June 23, 1994

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NOTE TO: Marty Virgilio, Acting Director
Division of Systems Safety & Analysis

FROM: Timothy Collins, Acting Branch Chief
Reactor Systems Branch
Division of Systems Safety & Analysis

SUBJECT: FERMI-2 SHROUD HEAD BOLT CRACK

During the current outage at Fermi-2, the licensee observed cracks in 16 out of a total of 48 Shroud Head Bolts (SHB). As shown in the attached diagrams, the SHBs hold the shroud head and separators in place, and keep the shroud head attached to the core shroud. The licensee is currently evaluating the magnitude of the cracks utilizing the GE recommended (SIL-433) UT examination procedure, and plan to implement the SIL recommendations for the cracked SHBs. The licensee will provide the information to NRC. The restart of the plant is currently scheduled in October, 1994.

Cracking of SHBs has been observed at several BWRs so far. GE SIL No.433, issued February 7, 1986, and Supplement 1, issued September 15, 1993, address the SHB crack issue, which indicates that there is no safety concern associated with a failure of these bolts, because a failed bolt will be captured during plant operation. Failure of the shroud head bolt does not result in loose parts. The lower part of the failed bolt cannot drop away from the sleeve and become loose because the alignment pin protrudes through the window in the sleeve and the broken segment is thus captured. The SIL further states that failure of one or two SHBs is not sufficient to allow differential pressure to lift the shroud head during plant operation.

The staff's preliminary assessment of the issue suggests that if sufficient number of the SHBs are degraded to the extent that the differential pressure during normal operation would lift the shroud head, bypass flow will result and a power/flow mismatch will be observed by the operator. This would be indicative of abnormal plant operating condition. The concern of Top Guide lift does not occur in this case because the Top Guide is set on a rim near the top end of the shroud and is bolted in place (Ref 1). For the same reason, Top Guide lift concern does not exist also for a steam-line break accident in this case. Therefore, the SRXB staff's opinion is that the SHB crack issue may not raise any new and significant safety concern. Our discussion with the Materials Engineering Branch also support the same opinion.

Reference 1: GE Technology Systems Manual, Vol.1, page 2.1-8.

/s/
Timothy Collins, Acting Branch Chief
Reactor Systems Branch
Division of Systems Safety & Analysis

