From WCAP-7870, "Neutron Shielding Pads", May 1972

7.5 4 LOOP PLANT - NEUTRON SHIELD PADS

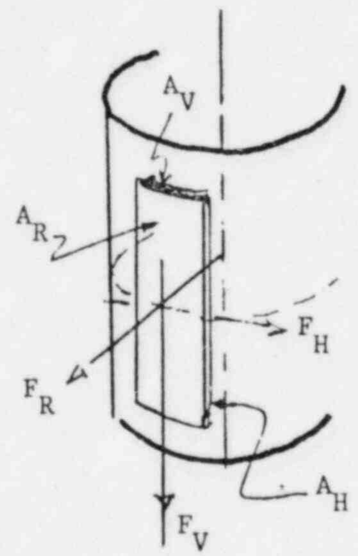
Faulted Condition Study.

During the primary pipe rupture accident (Blowdown) combined with the Design Basis Earthquake the following forces are applied to the neutron shield pads:

radial $F_R = \Delta P_R \times A_R$

axial $F_V = \Delta P_V \times A_V$

tangential $F_H = \Delta P_H \times A_H$



The pressure values were calculated using the Blowdown Code and the resulting stresses are as follows:

- Stresses in the pin

  - Maximum primary stresses $\sigma_x = 0$

    $\sigma_y = 55,697$ psi bending

    $\tau = 16,860$ psi shear

Resulting stress intensity = 65,109 < Allowable stress = 1.05 Su = 77,000 psi
(1.5 x 0.7 Su)

- Fatigue analysis (10 cycles fully reversed)

  Seq = 78,000 < Allowable stress = Sa = 650,000 psi
  (Section III)

- Stresses in the bolt

- Maximum stresses $\sigma = 62,071$ psi - bending

  $\tau = 660$ psi

  Resulting stress intensity = 62,085 < Allowable stress = 1.05 Su
  (1.5 x .7 Su)
  = 77,000 psi

- Fatigue Analysis (10 cycles fully reversed)

  Seq = 155,000 < Allowable stress = Sa = 650,000 psi
  (Section III)

APPENDIX A

NEUTRON SHIELD PAD BOLT STUDY

Two neutron shield bolt tests were performed at the Westinghouse R&D Materials Testing and Evaluation Laboratory.

Both tests were conducted on a fixture similar to that shown on Sketch A-1. The objective of the test was to subject the bolts, two per assembly, to a fatigue loading in both shear and bending. Sketch A-1 indicates the direction of loading.

The first test was conducted with the test bolts preloaded to 100% of the design value. An LVDT (linear variable displacement transducer) control maintained the cyclic displacement constant throughout the test. Testing was initiated and was not terminated until the bolts had been subjected to 370,000 cycles, the value specified in the test prospectus. Two minor problems were encountered during the test which caused short shutdowns:

1. The initial load required to attain the specified deflection exceeded the machine capacity. This was rectified by changing machines.

2. A stud in the test fixture broke, requiring replacement.

The second test was performed in the same manner as the first test with the exception that the bolts were preloaded to 25 percent of their design value. Displacement was again controlled to cycle between the same values and the test was concluded after attaining 370,000 cycles.

During both tests cycling was limited to 0.3 Hz to avoid overheating of the test specimens.

