May 7, 1998

Refer to: HNG-14

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

Dear Mr. Essex:

In your April 1 letter to Mr. Henry Rentz, Director of the Federal Highway Administration's Office of Engineering, you requested acceptance of a modified Triton Barrier as a National Cooperative Highway Research Program (NCHRP) Report 350 test level 3 (TL-3) temporary barrier. Your letter also requested FHWA acceptance of a further-modified Triton configuration to function as a TL-3 terminal for the barrier. This second request will be addressed in a separate letter.

To support your request for acceptance of the Triton Barrier at TL-3, you also sent copies of your December 19, 1997, report entitled "TRITON BARRIER TL-3: Qualification to NCHRP 350 Test Level 3 - Engineering Summary," which included the full report prepared by E-TECH Testing Services, Inc., entitled "NCHRP Report 350 Crash Test Results for the TRITON BARRIER TL-3," dated December 1997, and a video tape showing the full scale tests that you conducted on the modified Triton Barrier. We noted that the Triton Barrier TL-3 modules have the same exterior dimensions as those tested earlier to obtain TL-2 acceptance but that the interior U-bolts at the ends of each module are double-nutted to the interior steel framework in the TL-3 units. Each module is set on two 178-mm high plastic pedestals to raise its center of gravity in order to meet TL-3 evaluation criteria. These pedestals are strapped to each individual unit and are also tethered together (in groups of ten) with a braided polyester cord to reduce debris scatter following an impact. We understand that all new modules will be made with the two-nut connection noted above and that all pedestals shipped to the field separately for use with earlier-manufactured modules will include extra nuts and instructions to modify any existing segments that have only a single nut connection. Enclosure 1 shows the details of the TL-3 design.

NCHRP Report 350 recommends two tests for longitudinal barriers: tests 3-10 and 3-11, the first being an 820-kg car impacting at 100 km/h and at a 20-degree angle and the second being a 2000-kg pickup truck impacting at 100 km/h and at a 25-degree angle. You ran test 3-11 twice to determine the number of modules needed in advance of the barrier length of need to ensure vehicle containment. In the first test, the vehicle impacted near the center of a 30-module array. In the second, the impact point was between modules ten and eleven. You then concluded that at least ten water-filled modules are needed in advance of the barrier length of need.

Although both strength tests met NCHRP Report 350 evaluation criteria, barrier deflection was

reported as 5.8 and 6.9 meters, respectively. You then ran a non-standard test to determine the outcome of a more typical hit. When impacted with a 2000-kg pickup truck at 100 km/h and 7 degrees, the truck was contained and redirected parallel to the barrier, which deflected only 1.4 meters. User agencies should be informed of the range of deflections to be expected and advised to ensure that these distances are available in any given work zone or that the likelihood of high angle (or heavy vehicle) impacts is low enough to result in an acceptable risk when lesser clearances are available. The results of each of the four tests you reported are shown in Enclosure 2.

Based on our review of the information you provided, we concur that the Triton Barrier, as modified and tested, meets the acceptance criteria for an NCHRP Report 350 TL-3 longitudinal barrier. Because it is a proprietary device, its use on Federal-aid projects, except exempt, non-National Highway System projects, remains subject to the conditions listed in Title 23, Code of Federal Regulations, Section 635.411 when such use is specified by the contracting authority.

Sincerely yours,

(original signed by Dwight A. Horne)

Dwight A. Horne
Chief, Federal-Aid and Design Division

2 Enclosures
Acceptance letter B-48