cc: R. Jones

SRXB:DSSA	SRXB:DSSA	SRXB:DSSA
MRAZZAQUE:BAH	MRUBIN	TCOLLINS
6/27/94	6/27/94	6/27/94 G:\CRACK.SHB

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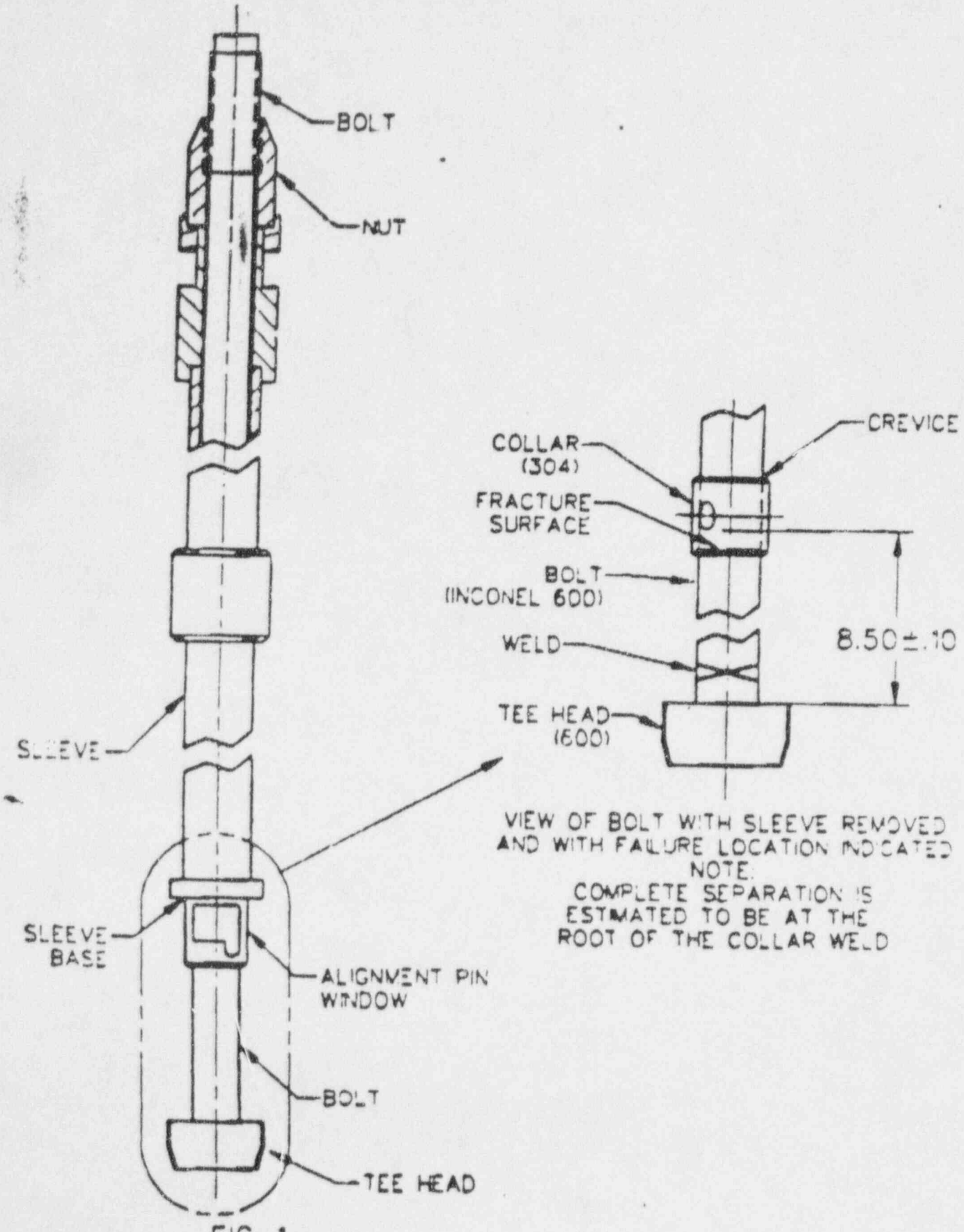

BOLT
NUT
SLEEVE
SLEEVE BASE
ALIGNMENT PIN WINDOW
BOLT
TEE HEAD
COLLAR (304)
CREVICE
FRACTURE SURFACE
BOLT (INCONEL 600)
WELD
8.50±.10
TEE HEAD (600)
VIEW OF BOLT WITH SLEEVE REMOVED AND WITH FAILURE LOCATION INDICATED
NOTE:
COMPLETE SEPARATION IS ESTIMATED TO BE AT THE ROOT OF THE COLLAR WELD

