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FPL

Florida Power & Light Company, 6351 S. Ocean Drive, Jensen Beach, FL 34957

March 16, 1999

L-99-55  
10 CFR 50.4  
10 CFR 50.55a

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

RE: St. Lucie Unit 2  
Docket No. 50-389  
In-Service-Inspection Plan  
Second Ten-Year Interval  
Relief Requests 23 and 24

Pursuant to 10 CFR 50.55a (g)(5)(iii) and (a)(3)(i), and 10 CFR 50.55a, (Footnote 6) Florida Power and Light Company (FPL) requests approval of the enclosed Relief Requests 23 and 24.

Relief Request 23 documents the impracticality of the Code examination requirements of category B-A, Code item B1.21 for weld 102-101. Relief Request 24 incorporates Code Case N-566, *Corrective Action for Leakage Identified at Bolted Connections, Section XI, Division 1*, in lieu of the requirements of IWA-5250(a)(2). The Code Case will be used for the performance of the required examinations of Class 1, 2, and 3 pressure retaining bolted connections as specified in the 1989 Edition of ASME Section XI. FPL has determined pursuant to 10 CFR 50.55a (a)(3) that the proposed alternatives would provide an acceptable level of quality and safety, and that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

NRC action is requested to be complete by August 1999 to support planning for the Spring 2000 Unit 2 refueling outage (SL2-12). Please contact us if there are any questions about this submittal.

Very truly yours,

J. A. Stall  
Vice President  
St. Lucie Plant

JAS/GRM

Enclosures

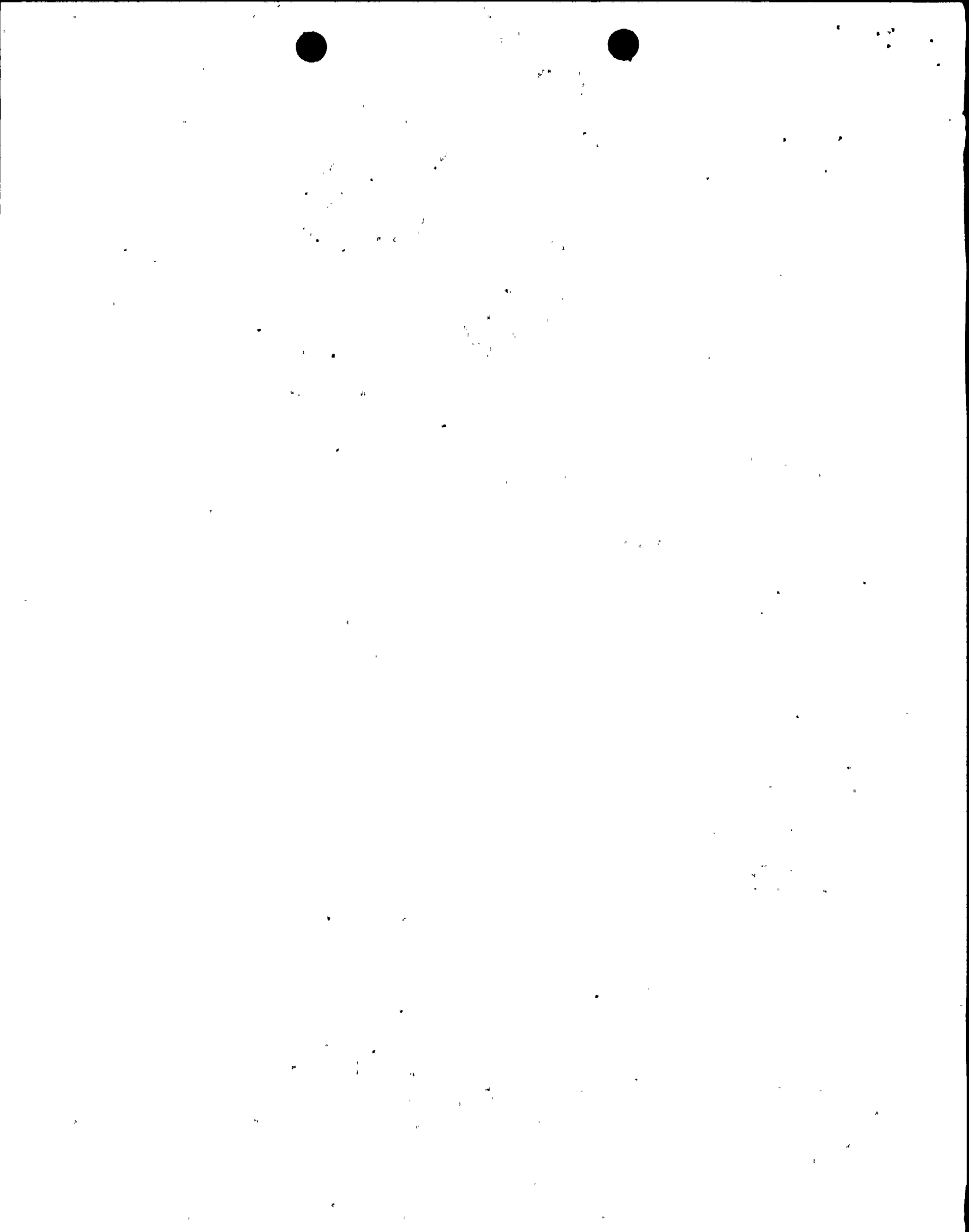
cc: Regional Administrator, Region II, USNRC  
Senior Resident Inspector, USNRC, St. Lucie Plant