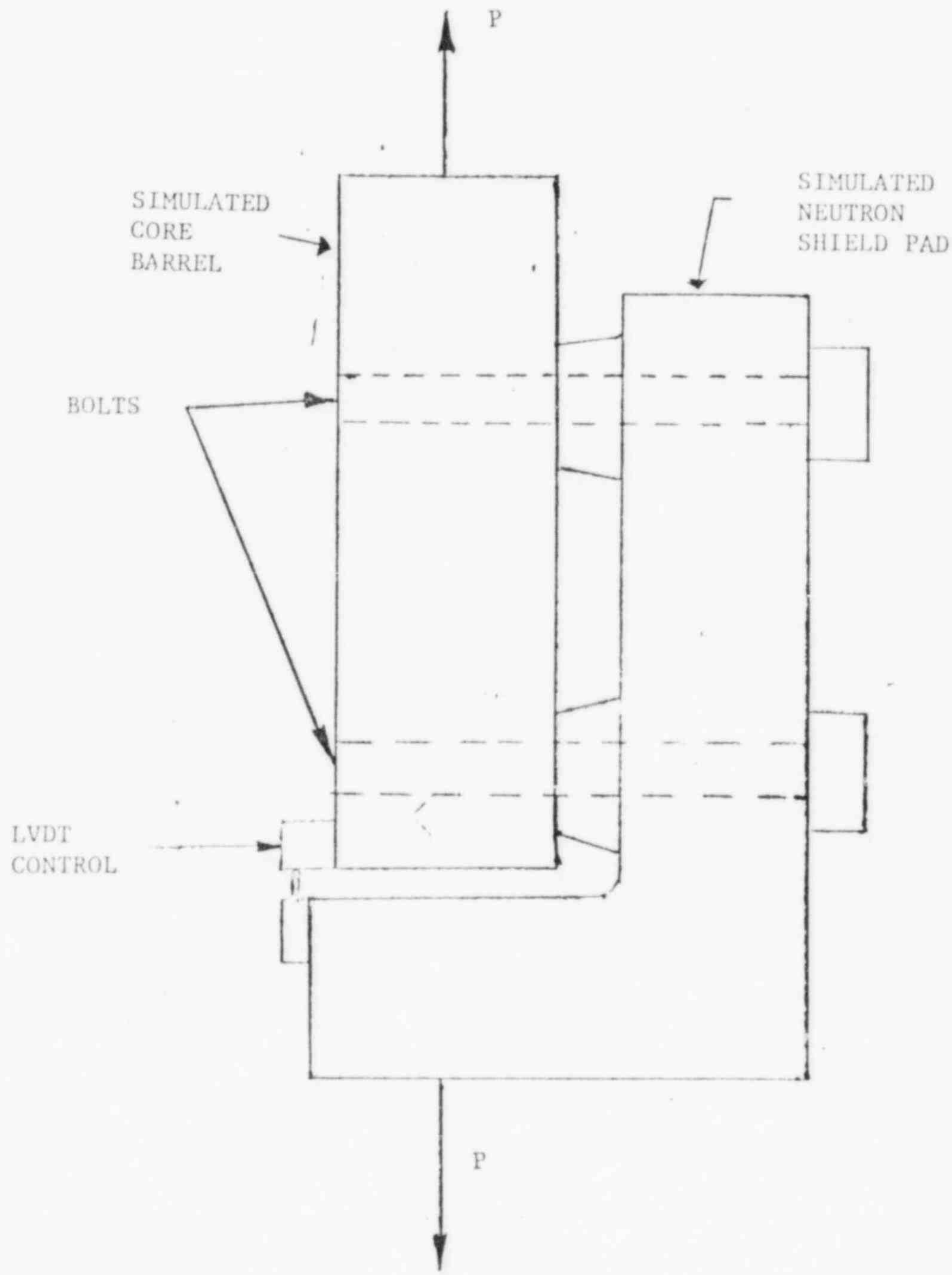


FIGURE A-1. NEUTRON SHIELD BOLT ASSEMBLY SIDE VIEW

John Faw 27072

To NRC
ORB #4
P. Wagner
Fm RLG. 11
- 4 pages

DUKE POWER COMPANY

POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

August 5, 1981

Mr. James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Re: Oconee Nuclear Station
Docket No. 50-269
RO-269/81-11, Supplement 1

Dear Mr. O'Reilly:

My letter of July 24, 1981 provided Reportable Occurrence Report RO-269/81-11 concerning broken core barrel assembly thermal shield bolts. This letter supplements the initial submittal and provides information available to date from laboratory examinations of the fractured bolt samples.

Other utilities with B&W designed NSSS have been advised of results contained herein. Duke will continue to provide supplementary reports as significant actions are completed.

Very truly yours,

William O Parker Jr

William O. Parker, Jr.

RLG/php
Attachment

cc: B&W Regulatory Response Group:

J. J. Mattimoe, SMUD, Chairman
J. H. Taylor, B&W
W. C. Rowles, TECO
D. C. Trimble, AP&L
G. Beatty, FPC
R. J. Wilson, GPU

Director, Office of Management and Program Analysis

Mr. T. M. Novak, U. S. Nuclear Regulatory Commission

Mr. Bill Lavallee, Nuclear Safety Analysis Center

8108130043

PDR/LPDR

Duke Power Company

Oconee Nuclear Station

Unit 1

Report Number: RO-269/81-11, Supplement 1

Report Date: August 5, 1981

Occurrence Date: July 15, 1981

Facility: Oconee Nuclear Station, Seneca, South Carolina

Identification of Occurrence: Core Barrel Assembly Thermal Shield Bolts Broken

Conditions Prior to Occurrence: Defueled

Supplementary Information:

Additional information has been developed since the July 24, 1981, report which may be useful to the Nuclear Regulatory Commission, specifically in regard to the unaccounted for loose parts (listed on page 2 of the previous report) and the information available to date from laboratory examinations of fractured bolt samples.

With regard to the loose parts, except for one thermal shield bolt head, all thermal shield attachment bolt parts previously identified as missing have been located. The guide block and its attachments are still missing. Due to the completeness of the search to date and due to the size of the block, it is believed not to have been in place when the internals were last installed in 1976. The following table summarizes the current status of components missing, located, and retrieved:

	Initially Missing	Located	Retrieved	Still Missing (8/5/81)
Guide Block	1	0	0	1
Guide Block Dowel	1	0	0	1
Guide Block Bolt	1	0	0	1
Guide Block Bolt Washer	1	0	0	1
Thermal Shield Bolt Heads	5	4	2	1
Thermal Shield Bolt Shanks	4	4	3	0
Thermal Shield Locking Clips	3	3	0	0

The three bolt shanks and two bolt heads retrieved were sent to the Lynchburg Research Center (LRC) of Babcock & Wilcox for examination. One bolt shank and one locking clip were located with remote video equipment in the flow distributor; one bolt head, tentatively identified as one of the missing thermal shield bolt heads, was located near the West upender in the Spent Fuel Pool, and two locking clips were located during the examination of discharged fuel in the Spent Fuel Pool. Efforts are in progress to retrieve these parts.

With regard to the examinations conducted by LRC, the results of the examinations are summarized in the following paragraphs.

A Scanning Electron Microscope (SEM) examination was performed on the best fracture surface, following routing macrophotography work and dimensional and material hardness checks. Metallographic studies were also conducted.

The fracture surface covering most of the bolt cross section was found to be intergranular with grain boundary corrosion attack and branch cracking evident. A smaller central region was found to be transgranular with some fatigue evident. No evidence of shear lips or ductile tearing associated with overload was found. The failure mechanism identified from this examination was determined to be a corrosion fatigue mechanism with low stress levels involved.

Due to the nature of these findings, a review has been initiated in regard to other A-286 (SA 453 GR 660) bolt applications in the reactor internals. Bolts of different size but similar material are used in the Core Barrel to Core Support Shield, Core Barrel to Lower Grid, Upper Thermal Shield Restraint Blocks, and Flow Distributor to Lower Grid Joints. These joints have been carefully scanned with remote video equipment. The joints appear to be tight and no abnormal conditions have been observed. As a precautionary measure, plans are being made to remove one or more bolts from these joints for detailed examination.

While these joints appear to be in the as-installed condition, a review is currently in process to assess the potential consequences of bolt failure. The results of this review will be submitted to the NRC Staff upon completion. The Oconee FSAR, Section 3.2.4, discusses the mechanical design of the reactor internals. As stated there, in the unlikely event that a flange, circumferential weld, or bolted joint might fail, core support lugs welded to the inside of the reactor vessel will limit core drop to ½ inch or less. A ½ inch core drop will not allow the lower end of the CRA rods to disengage from their respective fuel assembly guide tubes, even if the CRAs are in the full-out position. In this rod position, approximately 6½ inches of rod length remain in the fuel assembly guide tubes. A core drop of ½ inch will not result in a significant reactivity change. The core cannot rotate and bind the drive lines, because rotation of the core support assembly is prevented by the guide lugs.

As indicated in the July 24, 1981 initial report, sensitivity checks on the Loose Parts Monitoring Systems (LPMS) on Oconee Units 2 and 3 have been completed and they have been recalibrated. The operators have been provided additional guidance regarding the importance of the LPMS.

Additional supplemental reports will be provided to advise the status of completion of the corrective actions, and of any new developments that may occur.

