TOLEDO
EDISON

May 28, 1982

Log No. K82-836
FILE: RR 2 (NP-32-82-03)

Docket No. 50-346
License No. NPF-3

Mr. James G. Keppler
Regional Administrator, Region III
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

Enclosed are three copies of Revision 1 to Licensee Event Report 82-019 including the respective supplemental information sheets. The revision to the report is indicated by a "1" in the left margin of each page.

This reissue of Revision 1 is due to a typographical error on the cover letter (Log No. K82-806) issued May 24, 1982. This error listed the Licensee Event Report as 82-016 instead of 82-019. Please replace your previous copies of this report with the attached revision.

Yours truly,

Terry D Murray

Terry D. Murray
Station Superintendent
Davis-Besse Nuclear Power Station

TDM/lmr

Enclosure

CC: Mr. Richard DeYoung, Director
Office of Inspection and Enforcement
Encl: 30 copies

Mr. Norman Haller, Director
Office of Management and Program Analysis
Encl: 3 copies

Mr. Luis Reyes
Resident Inspector
Encl: 1 copy

THE TOLEDO EDISON COMPANY EDISON PLAZA 300 MADISON AVENUE TOLEDO, OHIO 43652

IE22

JUN 3 1982

LICENSEE EVENT REPORT

CONTROL BLOCK: ☐☐☐☐☐☐ ① (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

0 1	LICENSEE CODE: O H D B S 1 ②	LICENSE NUMBER: 0 0 - 0 0 0 0 0 - 0 0 ③	LICENSE TYPE: 4 1 1 1 1 ④	CAT: ⑤		
CON'T 0 1	REPORT SOURCE: L ⑥	DOCKET NUMBER: 0 5 0 0 0 3 4 6 ⑦	EVENT DATE: 0 4 1 9 8 2 ⑧	REPORT DATE: 0 5 2 4 8 2 ⑨		

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES ⑩

0 2 (NP-32-82-03) During the steam generator eddy current inspection, it was discovered
0 3 that some of the steam generator tubes located adjacent to the auxiliary feedwater
0 4 header showed potential interaction with the header support system. Secondary side
0 5 manways from Steam Generators 1-1 and 1-2 were removed, and it was discovered by di-
0 6 rect visual observation and fiberoptic inspection that the auxiliary feedwater headers
0 7 were not securely fastened and had experienced damage. Further inspections since the
0 8 initial submittal are detailed as of May 17, 1982 on the attached Supplemental Information report.

	SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
0 9	C H ⑪	B ⑫	A ⑬	X X X X X X ⑭	X ⑮	Z ⑯

⑰ LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	8 2	—	0 1 9	/	0 1	X	—	1

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS ㉒	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
F ⑱	X ⑲	Z ⑳	Z ㉑	2 0 0 0	Y ㉓	Y ㉔	N ㉕	B 0 1 5 ㉖

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS ㉗

1 0 The damage appears to have been caused by the localized collapse of the steam bubble
1 1 within the header during injection of cold auxiliary feedwater, resulting in large
1 2 differential pressures across the walls of the headers. Proposed corrective actions
1 3 include a change to external auxiliary feedwater headers. This report will be revised
1 4 as further information becomes available.

	FACILITY STATUS	% POWER	OTHER STATUS ㉚	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION ㉜
1 5	H ㉘	0 0 0 ㉙	MODE 6	C ㉛	TUBE INSPECTION

	ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY ㉟	LOCATION OF RELEASE ㊱
1 6	Z ㉝	Z ㉞	NA	NA

PERSONNEL EXPOSURES

	NUMBER	TYPE	DESCRIPTION ㊴
1 7	0 0 0 ㊲	Z ㊳	NA

PERSONNEL INJURIES

	NUMBER	DESCRIPTION ㊶
1 8	0 0 0 ㊵	NA

LOSS OF OR DAMAGE TO FACILITY ㊸

	TYPE	DESCRIPTION
1 9	Z ㊷	NA

PUBLICITY

	ISSUED	DESCRIPTION ㊺	NRC USE ONLY
2 0	Y ㊹	Northwestern Ohio News Media and Wire Services	

Dupe of ~~8206020310~~

DVR #82-048 NAME OF PREPARER Stan Batch PHONE: (419) 259-5000 ext. 188

TOLEDO EDISON COMPANY
DAVIS-BESSE NUCLEAR POWER STATION UNIT ONE
SUPPLEMENTAL INFORMATION FOR LER NP-32-82-03

DATE OF EVENT: April 19, 1982

FACILITY: Davis-Besse Unit 1

Description of Occurrence: During the steam generator eddy current inspection, it was discovered that some of the steam generator tubes located adjacent to the auxiliary feedwater header showed potential interaction with the header support system. A secondary side manway from Steam Generator 1-1 was removed, and it was determined by direct visual observation and fiberoptic inspection that the auxiliary feedwater header was not securely fastened to the upper shroud and had experienced damage. Inspection of the other steam generator yielded similar results. These inspections have identified:

(1) Ten peripheral tubes in the 1-2 SG and fourteen peripheral tubes in the 1-1 SG based on eddy current examinations may have been in contact with the AFW header assembly.

