

October 17, 1996

Refer to: HNG-14

J. M. Essex, P.E.
Vice President, Sales
Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601

Dear Mr. Essex:

My June 21, 1996 acceptance letter to Mr. Roger Egan restricted the use of your QuadGuard impact attenuator to locations where reverse direction hits were unlikely pending development and testing of suitable transition designs.

On October 3 Messrs. Bernard and Stevens provided members of my staff with a copy of your October 1 letter to Mr. Eller, which forwarded data on three reverse-direction crash tests that were run on transition designs for use with the QuadGuard in locations where reverse-direction hits are possible. You requested FHWA acceptance of these specific designs. The test results are documented in a report by E-TECH Testing Services, Inc. dated September 1996 and entitled "NCHRP Report 350 Crash Test Results for the QuadGuard Transitions." The specific tests run and their results are shown as Enclosure 1. The two designs tested are Enclosures 2 and 3. Having reviewed these data, we have concluded that the tested reverse-direction transition designs satisfactorily meet the evaluation criteria appropriate for a TL-3 appurtenance. Thus, they are acceptable for use with the QuadGuard attenuator at locations where reverse-direction impacts are possible. We noted that the wood-post, w-beam transition was tested in a weak soil and with rail on only one side of the posts, as in a *roadside* (guardrail) installation. We consider this test as also supporting our acceptance of the wood-post, w-beam guardrail transition in strong soil and when used as a *median* barrier in either soil. It also supports our acceptance, for use in either soil type, of a wood-post, thrie beam barrier transition to the QuadGuard in either a guardrail configuration (as shown in Enclosure 4) or a median barrier configuration.

We noted that in the test of the concrete safety shape-to-QuadGuard transition, the concrete safety shape was reinforced and anchored to prevent movement. An equivalent design must be

used in the field to ensure satisfactory performance.

In summary, the QuadGuard may now be used on the National Highway System, when requested by a highway agency, in bi-directional applications with a wood-post w-beam or thrie beam guardrail or median barrier in either strong or weak soil or with an adequately reinforced and anchored vertical-face (as shown in Enclosure 5) or safety shape concrete barrier when an appropriate one of the previously described transition designs are used.

By copy of this letter, the FHWA field offices will be informed of our action. Please address any questions or comments to

Mr. James Hatton at (202) 366-1329.

Sincerely yours,

(original signed by Seppo I. Sillan)

Seppo I. Sillan, Acting Chief
Federal-Aid and Design Division

5 Enclosures
Acceptance Letter CC-35B