Schwenk

Babcock & Wilcox
a McDermott company

Nuclear Power Generation Division
3315 Old Forest Road
P.O. Box 1260
Lynchburg, Virginia 24505
(804) 384-5111

August 11, 1981

Mr. Victor Stello, Director
Office of Inspection and Enforcement
United States Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Broken Thermal Shield Bolts at Oconee Unit I

Dear Mr. Stello:

The Region II OIE is aware of recent reactor internals bolt problems observed during the Oconee Unit I ten year inspection. These problems were documented in reports to OIE dated July 24, 1981, and August 5, 1981.

The purpose of this letter is to advise OIE headquarters of this matter and to provide some additional information regarding the potential applicability to other operating plants. In addition to these written communications, NRR has been informed through the B&W Regulatory Response Group and Messrs. Herdt, Economos, and Fair of the OIE were briefed on August 6, 1981, at B&W's Lynchburg Research Center.

Description of Observations and Inspections

During the visual examination of the Oconee I reactor vessel internal components on July 15, 1981, unexpected conditions were observed. The following table summarizes the results of the initial visual examination:

1. Four of 96 bolts connecting the thermal shield to the lower grid flow distributor flange were missing.
2. Approximately 80 percent of the remaining thermal shield bolts were backed out from 0.1 to 0.5 inches.
3. Three bolt locking cups were missing.
4. One locking cup was partially attached.
5. One guide block on the Y-axis was missing.

The above results are shown on Attachment 1. Attachment 2 is a photograph of the lower portion of the internals.

8109030210 / PDR/LPDR

The following discussions of pertinent portions of the internals are provided for background. Attachment 3 provides a cross-section view of the 177 FA reactor internals.

The thermal shield is a 2-inch-thick cylinder surrounding the core barrel; it extends the length of the core region. Its function is to provide additional shielding against gamma and neutron flux effects on the reactor vessel wall in the core region to reduce gamma heating in the reactor vessel wall and radiation effects on the vessel materials. The bottom support is shown in Attachment 4. The ID of the thermal shield is machined to clear the bottom flange of the core barrel and to engage the lower grid with a diametral interference fit. Ninety-six 1-inch-diameter, high-strength bolts secure the bottom end of the thermal shield to the lower grid plate. (The four missing bolts were from this location.)

The thermal shield's upper support (shown in Attachment 5) consists of a Stellite clamp and shim pad that are contoured to the thermal shield and core barrel curvature. Twenty of these assemblies are placed at equal intervals around the top end of the thermal shield and secured to the core barrel by high-strength bolts (three in each assembly). The design restrains the thermal shield radially both inward and outward, and allows axial motion to accommodate longitudinal differential thermal growth between the core barrel and the thermal shield.

Attached to the exterior of the lower internals are 12 pairs of lateral restraint guide blocks. Each half of the blocks is about 3" x 6.5" x 5" and weighs about 18 lbs. Each pair of blocks straddles one of the 12 core support lugs. One of these 24 guide blocks was observed to be missing.

A visual examination of the core internals and the reactor vessel was conducted. The examination was designed to carefully inspect important areas of the reactor vessel internals and the inside of the vessel, and to locate the missing parts.

The following table summarizes the current status of components missing and those retrieved at the bottom of the reactor vessel:

	Weight (lbs)	Dimensions	Initially Missing	Located
Guide Block	18.0	3" x 6.5" x 5"	1	0
Guide Block Dowel	2.3	4.5", 1.5"D	1	0
Guide Block Bolt	0.902	4.1", 1.7"D, 10D	1	0*
Guide Block Bolt Washer	0.085	2" OD, 1.0 ID	1	0
Thermal Shield Bolt Heads	0.582	1.375", 1.75"D	5	4
Thermal Shield Bolt Shanks	0.669	5.125 1.0D	4	4
Thermal Shield Locking Clips	0.124	1.0" x 2.5" x 1.75"	3	3

*Observed broken end in attachment hole.

As shown above except for one thermal shield bolt head, all thermal shield attachment bolt parts have been located. The guide block and its attachments are still missing. Due to the completeness of the search to date and due to the size of the block, it is believed not to have been in place when the internals were last installed in 1976.

The visual examination has revealed no other significant abnormal conditions. The following table summarizes the inspection results:

Thermal shield to lower grid joint	No distress of metal
Upper thermal shield restraint	Locking clips intact; no visual evidence of wear
Core guide blocks	Welds intact; indication of guide block and lug contact
Flow distributor, outside	No indication of impact damage
Incore instrument guide tubes	No indication of impact damage
RV guide lugs	Some indication of contact
Core barrel to core support shield joint	No indication of joint degradation
Core barrel to lower grid joint	No indication of joint degradation
Flow distributor to lower grid joint	No indication of joint degradation

Laboratory Examinations

As part of the investigation of the thermal shield bolt failure mechanism, three bolt shanks and two bolt heads were shipped to the Lynchburg Research Center of Babcock & Wilcox for examination.

The results of these examinations to date are summarized as follows:

Of the five fracture surfaces, two were damaged from impacting to such an extent that examination was precluded. The remaining three fracture surfaces (two bolt shanks and one bolt head) were examined and found to contain similar fracture features. A Scanning Electron Microscope (SEM) examination was performed on the best fracture surface, following routine macrophotography work and dimensional and material hardness checks. Metallographic studies were also conducted on a second bolt shank, fracture surface.

The fracture surface covering most of the bolt cross-section was found to be intergranular with grain boundary corrosion attack and branch cracking evident. A smaller central region was found to be transgranular with some fatigue evident. No evidence of shear lips or ductile tearing associated with overload was found. The failure mechanism identified from this examination was determined to be a corrosion fatigue mechanism with low stress levels involved.

Analysis of Occurrence

An evaluation has been made of the safety implications of the observed conditions. This safety evaluation considered the following:

1. Structural implications of the thermal shield bolt failures
2. Structural implications of the guide block failures.
3. Loose part implications, i.e., damage to the fuel, interference with CRD motion and damage to other RCS components due to loose parts.

Due to the function served by the thermal shield and the manner in which it is structurally considered in the accident analyses, the observed conditions are not believed to have significant public health and safety implication.

Each of the above three types of safety implications is discussed in detail below.