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an FPL Group company

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St. Lucie Unit 2  
SECOND INSPECTION INTERVAL  
RELIEF REQUEST NUMBER 23

**A. COMPONENT IDENTIFICATION:**

Class: 1

Reactor Pressure Vessel (RPV)

Class 1 pressure retaining welds in the reactor vessel at Florida Power and Light's (FPL) St. Lucie Unit 2.

**B. EXAMINATION REQUIREMENT:**

Rules for In-Service-Inspection of Nuclear Power Plant Components, Section XI, 1989 Edition

Exam Cat.	Item no.	Examination Requirements
B-A	B1.20 B1.21	Essentially 100% volumetric examination of accessible length of circumferential head welds

**C. RELIEF REQUESTED:**

Pursuant to 10 CFR 50.55a (g)(5)(iii), FPL requests relief from the required volumetric examination of RPV head weld 102-101 as specified in Table IWB-2500-1 Category B-A of the 1989 Edition of ASME Section XI.

**D. BASIS FOR RELIEF:**

Weld 102-101 is located under the RPV head shroud, has permanent obstructions due to the control element drive mechanisms (CEDM) penetrating it, and is generally inaccessible from the outside and inside surfaces of the RPV head. The shroud is welded and bolted to the RPV head in several areas. Removal and replacement of the shroud would be time consuming, involve high radiation exposure, could create an airborne contamination hazard, and potentially cause harm to the RPV head. Alternative surface examinations can not be utilized for the same reasons.

The performance of a weld examination from the outside surface is impractical. The shroud, which is located below the weld (see attachment), would interfere with access for manual ultrasonic examinations and robotic equipment from the flange side. CEDMs that are located through and above the weld, limit access for manual examinations and robotic equipment from the other direction. Performing radiography is also impractical due to the high radiation levels and limited access. The CEDMs that penetrate the weld further limit the amount of weld that could be radiographed. Performance of an ultrasonic examination from the inside surface is also impractical due to the interference of the CEDMs and the high radiation levels.

Performing the examinations would require FPL to remove the shroud from the RPV head. This would involve a great deal of radiation exposure, cutting shroud components, disassembly of RPV instrumentation, and restoration of that same equipment. The possibility of harming the head would increase due to the work involved in removing the shroud and its associated components.



St. Lucie Unit 2  
SECOND INSPECTION INTERVAL  
RELIEF REQUEST NUMBER 23

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FPL has performed a system leakage test on this weld every outage. No leakage has ever been noted. Industry experience with the St. Lucie vintage of reactor has not shown any specific or generic problems with this weld.

Having FPL remove the shroud to gain access to a small percentage of the weld would be a hardship without a compensating increase in safety. Removing the shroud would also increase the possibility of damage to the RPV head.