(2) As a result of this potential contact between the tubes and header assembly, three tubes contain pluggable indications.

(3) The amount of tube ID reduction on the damaged tubes is less than 20 mils.

(4) The outboard wall of the header is distorted inward (concave) as much as 4½".

(5) Certain header support brackets are bent, and on some the bottom ligaments are torn out or have broken off.

(6) Dowel pins are missing at six of eight locations inspected. Three dowel pins and two brackets have been retrieved from the steam annulus area in 1-2 SG.

(7) There is evidence of wear on dowel pins and brackets.

(8) The auxiliary feedwater nozzle thermal sleeve was not in alignment with the header on Unit #1 (1-1 SG).

See drawings on pages

This incident is being reported in accordance with Technical Specification 6.9.1.8.

Further inspections have been performed since the initial submittal, and the following information provides the status of those inspections as of May 17, 1982.

1 A detailed video inspection supplemented by selective ultrasonic (UT) and dye penetrant (PT) testing is underway. Video inspections have been performed on both steam generators. To date, the areas inspected include all eight dowel pin/bracket locations (external brackets only) on each header, the header to shroud interface and the bottom, top, and outboard side of each header for its extire circumference.

Ultrasonic and dye penetrant testing was performed on the portion of the header accessible in the manway of steam generator 1-2; a portion of the bottom and outboard plates and the connecting weld was examined. This area was choosen for testing because of its accessibility and because the deformation of the header in this area was more severe than in any other location. The existing auxiliary feedwater piping has been disconnected from the steam generators to allow removal of the auxiliary feedwater thermal sleeves and to provide an additional inspection port. Dye penetrant testing of the inner wall of the auxiliary feedwater header has been conducted through the resulting hole and UT and PT examinations of the auxiliary feedwater nozzle area are being conducted.

The results of the video inspections indicate conditions similar to those previously reported. Six of the eight dowel pins in steam generator 1-2 and two in generator 1-1 are no longer in place. No broken brackets other than the two previously reported on generator 1-2 have been identified. The deformation of the header is not symmetrical; in some locations the outboard wall is indented (concave) as much as 4½" while in other areas little or no damage is noted. This non-uniform deformation has led to gaps between the header and shroud of as much as half an inch on generator 1-2 with less noticeable gaps in generator 1-1. In steam generator 1-2 the entire header has been rotated approximately 1/2 inch with respect to its vertical axis through the center of the steam generator and has shifted approximately 1/2" away from the manway. No corresponding rotation was noted in steam generator 1-1, although a small off-axis shift has occurred.

The entire header is structurally sound. Other than the deformations previously
1 noted, no indications of weld or material cracking have been found. The UT and PT examinations on the header at the manway of steam generator 1-2, and the PT examinations of the inner wall of the header, accessible through the auxiliary feedwater nozzle, support this finding. Preliminary results of the UT and PT examinations of the auxiliary feedwater nozzle area of the shell indicate that no damage occurred as a result of auxiliary feedwater splashing back on the nozzle from the misalignment between the header and the thermal sleeve on steam generator 1-1.

Additional inspections are underway and will be detailed in a future revision to this report.

Designation of Apparent Cause of Occurrence: Although the possible failure mechanisms are still being evaluated the damage appears to have been caused by the localized collapse of the steam bubble within the header during injection of cold auxiliary feedwater, resulting in large differential pressures across the walls of the header. This problem may have been complicated by the large thermal gradients which develop across the walls of the header material during an injection. The new external ring header design will not be subjected to similar failure mechanisms.

Analysis of Occurrrence: There is no danager to the health and safety of the public or to station personnel. The steam generators are not in use at this time since the unit is shutdown for the refueling outage. There have been no actuations of the auxiliary feedwater system where the header was unable to deliver adequate flow.

Corrective Action: Two major objectives must be satisfied by the corrective actions taken for this problem. The existing internal auxiliary feedwater header must be restrained to preclude further damage to the steam generator tubes, and a means to inject auxiliary feedwater to the steam generators must be provided. To satisfy these objectives the internal auxiliary feedwater header will be attached to the shroud on which it currently rests, and an external auxiliary feedwater ring will be installed with eight injection nozzles to provide auxiliary feedwater flow. The existing auxiliary feedwater nozzle will be blank flanged and the internal header will not be used for flow distribution.