A. Thermal Shield Bolts

The thermal shield is not a principal load carrying member of the reactor internals; i.e., its function is to reduce radiation effects on the reactor vessel. In spite of this function, however, several consequences of joint degradation were considered at the upper and lower end of the thermal shield. If the upper restraint becomes loose, the thermal shield response due to fluid loadings will change with the most likely consequence being a reduction in natural frequency of the shield. This could lead to an increase in the cyclic stresses of the lower end attachment bolts. As looseness at the upper restraint develops, any significant metal-to-metal impact would be most likely detected by the loose parts monitoring system (LPMS). Detection becomes increasingly probable at higher frequencies. Should the lower attachment bolts fail, the shrink fit between the lower grid flange and the thermal shield could then loosen and vertical motion would be possible. In the upward direction, motion would be limited by the core barrel flange and stop. In the downward direction, motion is limited since the thermal shield rests on the lower grid flange. Therefore, vertical motion is constrained in both directions but should signficiant vertical motion occur, metal-to-metal impact would also occur and the LPMS would indicate the condition before serious damage would occur. Before vertical motion and associated impacting could occur, numerous loose parts (i.e., bolts, locking cups, etc.) would also exist in the system and again the probability of detection by the LPMS is high.

Although not considered credible, the extreme condition considered was complete failure of the lower grid flange to which the thermal shield is attached. Even under this extreme condition, the core support assembly would remain intact but the thermal shield could conceivably [illegible] a short distance and then be restrained by the twelve core support lugs. These core support lugs are designed to accommodate the design weight of the core and thermal shield, which together, are 13 times the weight of the thermal shield alone. The failure of the lower grid flange is considered to be an extremely remote possibility but nevertheless one in which core cooling would be unaffected.

In summary, evaluation of failure consequences considerably more severe than those observed are not considered to represent a significant risk to public health and safety because of the purpose served by the thermal shield and the lack of adverse effect on core cooling.

B. Guide Blocks

The guide blocks are attached to the lower RV internals and in the original design they were to provide laterial (side) restraint for seismic loadings. During recent analyses, however, including the analysis of the effects of LOCA-induced asymmetric forces, no restraint was assumed at the bottom of the core support assembly and all stresses were found to be within ASME code allowables. Therefore, the guide blocks are not essential to assuring the intergrity of the reactor internals under accident loads. Furthermore, it appears that the guide block failure is independent of the thermal shield bolt failures and would seem to be an isolated event based on the normal appearance of the dowel pins and attachment bolts in the other 23 guide blocks. The single guide block failure appears to be an isolated event but even if this were not the case, additional failures would not have significant safety consequences aside from the loose parts implications which are addressed below.

C. Loose Parts

The size of the loose parts which have resulted from these failures vary widely - from the locking clip or a fraction thereof to the guide block. Any loose parts in the lower head - lower internals region of the reactor vessel which are larger than the flow passages in the fuel assembly end fittings would be precluded from passing through the core or entering the reaminder of the reactor coolant system. Pieces which are small enough to pass through the fuel assemblies and into the reactor coolant system are not large enough to seriously degrade the RCS pressure boundary with the possible exception of the steam generator tubing or tube to tubesheet joint. Impacts on the generator upper tubesheet from an object as small as 1.3 oz. have been detected by the Loose Parts Monitoring System. Even if not detected, however, the most significant consequences would be primary to secondary leakage which is detectable and would not interfere with an orderly shutdown.

In no case is it anticipated that fuel damage would occur due to either mechanical effects or flow blockage. This is because pieces which are small enough to pass through the fuel assembly end fitting would be expected to pass on through the core, and out of reactor vessel. Should a small piece lodge in a fuel assembly grid spacer, the effect would be quite localized and could conceivably cause localized fuel damage. Any fuel damage great enough to breach the cladding would be readily detected.

The remote possibility also exists that a larger piece could cause some flow blockage in the lower grid area but because the lower end of the active core operates at reduced heat rates, no fuel damage would be anticipated.

The possible effects of loose parts were considered in connection with interference between control rod pins and guide tubes. This is not considered likely because of the small diameter (1/8") coolant entry at the lower end of each guide tube. This would require not only a very small piece but also a precise flow direction to enter the guide tube. Furthermore, the velocity in the guide tube, immediately past the entrance decreases significantly so that a metallic object is not likely to be supported by the vertical fluid stream. However, although control pin interference is considered very improbable, if it were assumed to occur, it would very likely be detected during control rod exercise programs.

This is not considered to be a problem because any pieces small enough to reach the upper plenum area would not be expected to lodge between a control pin and guide tube but rather pass on through the upper plenum.

If a loose part were to reside in the lower plenum of the reactor vessel, damage to the incore guide tubes or incore nozzles could occur if the part were located in a highly turbulent area. These, however, are not pressure boundary parts. Furthermore, repeated impacts from a loose part (approximately a 2 lb. RC pump impeller nut) have been detected in the past by the LPMS. Somewhat smaller parts than the pump impeller nut should also be detectable in this area.

The effects of loose parts in the reactor coolant system do not represent a treat to public safety. Experiences in several operating reactors have proven this to be the case.

Potential Significance of Laboratory Examinations

The thermal shield lower attachment bolts which failed are made of A-286 (A 453 GR 660) material. Due to the laboratory examinations which indicated a corrosion process, a review has been initiated in regard to other A-286 bolt applications in the reactor internals. Bolts of different size but similar material are used in the Core Barrel to Core Support Shield, Core Barrel to Lower Grid, Upper Thermal Shield Restraint Blocks, and Flow Distributor to Lower Grid Joints. As indicated above, these joints have been carefully scanned with remote video equipment and no areas of distress were evident. As a precautionary measure, plans are being made to remove one or more bolts from these joints for detailed examination. Also, archive bolt samples will be given detailed examination and material records for the bolts are being reviewed.

Pending the outcome of these examinations and reviews which are expected to be complete by the end of August, the need for further examination will be determined.

The bolted joint configuration and bolt material specifications are the same for the following B&W 177 fuel assembly reactor internals.

Oconee 1, 2, 3 (next outage - May 1982)
Crystal River-3
Arkansas Nuclear 1 Unit 1
Rancho Seco
Davis Besse*

*The bolted joint configuration is the same for Davis Besse except the core barrel flanges (upper and lower) are 1/2 inch thicker with 1/2 inch longer bolts.

The bolt material for TMI-1 and 2 is Inconel X750 at the above mentioned joints. There are also more (120) thermal shield lower attachment bolts.

