.5</u>	<u>126.5</u>	<u>132.5</u>
Original	-.016	-.003	-.004
Case 1	-.031	-.018	-.019
Case 2	-.046	-.033	-.034
Case 3	-.061	-.048	-.049