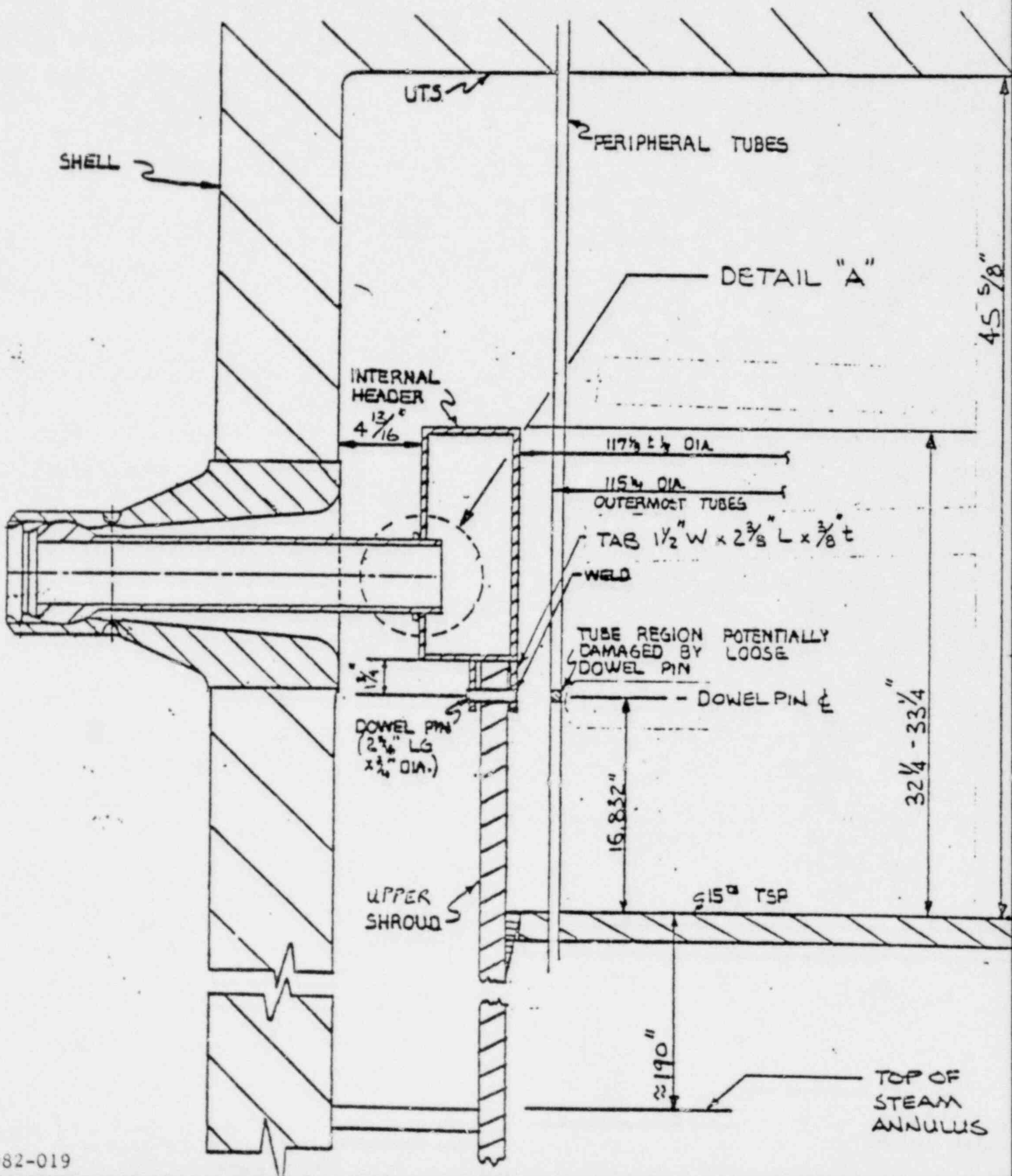
To stabilize the internal header, eight holes will be drilled through the steam generator shell and shroud near each dowl pin and bracket location. Those dowel pins and brackets which are not or cannot be securely fastened to the header or the shroud will be removed. If any additional dowel pins or internal brackets are found to be missing they will be located and retrieved. The header will then be centered on the shroud and the assembly will be securely fastened to the shroud. Although the exact method by which the header will be attached to the shroud has not yet been identified, several methods are being considered. The concept of header stabilization is still under review. The seismic and accident loads to which the header may be subjected are currently being evaluated to ensure that the header will remain in place. 1

The eight holes drilled in the steam generator shell and shroud for header stabilization work will also be used as points of injection for an external feedwater ring header. The design of the external header system is similar to the design on earlier B & W units. The design includes an external, split ring header, with eight, fifty inch long J-pipe risers feeding into the steam generator through thermal sleeves, directively into the tube bundle. Auxiliary feedwater will be injected into the steam generator tube bundle approximately three inches higher than in the earlier header design. Since injection at this higher elevation results in an increased susceptibility of the steam generator tubes to flow induced vibrations, compensating measures to reduce the flow volocity into the tube bundle have been taken. Eight injection nozzles will be used at Davis-Besse as opposed to the six in the earlier external header design and the throat diameter on the thermal sleeve will be increased from 2 inches to 2½ inches. This report will be updated as further information becomes available.