Summary

The thermal shield bolt failures observed to date are not a significant safety concern. The cause of these failures appears to be corrosion-fatigue. Additional work is underway to determine the initiating cause. The same material is used in other joints in the reactor internals. While these other joints have more structural significance than the thermal shield to lower grid joint, there is no indication at this time of any degradation of these joints. This information is based on examinations of the Oconee Unit I RV Internals as of August 7, 1981. B&W has issued guidance to the operating plants regarding the importance of proper calibration and operation of the loose parts monitoring system. Similar information has been transmitted to the operating plants regarding neutron noise measurements. While these precautionary steps have been recommended, it is not at all clear that the problem at Oconee Unit I is generic. This is because of the many variables that could contribute to the failures, i.e., bolt lubricants, torquing procedures, materials properties, etc. A plan for the inspection of other bolts and other joints in Oconee Unit I has been developed and is being implemented. The selection of a possible alternate bolting material for the thermal shield bolts is underway.

Pending the outcome of the above investigations, the need for further investigations at Oconee and other plants will be determined. These above investigations should be completed by late August 1981.

Very truly yours,

Henry Bailey
for J. H. Taylor
Manager, Licensing

804-385-51
-2815

JHT/fch

Attachment 1

LOWER THERMAL SHIELD

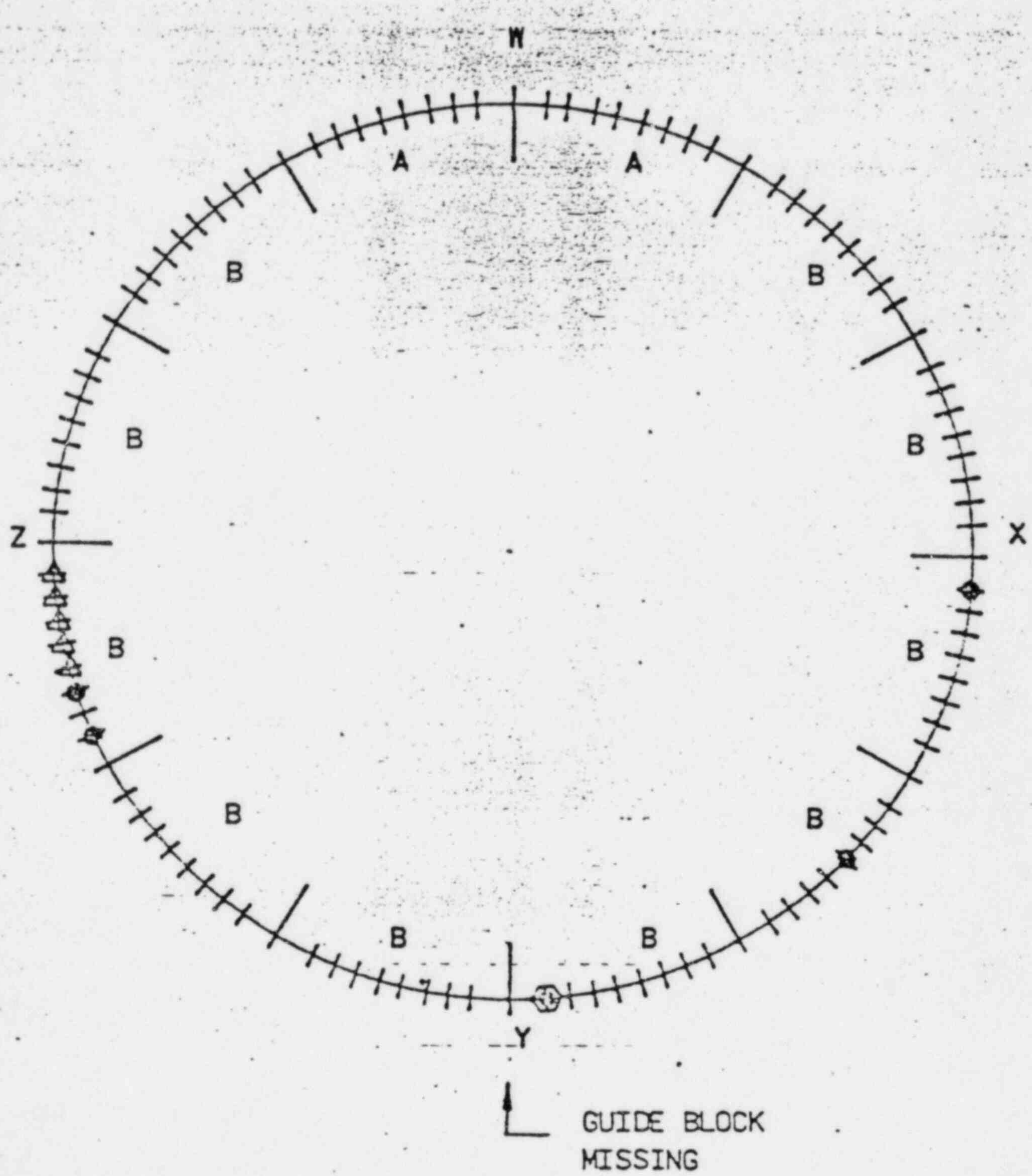
BOLT MISSING

BOLT HEAD MISSING

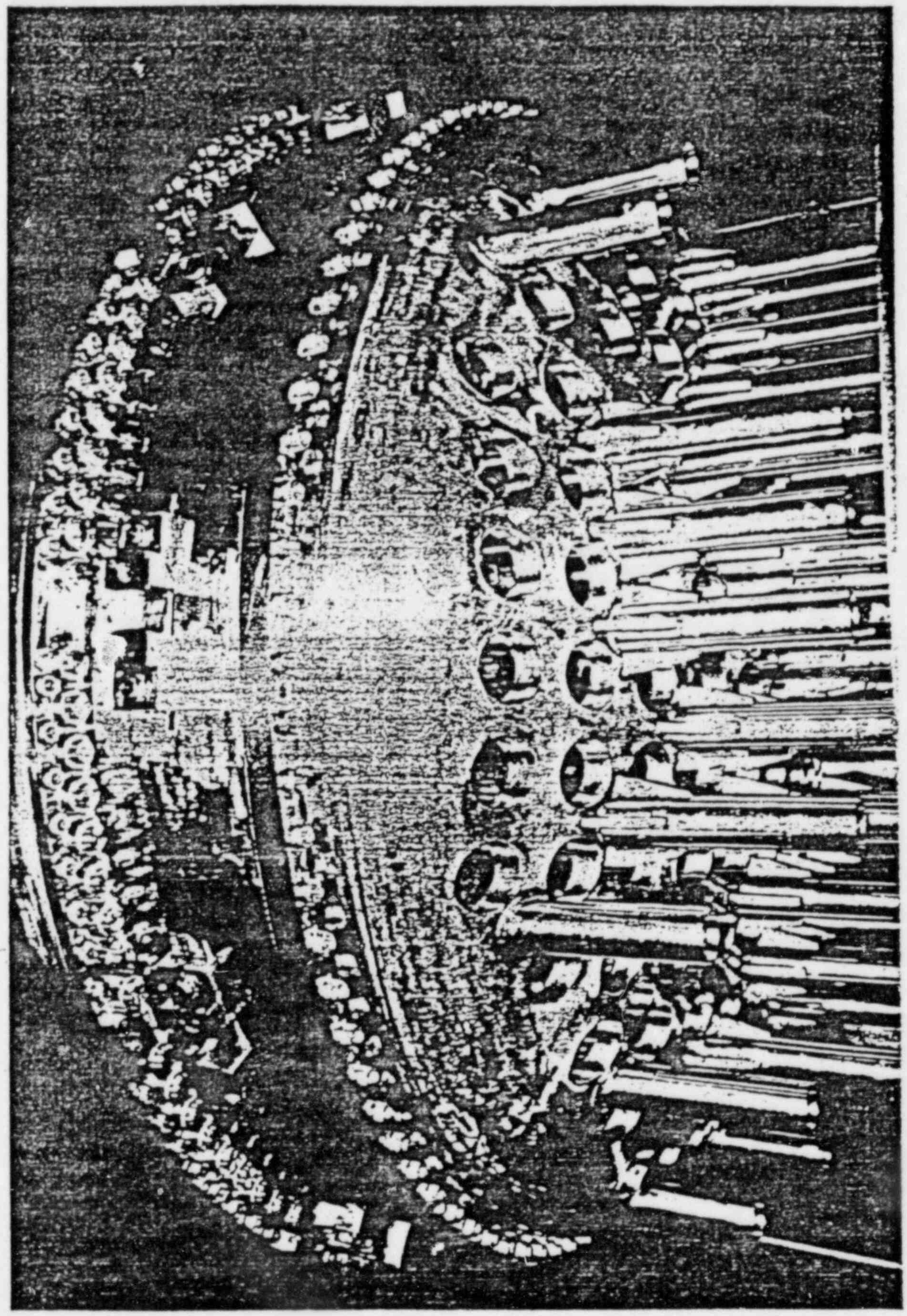
A ALL BOLTS FLUSH

B ALL BOLT HEADS ~ 0.1" TO 0.2 OUT