**E. ALTERNATIVE EXAMINATIONS:**

Periodic system pressure tests per Category B-P, Table IWB-2500-1

**F. IMPLEMENTATION SCHEDULE:**

Second In-Service-Inspection Interval

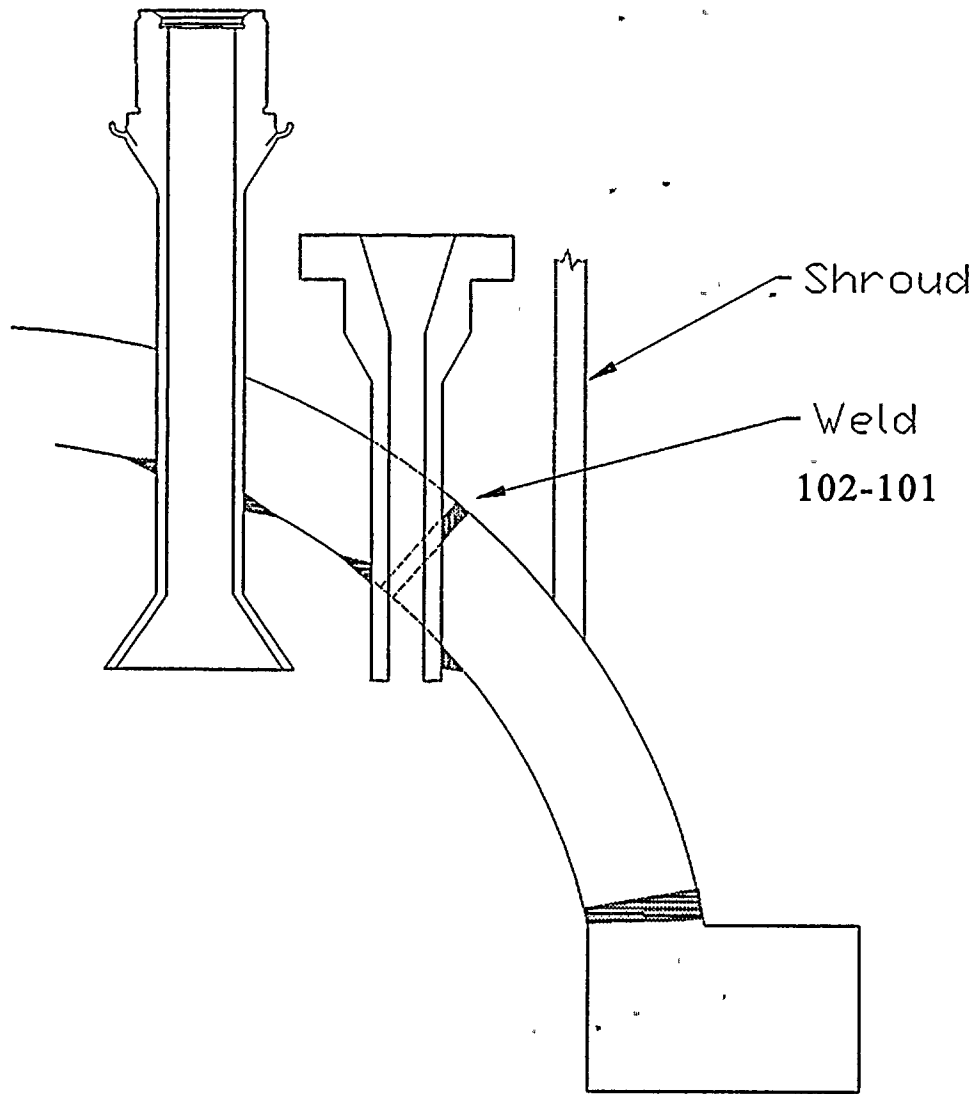
**G. ATTACHMENTS TO THE RELIEF:**

RPV head drawing showing general arrangement

St. Lucie Unit 2  
SECOND INSPECTION INTERVAL  
RELIEF REQUEST NUMBER 23

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RPV Head General Arrangement







St. Lucie Unit 2  
SECOND INSPECTION INTERVAL  
RELIEF REQUEST NUMBER 24

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**A. COMPONENT IDENTIFICATION:**

Class 1, 2, and 3 Pressure Retaining Bolted Connections at Florida Power and Light Company's (FPL) St. Lucie Unit 2.

**B. EXAMINATION REQUIREMENT:**

ASME Section XI, 1989 Edition with no Addenda, paragraph IWA-5250(a)(2) requires that if leakage occurs at a bolted connection, during the conduct of a system pressure test, the bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100.

**C. RELIEF REQUESTED:**

Pursuant to 10 CFR 50.55a (a)(3)(i), FPL requests to use the alternative requirements of Code Case N-566, *Corrective Action for Leakage Identified at Bolted Connections*, when leakage is observed at a bolted connection during the conduct of a system pressure test. Additionally, when required, FPL proposes to perform a VT-1 visual examination of the affected bolting in lieu of the specified VT-3 examination.