Failure Data: There have been no previously reported incidents of auxiliary feedwater header damage.

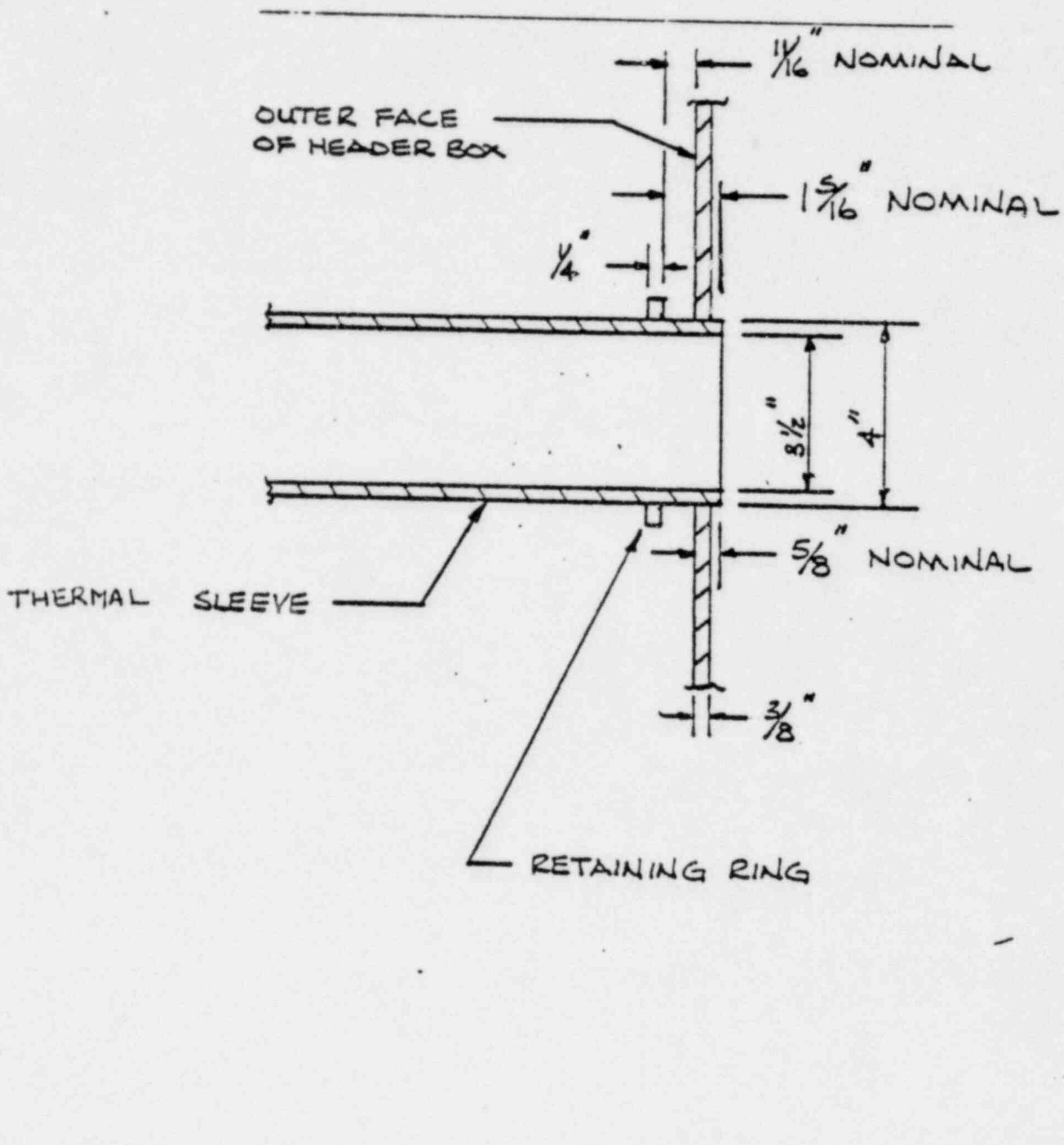
LER #82-019

LONGITUDINAL SECTION AT DOWEL PIN



DETAIL A

AUXILIARY FEEDWATER SLEEVE/HEADER INTERFACE



LOCATION OF AUXILIARY FEEDWATER HEADER FLOW HOLES