△ BOLT HEADS 1/4" TO 1/2" OUT

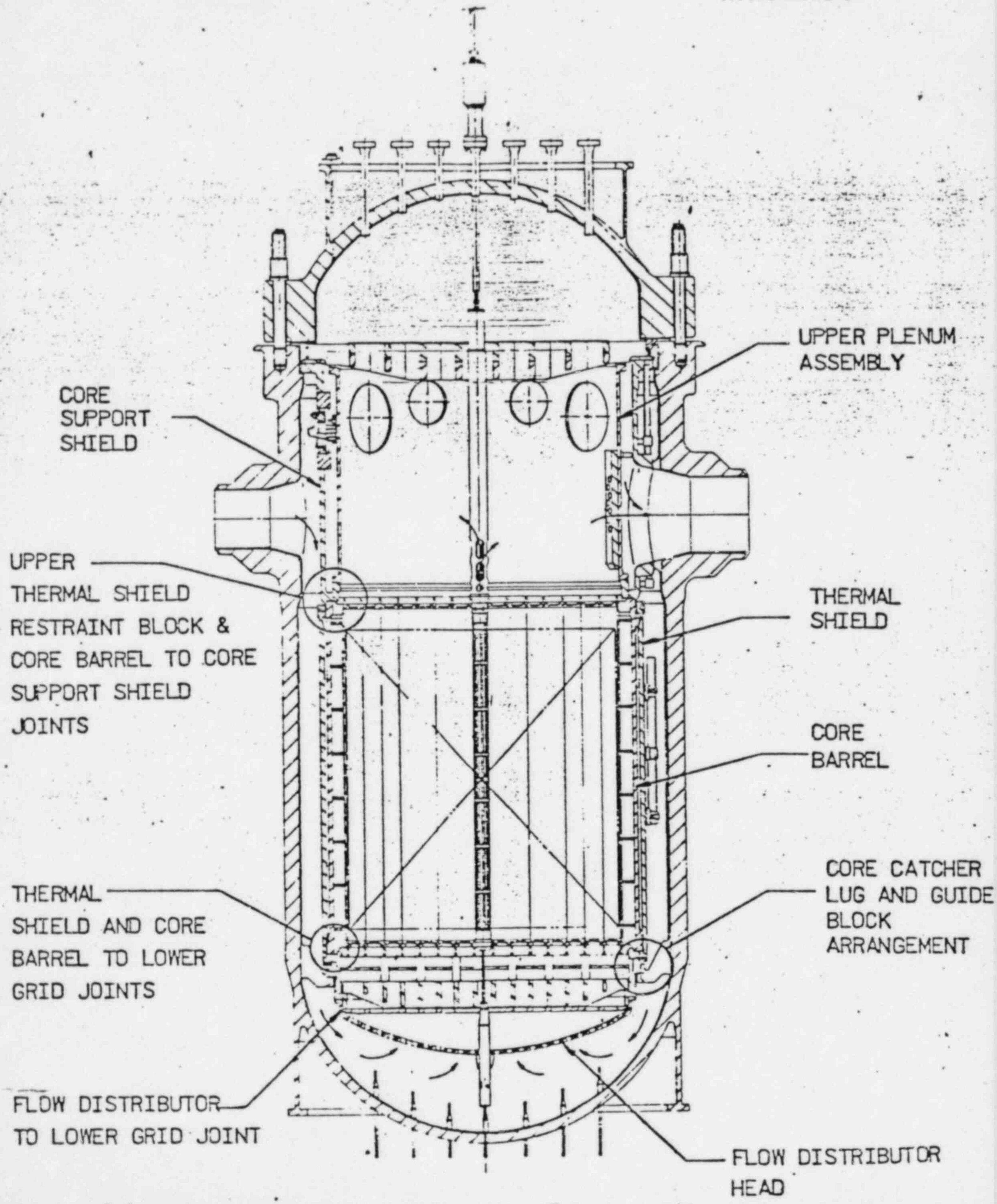


Attachment 2

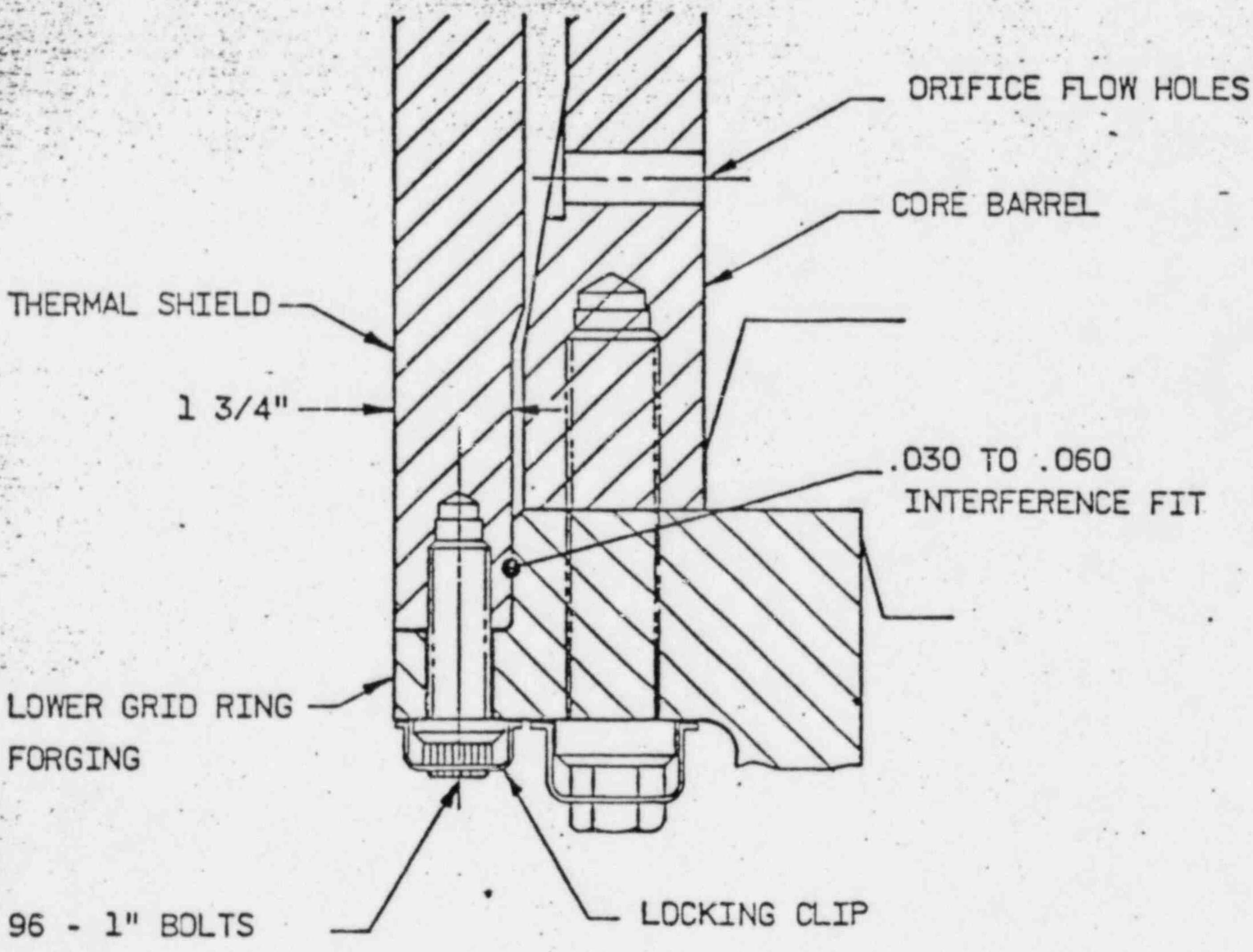


CROSS SECTION OF 177FA REACTOR INTERNALS

Attachment 3

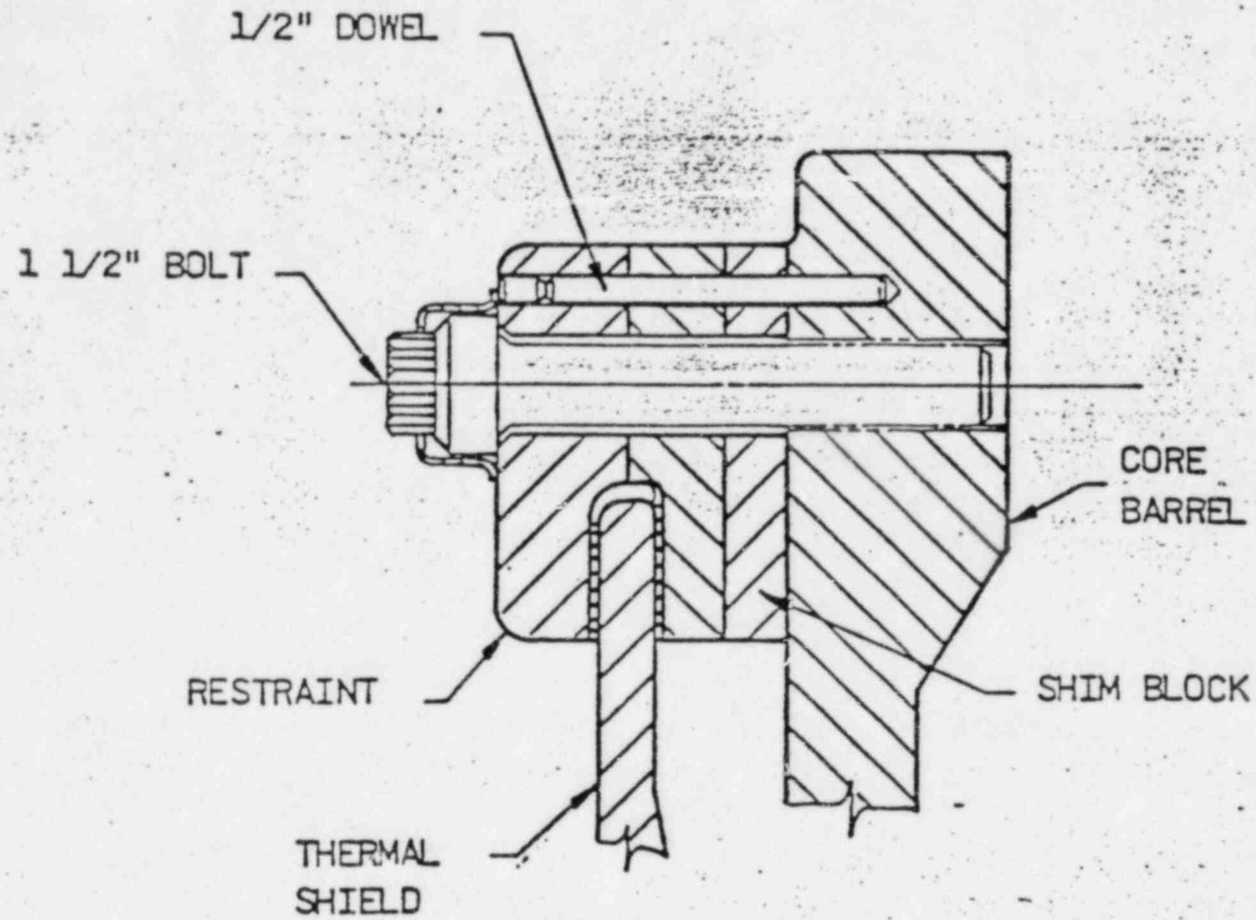


THERMAL SHIELD LOWER SUPPORT



Attachment 5

UPPER THERMAL SHIELD RESTRAINT



~~1) Schwartz~~
[redacted]
3) Collins
4) Marlene - File

September 28, 1981

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE PNO-II-81-52B

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information is as initially received without verification or evaluation, and is basically all that is known by IE staff on this date.

FACILITY:	Duke Power Company Oconee Nuclear Station Units 1, 2, and 3 Docket Nos. 50-269, 270, and 287 Seneca, South Carolina	Licensee Emergency Classification: ____ Notification of Unusual Event ____ Alert ____ Site Area Emergency ____ General Emergency _X_ Not Applicable

SUBJECT: LOOSE PARTS IDENTIFIED IN REACTOR COOLANT SYSTEM

This Preliminary Notification supplements PNO-II-81-52 of July 16, and its supplement 52A of August 7, which described the identification of loose parts in the reactor vessel.

On July 15, while performing an inspection of the reactor vessel internals as part of the 10 year inservice inspection program, the licensee discovered loose parts in the bottom of the Unit 1 vessel and identified them as parts missing from the lower flow distributor plate. Initial licensee and vendor (B&W) reviews attributed the failure to inadequate modifications that were unique to Unit 1. Information provided by the licensee and B&W on September 25, revealed that Units 2 and 3 and other B&W facilities might also be affected in that the bolt failure could be generic. Current indications are that the failure mechanism could be material failure due to fabrication techniques. B&W stated that 600 of the suspect type bolts were released for use in the thermal shield modification.