**D. BASIS FOR RELIEF:**

Removal of pressure retaining bolting at mechanical connections for visual examination and subsequent evaluation in locations where leakage has been identified is not always the most prudent action to take. Many bolted connections associated with pumps and valves are simply studs threaded into the body of the component. Removal of these studs is typically very difficult and time consuming due to the length of time they have been installed and can easily result in additional damage to the main component as a result of the attempts or methods of removal. Another situation frequently encountered at commercial nuclear plants is the complete replacement of bolting materials (studs, bolts, nuts, washers, etc) at mechanical joints during plant outages. When the associated system process piping is pressurized during plant start-up, leakage is identified at these joints. Proper retorquing of the joint bolting, in most cases, stops the leakage. Removal of any of the joint bolting to evaluate for corrosion would be unwarranted in this situation due to new condition of the bolting materials. ASME Section XI Interpretation XI-1-92-01 has recognized this situation as one to which the requirements of IWA-5250(a)(2) do not apply. The requirement to remove bolting for these components, and on components when only minor leakage is noted, is a task that increases system out of service time, radiation exposure and subjects the systems to a potential for internal contamination without a commensurate increase in safety or quality.

The Code requirement to remove, examine, and evaluate bolting does not allow the owner to consider other factors which may indicate the acceptability of the bolted connection. FPL considers this requirement to be unnecessarily prescriptive and restrictive. Other factors that should be considered when evaluating bolting condition: joint bolting materials, service age of joint bolting materials, location of the leakage, history of leakage at the joint, evidence of corrosion with the joint assembled, corrosiveness of process fluid, and plant/ industry studies of similar bolting materials in a similar environment. The proposed alternative will allow FPL to utilize a systematic approach and sound engineering judgment in the evaluation of leakage identified at bolted connections during the conduct of a system pressure test. As part of the



St. Lucie Unit 2  
SECOND INSPECTION INTERVAL  
RELIEF REQUEST NUMBER 24

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evaluation, the seven factors listed in the proposed alternative will be considered, as applicable. Based on the preceding discussion, FPL considers the proposed alternative to provide an acceptable level of safety and quality.

With regard to the practicality of performance of a VT-3 visual examination, ASME Section XI consistently references the VT-1 for examination of pressure retaining bolting. Guidance for performance of VT-1 examination of bolting is already incorporated within FPL procedures and is considered more stringent than a VT-3 examination.

**E. ALTERNATIVE EXAMINATIONS:**

As an alternative to the requirements of the 1989 Edition of the ASME Section XI Code, FPL proposes that if leakage is discovered at a bolted connection by VT-2 examination during a system pressure test, the leakage will be stopped and an engineering evaluation will be performed to determine the susceptibility of the bolting to corrosion and assess the potential for failure. The following factors will be considered, as applicable, when evaluating the acceptability of the bolting:

1. Service age of the bolting
2. Bolt and component material
3. Corrosiveness of process fluid
4. Leakage location and system function
5. Leakage history at the specific location
6. Visual evidence of corrosion at connection (while connection is assembled)
7. Physical configuration of the bolted connection

If the evaluation of the above criteria concludes that the leaking condition has not degraded the bolting, no further action is necessary. If the evaluation concludes that the bolting is degraded or is inconclusive in determining degradation, the bolt closest to the source of leakage shall be removed, VT-1 examined, and evaluated in accordance with IWA-3100(a). When the removed bolt shows evidence of unacceptable degradation, additional affected bolting shall be removed, VT-1 examined, and evaluated in accordance with IWA-3100(a), or the affected bolting shall be replaced.

**F. IMPLEMENTATION SCHEDULE:**

Second In-Service Inspection Interval

**G. ATTACHMENTS TO THE RELIEF:**

Code Case N-566

St. Lucie Unit 2  
Docket No. 50-389  
L-99-55 Enclosure 2

CASE  
N-566

CASES OF ASME BOILER AND PRESSURE VESSEL CODE

Approval Date: August 9, 1996

*See Numerical Index for expiration  
and any reaffirmation dates.*

Case N-566

**Corrective Action for Leakage Identified at Bolted  
Connections Section XI, Division 1**

**Inquiry:** What alternative to the requirements of IWA-5250(a)(2) may be used when leakage is detected at bolted connections?

**Reply:** It is the opinion of the Committee that, as an alternative to the requirements of IWA-5250(a)(2), one of the following requirements shall be met for leakage at bolted connections:

(a) The leakage shall be stopped, and the bolting and component material shall be reviewed for joint integrity.

(b) If the leakage is not stopped, the joint shall be evaluated in accordance with IWB-3142.4 for joint integrity. This evaluation shall include consideration of the number and condition of bolts, leaking medium, bolt and component material, system function, and leakage monitoring.