Memorandum

U.S. Department
of Transportation

**Federal Aviation
Administration**

Subject: **INFORMATION**: Review and Concurrence, Equivalent Level of Safety for Fuel Cutoff Control for the Eclipse 500 Aircraft (Ref. 14 CFR Part 23, §§ 23.777(d) and 23.781(b) Fuel Cutoff Control)(FAA Project TC3853CH-A) ; ACE-02-19

Date: MAR 15 2002

Reply to
Attn of:

From: Manager, Small Airplane Directorate, ACE-100

To: Manager, Chicago Aircraft Certification Office, ACE-115C

Background: Eclipse Aviation has applied to the Chicago ACO, for an Equivalent Level of Safety Finding (ELOS) to the above referenced 14 CFR Part 23 regulations. The Eclipse Model 500 fuel cutoff is on a four position, rotary knob located on the center, overhead panel (see figure at Attachment 1). The four positions are MOTOR/STOP/RUN/START. The MOTOR position is spring-loaded, so the pilot has to hold it in place to function or it will return to the STOP position. The START position is also spring-loaded, and once the start sequence is started, the pilot releases the knob and it then goes to the RUN position. To go from RUN to STOP (fuel cutoff), the pilot must push in the knob and rotate it to STOP. This is to safeguard against inadvertent fuel cutoff. There are two other push buttons located on the overhead panel used for ignition override. Since push buttons require a different action to initiate, there cannot be inadvertent fuel cutoff with any action used for ignition override. These are the only items located on the overhead panel. The engine throttle system is actuated by electrical sensors, a throttle by wire design. Enabling a mechanical fuel shutoff by an aft throttle movement was deemed unnecessarily complex for this design; therefore, this ELOS was developed. The Eclipse fuel shutoff mechanism does not have a manual shutoff capability; however, the system includes a motor operated ball valve that will not move when electrical power is removed. This motor operated ball valve is energized through the emergency electrical bus. This system is consistent with similar business jet fuel system design standards.

Applicable Regulations and Guidance: The applicant is requesting an equivalent level of safety finding for 14 CFR Part 23, §§ 23.777(d) and 23.781(b), in relation to fuel cutoff. In accordance with § 23.777(d), the fuel cutoff is to be placed in a specific location (right of thrust control for non-propeller driven airplanes), and in accordance with § 23.781(b), the control knobs must conform to specific shapes. The intent of these requirements was to standardize cockpit controls to enhance pilot effectiveness. This was due to pilots inadvertently using the wrong controls on various propeller driven, small airplanes (please refer to FAA Notice 84-12, which provides the basis of the requirements).

Key features that provide an ELOS: As described above, the design of the Eclipse Model 500 fuel cutoff precludes inadvertent cutoff by the pilot. The design also precludes inadvertent action by the pilot of another function. Therefore, the CHI-ACO position is that the design provides a level of safety that exceeds the intent of the requirements for fuel cutoff contained in §§ 23.777(d) and 23.781(b).

Recommendation: Approve request for an ELOS to 14CFR Part 23, §§ 23.777(d) and 23.781(b) Fuel Cutoff Control, based on no other equipment placed on the overhead and the System Safety Assessment per § 23.1309 is acceptable.

If you have any questions, please contact Mr. Mike Keisov at (816) 329-4144, by fax at (816) 329-4090 or by email at Mike.Kiesov@faa.gov.

Concur

Signature: _____

Manager, Small Airplane Directorate
Standard Staff, ACE-110

Date: 3/12/02

Concur

Signature: _____

Manager, Small Airplane Directorate,
ACE-100

Date: 3/15/02

Attachment
Eclipse Equivalent Level of Safety request letter with Overhead Panel Figure.