A meeting between NRC, the licensee, and B&W is scheduled for early October to discuss the issue. The licensee is continuing the investigation.

No media interest has resulted since the press release of July 29. Neither the licensee nor the NRC plans further news releases at this time.

Contact: J. C. Bryant, RII 242-5537; P. J. Kellogg, RII 242-5581

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1981 SEP 29 PM 4 23
REGULATORY

PDR
8111060379

A. Dunnick
IE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 30, 1981

Dockets Nos. 50-269, 50-270
and 50-287

Mr. William O. Parker, Jr.
Vice President - Steam Production
Duke Power Company
P. O. Box 33189
422 South Church Street
Charlotte, North Carolina 28242

Dear Mr. Parker:

The NRR staff has been reviewing the broken thermal shield bolt problem at the Oconee Nuclear Station, Unit 1 and we have determined that additional information is necessary for us to reach a conclusion on an acceptable course of action to resolve this problem. Since we feel an expeditious resolution is necessary, we request that you meet with us in Bethesda, Maryland during the week of October 5, 1981. We have enclosed a list of topics we would like to discuss during our meeting which can serve as an agenda. Because of the possible generic implications of this problem, some of the topics necessarily involve information related to other B&W plants. Our plan is to invite representatives from each operating B&W plant because of what we believe to be generic concerns and because of this view would welcome any recommendations on topics to be added to the meeting agenda.