FIG. 1

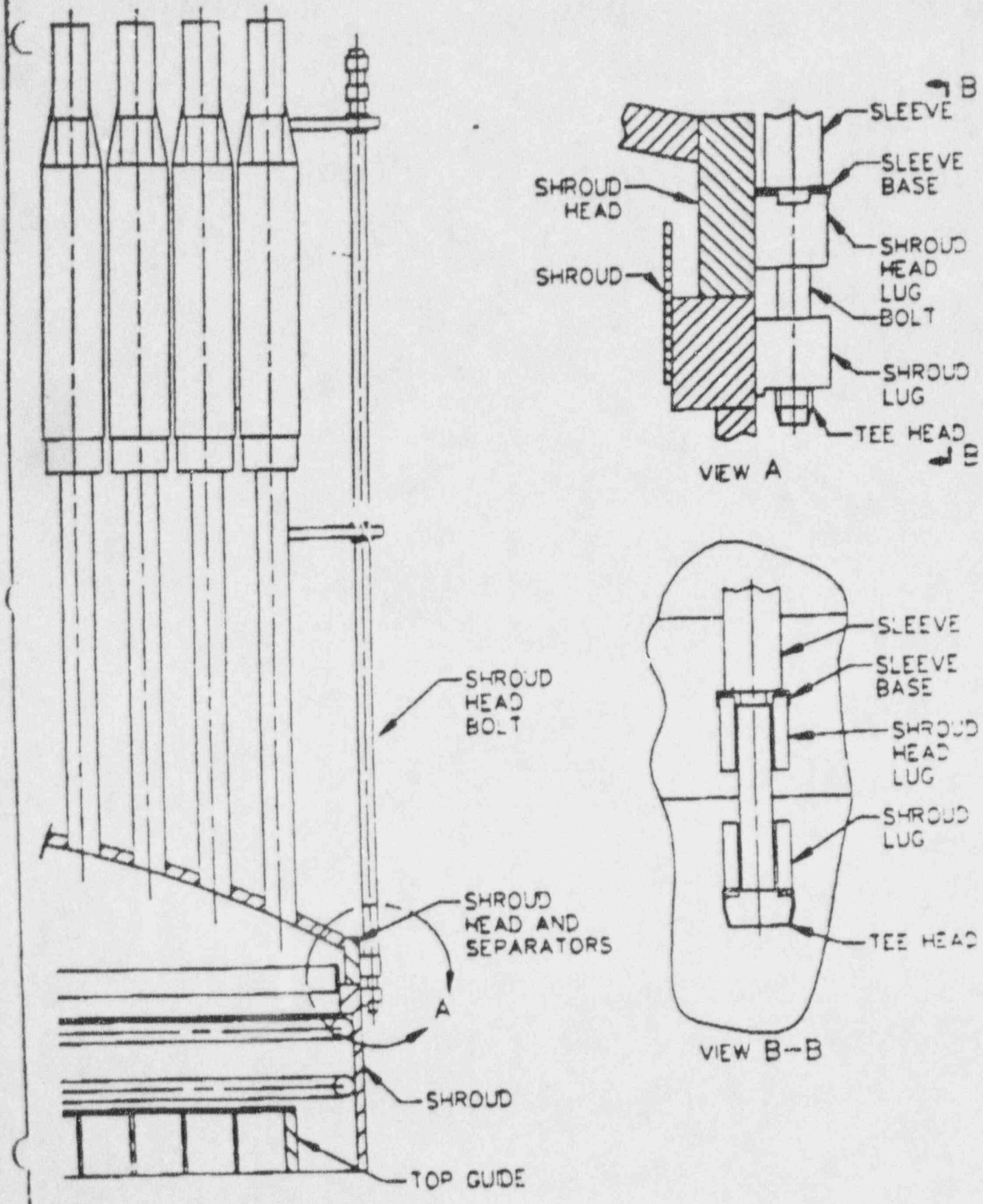
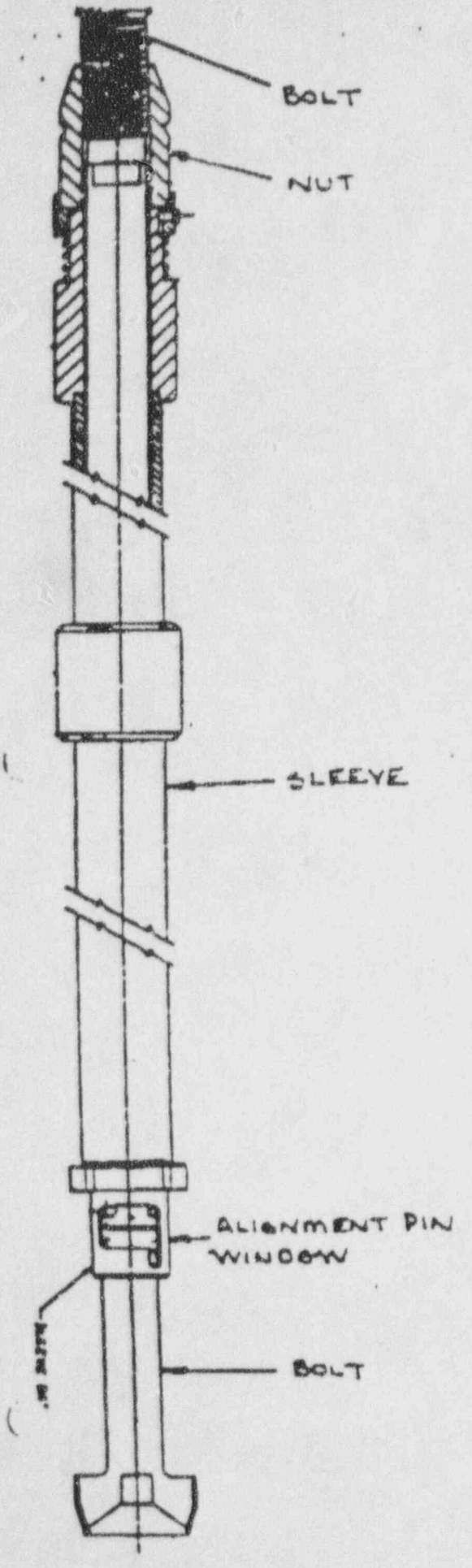
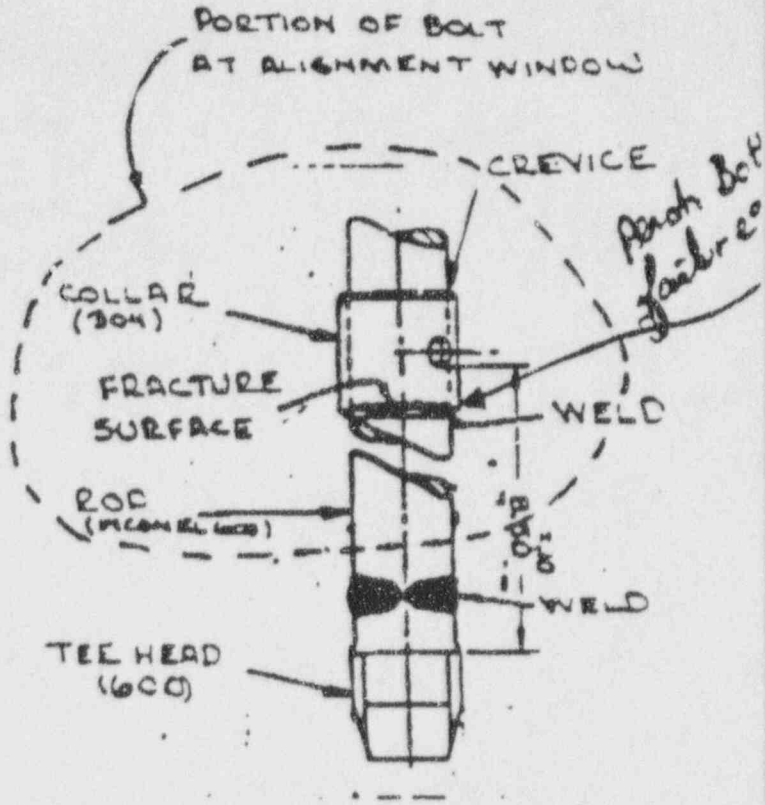

B
SLEEVE
SLEEVE BASE
SHROUD HEAD
SHROUD
SHROUD HEAD LUG BOLT
SHROUD LUG
TEE HEAD
B
VIEW A
SHROUD HEAD BOLT
SHROUD HEAD AND SEPARATORS
A
SHROUD
TOP GUIDE
SLEEVE
SLEEVE BASE
SHROUD HEAD LUG
SHROUD LUG
TEE HEAD
VIEW B--B

FIG. 2



ENLARGED VIEW WITH FAILURE LOCATION INDICATED



NOTE: COMPLETE SEPARATION IS ESTIMATED TO BE AT THE ROOT OF THE COLLAR WELD