If you have any questions on the agenda topics and to finalize a meeting date, please contact your NRC Project Manager.

Sincerely,

T. M. Novak

Thomas M. Novak, Assistant Director
for Operating Reactors
Division of Licensing

Enclosure:
Agenda/Discussion Topics

cc w/enclosure:
See next page

Dupe of ~~8110190063~~

Duke Power Company

cc w/enclosure(s):

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Charlotte, North Carolina 28242

Oconee County Library
501 West Southbroad Street
Walhalla, South Carolina 29691

Honorable James M. Phinney
County Supervisor of Oconee County
Walhalla, South Carolina 29621

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EPA Region IV
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Enclosure

AGENDA/DISCUSSION TOPICS FOR MEETING ON BROKEN THERMAL SHIELD BOLTS ON OCONEE UNIT 1

1. Describe the differences between the modifications made to the Oconee 1 thermal shield and other Oconee units including such items as bolting material and fabrication, modification procedures (shop or field), installation and preloading procedures.

2. Provide the details of the bolt failure investigation available to date (metallography, etc.), describe the failure mode and describe the condition of the other bolts.

3. Describe the differences in hydraulic loads between the inside and outside surfaces of the thermal shield.

4. Describe the Loose Parts Monitoring System at Oconee 1 and explain why it was ineffective in detecting these broken bolts and its sensitivity to thermal shield vibrations (i.e., is it sensitive such to preclude damage).

5. Provide additional discussion regarding the missing guide block, dowel, bolt and washer investigation.

6. Describe any planned inspection of Oconee 2 including sample size, inspection procedures and resolution for TV inspections.